Svenska BergsmannaFöreningen

SOMMARBLADET • Årgång LXXIX 2022

Sefströmsmedaljen går till
Malin Selleby,
Professor i
Termodynamisk Modellering
på KTH
Foto: Mats Gartz

www.bergsmannaforeningen.se

Här hittar Du intressant och värdefull information. Vi anordnar under normala omständigheter studiebesök, föredrag, företagspresentationer och kulturaktiviteter under kamratliga former i fem kretsar: Polar, Öst, Bergslagen, Väst och Syd.
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Internt organ för Svenska Bergsmannaföreningen • c/o Föreningshuset, Virkesvägen 26, 120 30 Stockholm.
Tel 08-121 513 26 • kansli@bergsmannaforeningen.se • www.bergsmannaforeningen.se
Redaktör: Elisabeth Torsner, elisabeth@torgesta.com. Tel. 073-650 90 28

Redigering och layout: Ida Hane Sahlin.

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Robert Eriksson

Kära medlemmar i SBF!

Välkomna till ett välfyllt Sommarblad. Vår redaktör Elisabeth Torsner har lagt ned ett enastående arbete med både egna texter och att få in bidrag från andra skribenter. Temat för detta nummer är den teknikomvandling som järn- och stålindustrin för närvarande genomgår. Vi kommer att få ta del av uppföljningar av ett par projekt som vi rapporterat om tidigare i olika former samt stifta ett par helt nya bekantskaper. Vi kommer dessutom att få ta del av berättelser från avlägsna platser som Grönland och Klondike och det lite mindre avlägsna Söderfors.

Detta är första gången som jag skriver till er medlemmar i egenskap av ordförande Svenska Bergsmannaföreningen. Jag kan konstatera att vi så här i slutet av juni upplevt (genomlevt) ett par väldigt varma dagar men att vi i skrivandets stund återfått en, i mitt tycke, mer behaglig temperatur. Sedan årsmötet i slutet av mars har vi arrangerat ett par digitala bergsmansaftnar med spännande föredrag om ”de gröna elementen”, arbetet med att ställa om metallurgin i Oxelösund, Bergsskolan i Filipstad och Gränges första 125 år. Missade ni något av dessa föredrag så kan jag rekommendera er att titta på dem i efterhand. Inspelningarna hittar ni i Arkivet på föreningens webbplats.

Vi planerar att fortsätta med de digitala föredragen som visat sig vara ett framgångsrikt koncept för att under trevliga och informativa former föra samman föreningens medlemmar som är spridda över hela landet. Vid sidan av de digitala evenemangen planerar vi att under hösten genomföra två fysiska aktiviteter i Stockholm. Den 7 oktober kommer vi att arrangera Jernkontorsafton med middag. Före middagen kommer vi att få ta del av ett föredrag från årets mottagare av Sefstömsmedaljen, professor Malin Selleby. Malin kommer i sitt föredrag att berätta om sitt mångåriga arbete med termodynamiska databaser. Höstens andra fysiska evenemang kommer att bli det traditionsenliga operabesöket med efterföljande middag på Jernkontoret. Operabesöket äger rum lördagen den 26 november. Denna gång kommer vi få uppleva Mozarts Trollflöjten.

I närtid kommer vi att arrangera en Bergswaganza den 27 augusti med en utflykt till Engelsbergs bruk och helgen därefter spelas årets upplaga av Bergsmannagolfen på Strand Golf strax utanför Eskilstuna lördagen den 3 september.

Jag hoppas att vi får möjlighet att träffas i samband med föreningens kommande evenemang, både i den fysiska och digitala världen.

Med önskan om
en avkopplande sommar och trevlig läsning!
Er ordförande,
Robert Eriksson

SBF Svenska BergsmannaFöreningen
SOMMARBLADET • Årgång LXXIX 2022

Elisabeth Torsner

Redaktörens ord

Här är Sommarnumret 2022! Njut av det! Det är mycket som rör sig i branschen just nu. Ny fossilfri teknik, nya företag både inom gruv och inom metall. Det finns de som kämpar med tillståndsmyndigheterna och de som har klar medskjuts.

Däremot verkar de flesta aktörer ha goda ekonomiska uppbackare, framför allt om de planerar verksamhet i Norrbotten. Man anar en lång, lång tids påverkan på politiska beslutsfattare. Samt tillgång till elenergi.

Det blir kanske värre för företag i Skåne, utanför Gränna eller det allra senaste, en zink-fyndighet utanför Sala. Det kanske kommer att störa turistnäringen på orten. Och vilket ger bäst avkastning? På lång sikt är det säkert en rejäl gruva, men på kort sikt?

I det här numret får vi stifta bekantskap med en ny författare - Mats Heimersson. Han skriver på engelska, efter att ha verkat utomlands hela sin karriär. Redan för 30 år sedan i vår sammanställning 1994 av alla bergsingenjörer som någonsin hade examinerats bodde han i Vancouver, BC, Canada.

NJUT!!

ELISABETH TORSNER

Editor´s note

Enjoy the 2022 Summer Issue!
Our business is changing! Fossil-free technology, new mining companies, new steelmakers. There are those fighting the environmental authorities and those who seem to easily sail along.

Apparently, most actors have good economic support, in particular those planning activities in North Bothnia. Longtime, persistent pressure on political decision-makers may be spotted. And electrical energy assets.

For companies in southern Sweden; Skåne, Gränna or the brand new zinc-finding outside Sala things may be worse. It may disturb the tourist industry. Which activity will pay best? In the long run it most certainly is a mine, but for now?

A new author is presented - Mats Heimersson. He writes in English after living abroad almost since his exam. 30 years ago our full catalogue of all mining and metallurgical engineers noted his address as Vancouver, BC, Canada. And he is still there.

ENJOY!!

ELISABETH TORSNER

Hur man tillverkar fossilfritt stål

Det är inte alla som slänger sig med uttrycket "fossilfritt" som riktigt vet vad det är.

Under tusen år eller mer har vi i Sverige producerat järn med hjälp av blästerhyttor alternativt masugnar. Järnmalm förekommer naturligt i två olika former av järnoxid, Fe_2O_3 och Fe_3O_4. Våra vanligaste hjälpmedel att framställa stål har varit hög temperatur i kombination med kol-tillsats, förr som träkol, numera som koks av stenkol. Kol har tillsatts av två skäl, dels för att ta hand om syret i järnmalmen i en kemisk reaktion som tillverkar CO_2 , dels för att höja temperaturen ytterligare så att allt verkligen smälter och blandas väl. Utsläppen av CO_2 har blivit en stor bidragande orsak till världens temperaturhöjning. Därför tittar man nu på andra sätt att smälta järn och stål.

Allra först - Vad är fossilfritt järn?

Det är järn som tagits fram med en fossilfri metod, dvs utan hjälp av CO_2 ,naturgas eller olja.

Hur tillverkar man fossilfritt järn?

Hur blir man av med syret i järnmalmen? Flera har fastnat för DRI eller direkt-reducerat järn. Metoden som sådan är ca 100 år gammal och utgår från finmalen malm som exponeras för naturgas eller kol.

Den nya metoden är baserad på vätgas istället för naturgas eller kol. Man delar vatten i sina beståndsdelar väte och syre. Det går åt mycket stora mängder elenergi bara för att producera den vätgas som behövs. Alltså blir kostnaden hög. Finmald järnmalm exponeras sedan för vätgasen, som tar upp syret i malmen och bildar H_2O, dvs vattenånga som kan kylas och återföras till processen. Den nödvändiga temperaturen är kanske 900°C. Produkten blir porös järnsvamp. På sista tiden har fler och fler företag börjat investera i vätgasprocesser. LKAB + SSAB + Vattenfall bygger just nu en s.k. electrolyzer i Gällivare på 500 MW, H2 Green Steel en electrolyzer i Boden på 800 MW och GreenIron en minivariant. H2 Green Steel planerar dessutom en electrolyzer på 1000 MW i Spanien.

Vad är fossilfritt stål?

Utgående från fossilfritt järn kan man göra stål. Då måste man tillsätta kol för att nå upp till de kolhalter som normalt krävs för att uppnå dagens standardiserade hållfastheter. Det betyder att järnet måste finnas i smält form, kol och legeringsämnen tillsättas och omrörning ske. I de flesta fall kan detta ske i en ljusbågsugn.

Vad göra med den syrgas som blir över?

Bara släppa ut i atmosfären? Ovako t.ex. tänker använda syrgasen som bränsle i sin värmebehandling.

Och om man inte har tillgång till fossilfri elenergi?

- Hur gör man då? Det pågår ett stort antal projekt för att få ned mängden CO_2 som vi kanske kan beskriva i ett senare nummer.

ELISABETH TORSNER

Fossilfri dumper. Foto: Volvo

HYBRIT -Demonstrationsanläggning i Malmberget och ombyggnad av Oxelösund

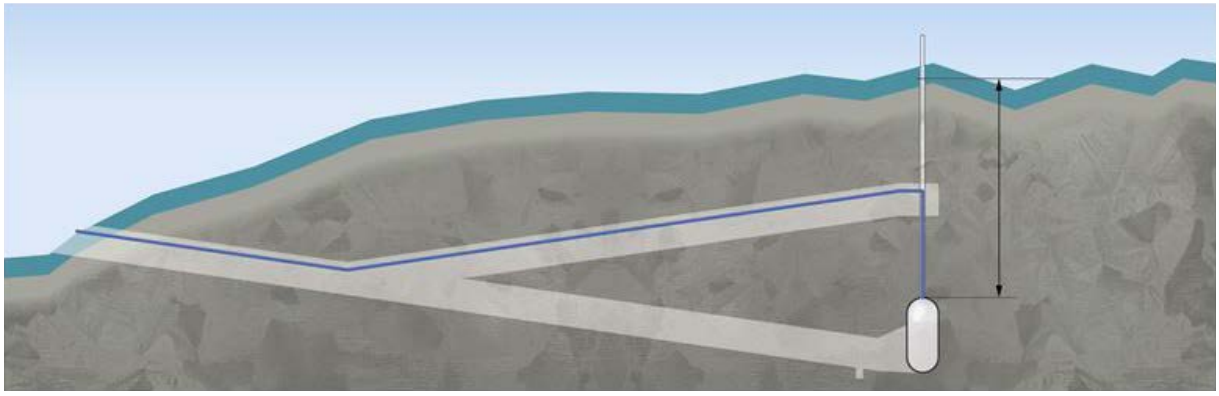
När man utvecklar en ny process säger expertisen att man måste passera tre steg - Pilotanläggning - Demonstrationsanläggning - Fullstor industriell skala. Risken är annars att man kan råka ut för oförutsedda problem när man ökar volymen på processkärlen eller själva den kemiska reaktionen. Hybrit har redan uppnått steg 1 - Pilotanläggningen i Luleå är i drift sedan juni 2021. De järnpulverkulor Luleå har producerat har bl.a. gått till en ljusbågsugn hos Ovako, som gjort stål, göten har valsat till plåt hos SSAB Oxelösund och levererats till kund i augusti 2021. Volvo har byggt (minst) en dumper av det.

Steg 2 - Demonstrations anläggningen på 1,35 miljoner ton/år byggs just nu i Malmberget. Den planeras vara i drift 2026. Processen bygger på en electrolyzer på 500 MW. Den kommer att ligga nära den nuvarande pelletsanläggningen. Demonstrationsanläggningen kommer att producera färdigt järnpulver, **inte** järnmalmspellets. Samtidigt byggs SSABs stålverk i Oxelösund om från masugnsdrift till ljusbågsugn, allt medan driften pågår. Man behåller chargevikten 170 ton. Jacob Sandberg föreläste om detta enorma stålverksprojekt den 27 april, det går fortfarande att ladda ned från vår website.

Ett delprojekt är ny och kraftigare strömförsörjning till Oxelösund. Det var ett misstag i det projektet som stängde av elförsörjningen till Nyköping och Oxelösund under två dagar i våras.

SSAB har två amerikanska stålverk med ljusbågsugnar och hämtar processkunnande därifrån med hjälp av utbytesingenjörer.

Steg 3 - Inte lika klarlagt som steg 1 och 2. Men Luleå och Rukki kommer att övergå till ljusbågsugns-drift ungefär år 2028-30. Och någonstans måste en större electrolyzer installeras dessförinnan.



HYBRIT - Bergrumslager för fossilfri vätgas invigt i Luleå

SSAB, LKAB och Vattenfall invigde i juni en pilotanläggning för lagring av fossilfri vätgas 30 m under mark i Svartöberget i Luleå.

Vätgaslagret är en viktig pus selbit i säkerställandet av en stabil stålproduktion och en milstolpe i utvecklingen av HYBRIT, säger Martin Pei, CTO på SSAB. Vid full produktion kan det finnas behov av att försörja en fullstor fabrik för järnsvamp i tre till fyra dagar.

Tekniken för lagring av gas i ett inklätt bergrum är väl beprövad och har använts för naturgas under 20 års tid i södra Sverige. Det man vill testa är hur storskalig vätgaslagring fungerar.

Vad som inte framgått av tidigare uttalanden om bergrumslagret är att vätgasen skall lagras i en container, som både kan tömmas och fyllas på i takt med produktionen.

Foto: Hybrit

H2 Green Steel, preview of Boden facilities.

H2 Green Steel i Boden får byggnadstillstånd

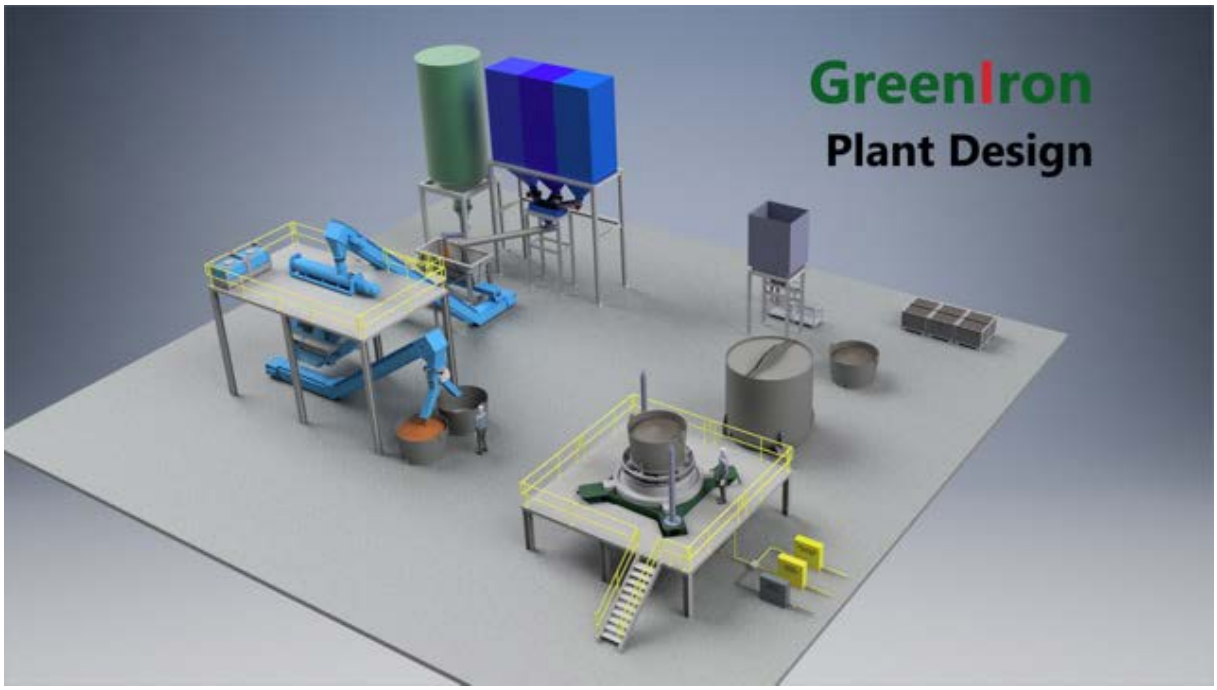
Den 1 juli 2022 kom Mark-och Miljödomstolens beslut att tillåta markarbetena i Boden att starta. Detta kommer att ske redan i sommar.

Huvudförhandlingen om villkor för bolagets kommande verksamhet planeras i nuläget äga rum under hösten 2022. Och det är först därefter som någon byggnadsverksamhet av 800 MW electrolysizer och stålverket kan påbörjas. Men bolaget är fortsatt optimistiskt och planerar första produktionen redan 2024. Hälften av den initiala kapaciteten är redan såld, över 1,5 miljon ton.

I juni 2022 skrev bolaget kontrakt med Statkraft om kraftleveranser om 2 TWh per år eller 2 miljoner MWh per år i 7 år. Statkraft är Norges motsvarighet till Vattenfall.

I december 2021 kom nyheten att ytterligare en vätgasenhet skall byggas i samarbete med spanska Iberdrola, ett vindkraftföretag, som kommer att leverera 1000 MW till electrolyzer. Alltså 25% större än Boden. H2 Green Steel står för stålkunnande och kunder. Man söker nu en lämplig placeringsort på Iberiska halvön.

ELISABETH TORSNER



Green-/Iron - Nygammal teknik inriktad på glödskal och annat

Green-/Iron har under våren 2022 attraherat ett stort intresse.
GreenIrons process är faktiskt mer än 50 år gammal, men då i slutet av 60-talet var intresset för miljö och CO_2 -reducerad produktion svagt. Idag, då masugnsprocessen i Sverige faktiskt har ett slutdatum, har intesset vaknat upp.

Klipp från stränggjutning och valsning och svarvspån kan chargeras tillbaka till en ljusbågsugn, men vad skall man göra av allt glödskal, filterstoff och alla andra oxiderade biprodukter som bildas under tillverkningens gång om det inte finns en masugn att ta hand om dem?
Green-/Iron menar att de har ett alternativ!

Jämfört med HYBRIT och H2 Green Steel ”är det inte konstigt att det inte blir lika mycket uppmärksamhet kring en 2,5 m stor ugn som skulle få plats i ett vardagsrum med generös takhöjd och som kostar mindre än en liten lägenhet i centrala Stockholm. Men det nystartade lilla företaget har lyckats locka några av näringslivets mest kända namn.” Citerat ur SvD den 7 febr av Mikael Törwall.

Processen utvecklades under en 3-årsperiod på 60-talet, åtföljt av en produktionsperiod på 6 månader 1971 i en klockugn vid stålverket i Hofors, men att marknaden inte var färdig.

De 28 juni rapporterar Green-/Iron om ett lyckat försök i Jönköping Universitets gjuteriugnar. Vi räknar med att ha vår första ugn i kommersiell drift om 20 månader. Den första leveransen av fossilfritt järn skall ske i augusti 2023. Och inom 7 år skall vi ha minst 300 ugnar i drift säger CEO Edward Murray.

ELISABETH TORSNER

Andra artiklar

Malin Sellby tar emot den fina medaljen av Bergsmannaföreningens ordförande Peter Samuelsson. Foto: Mats Gartz.

Sefströmsmedaljen tilldelas Malin Selleby

Högre teknisk utbildning tog sin början i Sverige 1819 då Fahlu Bergsskola grundades genom ett kungligt brev. Initiativtagare och förste ledare var Nils Gabriel Sefström, vilken har blivit förebilden i Svenska Bergsmannaföreningens förtjänstmedalj. Denna har sedan 1987 utdelats vart femte år till person, som i Sverige utfört förtjänstfulla insatser inom bergshanteringen av annat slag än administrativ eller företagsekonomisk gärning.

Svenska Bergsmannaföreningen har beslutat att tilldela Malin Selleby 2022 års Sefströms-medalj för sitt förtjänstfulla arbete inom svensk och internationell bergshantering. Hon är den åttonde mottagaren av medaljen.

Motivering

Malin Selleby har i sin gärning som forskare och lärare lämnat avgörande bidrag för att höja kunskapsnivån gällande termodynamisk modellering i Sverige.

Malin Selleby har en grundexamen i materialteknik från Kungliga Tekniska Högskolan från 1986. Därefter har hon varit verksam som forskare vid KTH, där hon 2008 blev utsedd till universitetslektor och 2012 till professor i termodynamisk modellering. Under hennes akademiska karriär har hon aktivt bidragit till framtagning av kurser, undervisning, doktorandhandledning och artikelförfattande inom området termodynamisk modellering. Malin Selleby har skaffat sig ett brett internationellt nätverk och är idag ansedd som en av världens främsta experter på termodynamisk modellering inom materialdesign.

För att exemplifiera Malin Sellebys bidrag till undervisning och forskningen och utvecklingen inom området termodynamisk modellering kan följande insatser nämnas:

i) utsedd till KTH:s bästa lärare av THS

(*Tekniska Högskolans Studentkår*) år 2020,
ii) ordförande i STT (*Stiftelsen för termodynamisk modellering*),
iii) publicering av 104 artiklar i välrenommerade internationella vetenskapliga tidskrifter,
iv) KTH:s representant i APDIC (*Alloy Phase Diagram International Commission*), och
v) KTH:s representant i SGTE (*Scientific Group Thermodata Europe*).

Sammanfattningsvis anser Svenska Bergsmannaföreningen att Malin Sellebys egna insatser, tillsammans med ett djupt engagemang och förmåga att inspirera såväl elever som yngre och äldre forskare, kraftigt bidragit till en ökad kunskap inom området termodynamisk modellering. Därför är det väl motiverat att tilldela Malin Selleby 2022 års Sefströmsmedalj.

Utdelning av Sefströmsmedaljen 2022

Utdelningen skedde på årets digitala årsmöte, den 23 april. Pristagaren, professor Malin Selleby och delar av styrelsen samlades på Jernkontoret. Medalj och blommor lämnades över vid en kort ceremoni med tal av ordföranden Peter Samuelsson. Alla närvarande applåderade och säkert också många via Internet, men det hördes inte. Styrelsemedlemmen Mats Gartz fotograferade.

Malin skulle ha berättat om sin termodynamiska forskning vid ett föredrag i maj på Internet, men hon blev tyvärr tvungen att ställa in. Föredraget kommer istället vid en Jernkontorsafton den 7 oktober. Det blir vårt första fysiska möte på nästan tre år!

SBF – Sefströmsmedaljen

Nils Gabriel Sefström var prästson från Hälsingland, men kom under gymnasiet i Härnösand att luta åt naturvetenskapliga studier. Han började som student i Uppsala 1807. Studierna finansierade han genom att arbeta som informator i Stockholm. Här träffade han Jöns Jacaob Berzelius.

Sefström blev Medicine doktor år 1813 – tekniska ämnen existerade inte på universitetsnivå. Därefter arbetade han som underläkare

på Serafimerlasarettet i Stockholm. Men ganska snart, 1817, blev han medhjälpare till Berzelius och ersättare under Berzelius utlandsresa 1818 – 19.

Sefström utnämndes till professor och förste föreståndare för Bergsskolan i Fahlun 1820 och kvarstod till 1838. Under arbetet i Falun upptäckte han vanadin år 1830. Sefström blev ledamot av Kungl. Vetenskapsakademien år 1820 och dess preses år 1840.

Inte minst var han redaktör för världens näst äldsta vetenskapliga tidskrift, Jernkontorets Annaler under 25 år, 1820 – 45.

När N G Sefström avslutade sina år som föreståndare för Bergsskolan i Fahlun beslutade eleverna att hedra honom med en minnesmedalj daterad 28 januari 1838. De lät tillverka en medalj i brons, upplaga obekant, som litet då och då finns till försäljning. Framsidan visar Sefströms porträtt och baksidan ”Minne och erkänsla af Fahlu Bergsskolas elever”.

År 1987 beslutade SBF att inrätta en förtjänstmedalj i guld i Nils Gabriel Sefströms anda. Framsidan visar samma porträtt av Sefström som bronsmedaljen, men baksidan visar smidesguden Hefaistos (Vulcanus) och hans maka gudinnan Afrodite (Venus). Medaljen delas ut vart femte år till person som i Sverige utfört förtjänstfulla insatser av annat slag än administrativ eller företagsekonomisk gärning.

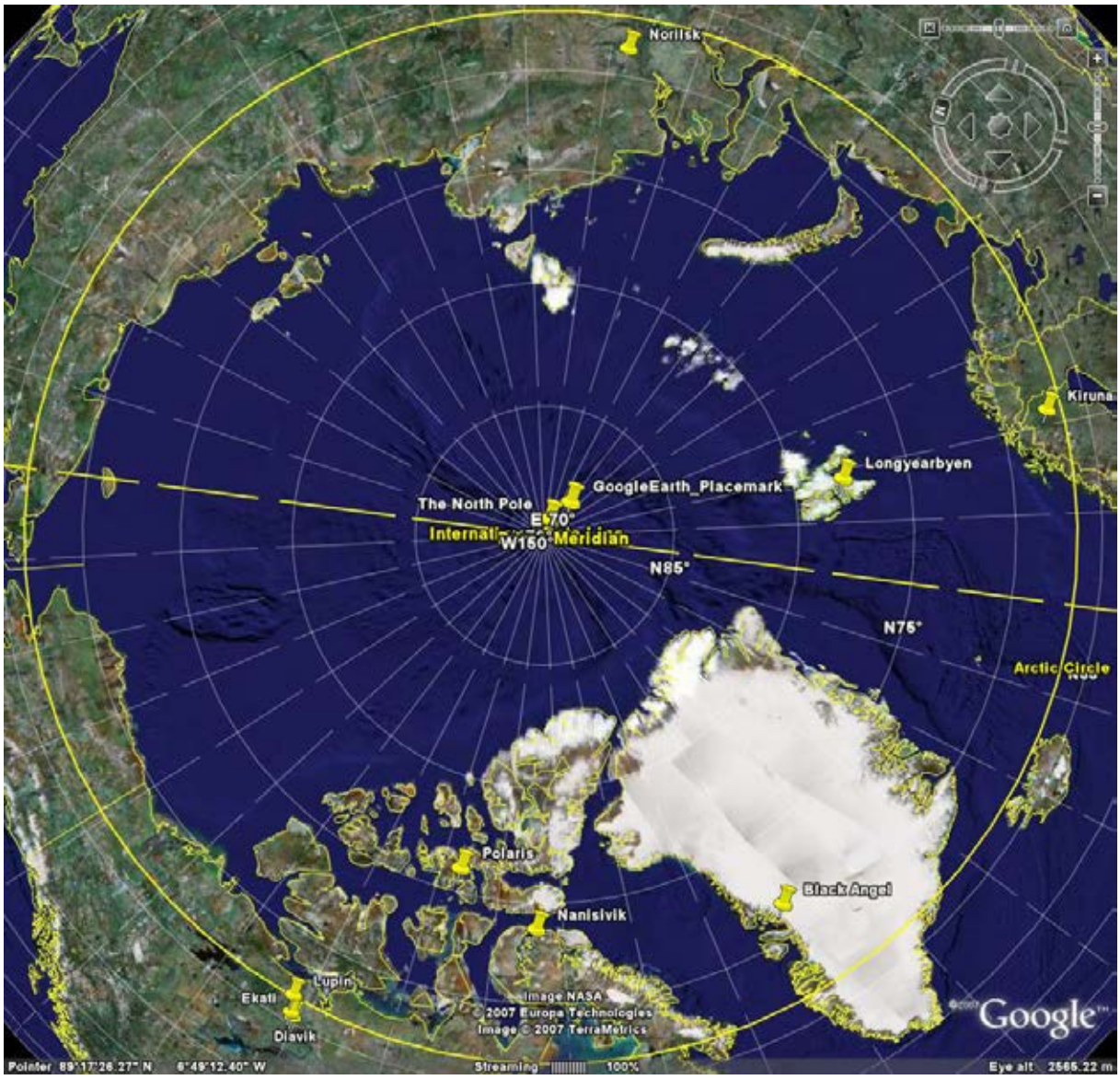
New author
Mats Heimersson

Mats Heimersson.

In 1967 Mats Heimersson began his studies at KTH Bergs, together with a group of Mining engineers-to- be. To this day, the group is held together by a team, among which is Anders Berntorp.

Anders has been important in persuading Mats that his stories from around the world would be interesting to all of us reading the Summer Issue. Thank you!

In Mats own words:
Mats Heimersson graduated from "Kungliga Tekniska Högskolan, avdelningen för Bergsvetenskap" in Stockholm Sweden as Mining Engineer (Bergsingenjör) in 1972. In his 40+ years career he has been involved in mines and mining projects for diamonds, gold, silver, copper, lead, zinc, tin, iron, nickel, garnet, coal as well and many secondary metals as byproducts. He has worked with many different open pit and underground mining methods as well as with rockfill, hydraulic fill and paste fill. His experience is gained in Sweden, Greenland, Denmark, Canada, USA, Australia, Spain, Iran, Morocco, Honduras, Chile, Peru and Bolivia.
Mr. Heimersson is presently semi retired and resides in Surrey, British Columbia, Canada. Surrey is a suburb of Vancouver.



Map 1. Looking at the northern part of the world from right above the North Poole. Marked are the Arctic Circle and the Black Angel, Longyear Byen, Kiruna, Nanisivik, Lupin, Diavik, Ekati and Norilsk Mines.

An exhaust raise incident at the Black Angel Mine

Mats Heimersson

I worked at the Black Angel Mine in Greenland 1976-78 and also 1984-85. The Black Angel Mine is located above the Arctic Circle on the west coast of Greenland a bit less than halfway up the coast. Please see the Map 1.

Among the other mines on this map where I also have worked are Kiruna (Iron), Nanisivik and Polaris (both lead-zinc silver), Lupin (gold), Diavik and Ekati (both diamonds). I did not work in the coal mines in Longyearbyen in Svalbard or in the nickel mine in Norilsk, Russia. I did apply for a job in Longyearbyen during one of my summer semesters at KTH but did not get the it. I have never had any urge to go

Photo 1. The face of the black angel mountain. Photo by Finn Mortensen

to Norilsk and will probably never get such an urge.

The Longyearbyen Mines were the northernmost mines in the world and the Polaris Mine was the northernmost metal mine in the world. These records probably still stand.

The Black Angel Mine is very isolated. The only access is by ship and helicopter. There is no air strip. The mine got its name from a rock formation on the steep mountain side that can with a bit of fantasy be described as a black angel. Please see Photo 1 showing this mountain side with the black angel as well as part of the mining camp on the right. The outcrop of the rich lead-zinc-silver ore can be seen as a thin rusty band above the black angel. Two cable cars provide the access to the mine. Two of the portals of one of these cable cars can be seen just below the left wing of the angel. When they were built one of these cable cars was the longest one span cable car in the world.

Standing inside one of these portals and looking down gives a good view of the mill and camp site. Please see Photo 2.

The mine extends more than 8 km kilometers into the mountain. Although there were exceptions the orebody is relatively flat lying and there are many different zones. Initially the Angel Zone lying closest to the entrance was mined followed by the Cover Zone further into the mountain as well as other zones. The ventilation for the Angel Zone was accomplished by blowing in fresh air from an intake at the mountain face and exhausting through excavations in the same face. This worked well for the Angel Zone but there was a need for an exhaust raise to develop the Cover Zone. This raise was driven to the closest surface which was on another steep mountain face. On Photo 3 the raise surfaced almost right above the end of the fiord to the left about two thirds or three quarters up from the water level to the relatively flat mountain top. The Black Angel is also visible in this photo as is the mine camp that is located on the moderately flat triangular piece of land across from and below the Black Angel

This ventilation system worked well for a while but late during the first winter a severe issue developed. Avalanches racing down the mountain side filled the raise with hard packed snow eliminating any air exhaust through the raise. The situation was dire as production from

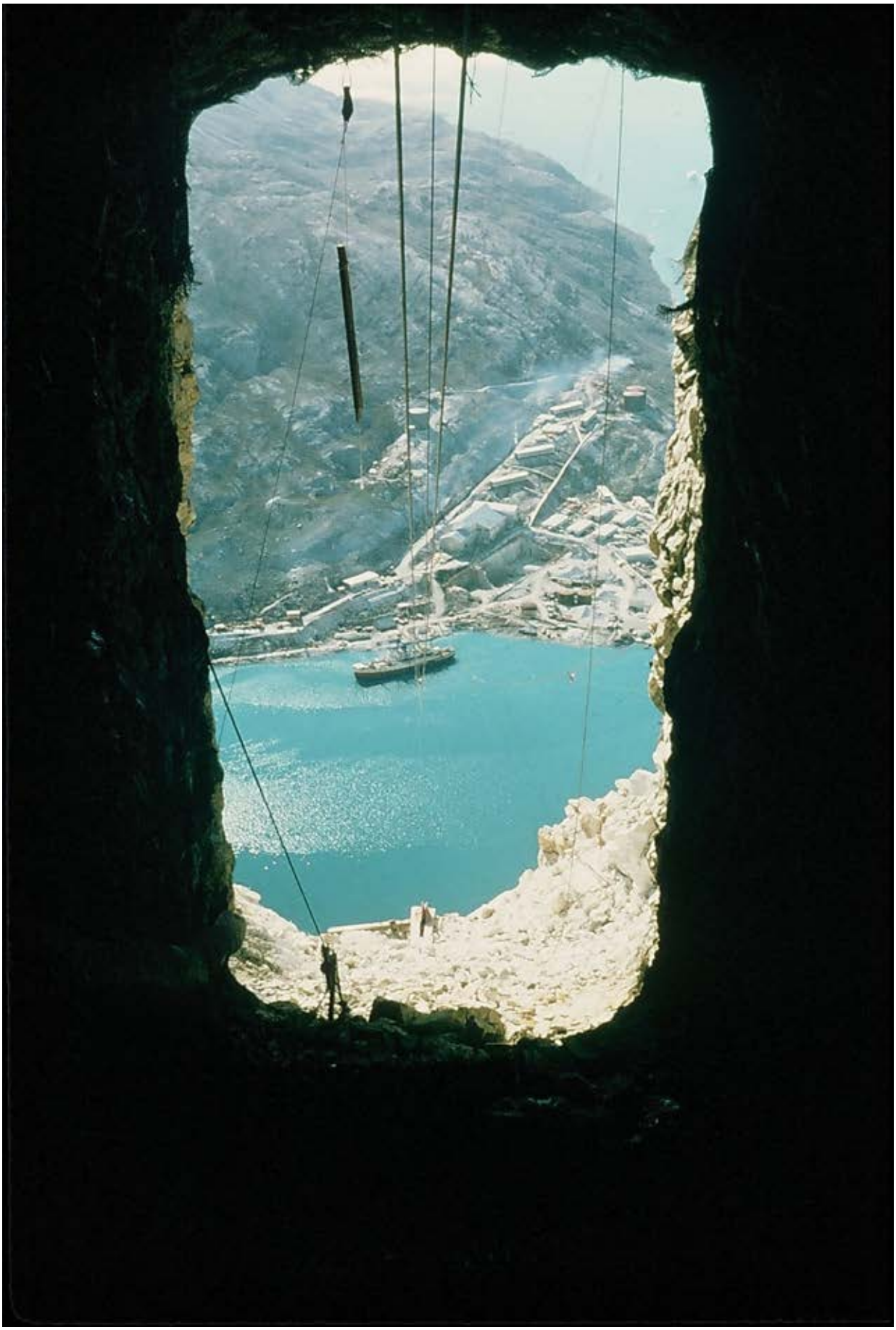
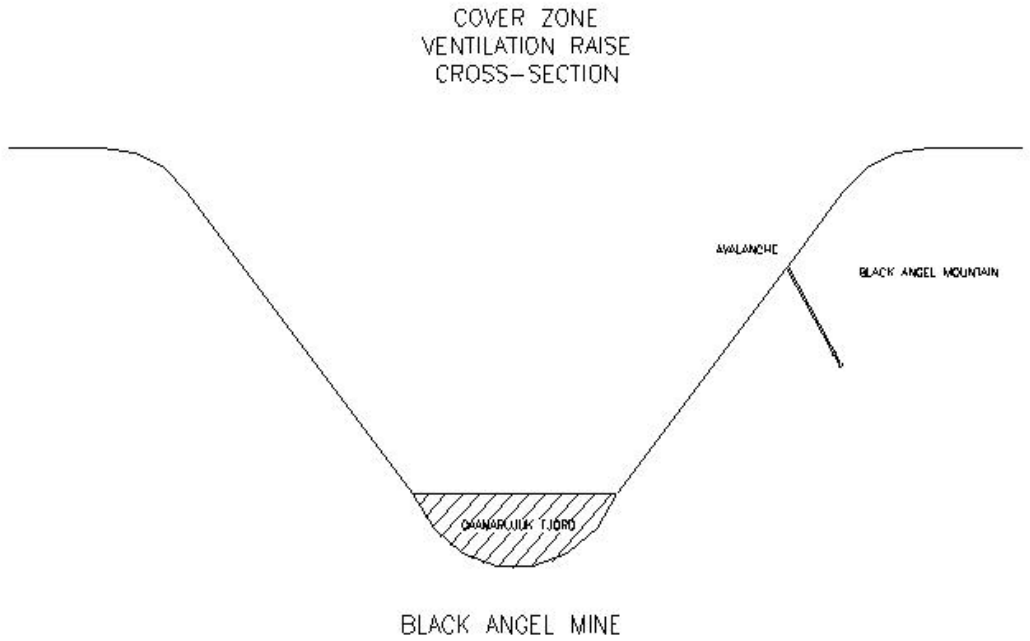


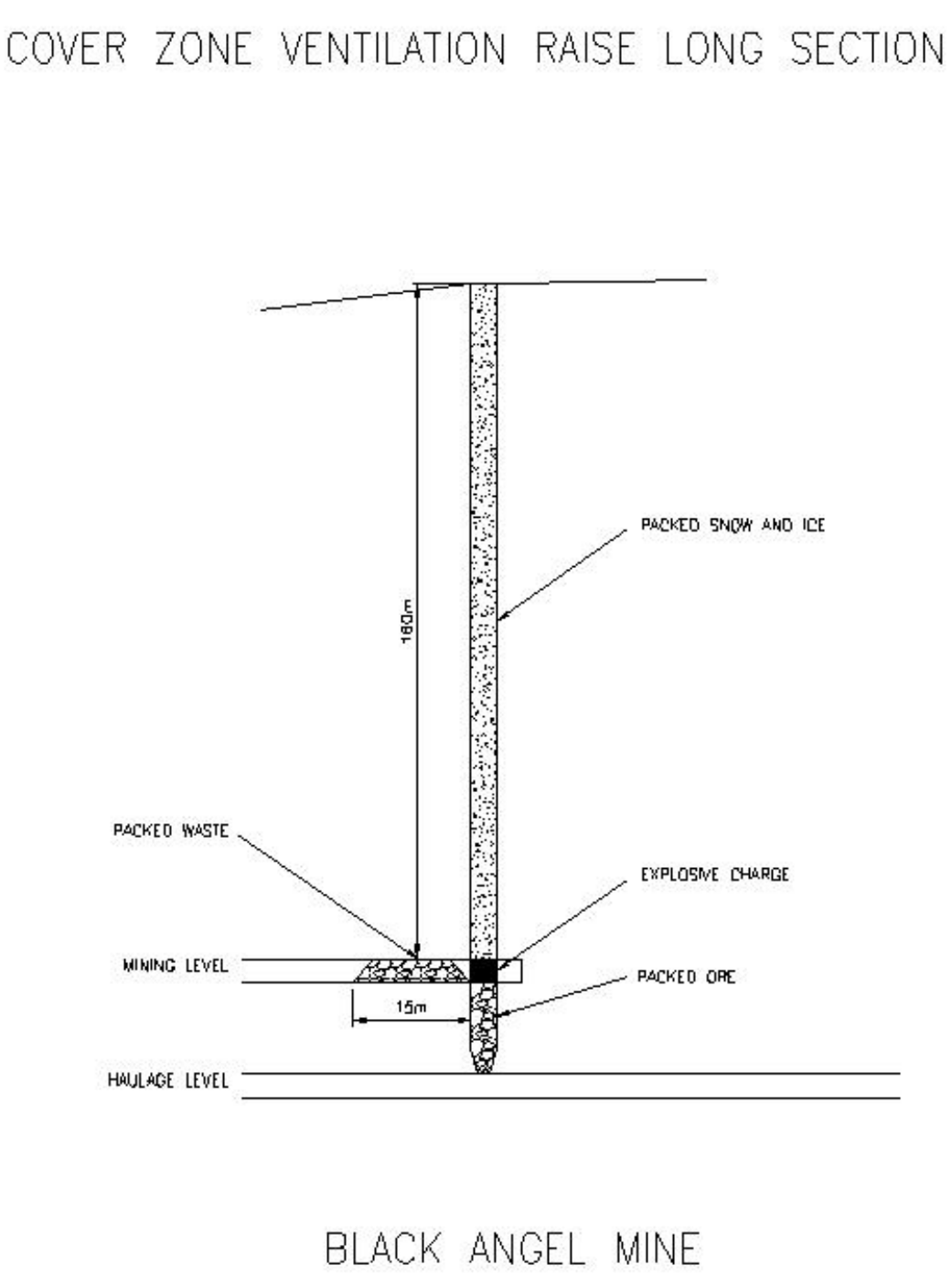
Photo 2. The harbour, mill and camp site as seen from inside one of the mine portals. Photo by Tony Keen.

Photo 3. The Black Angel Mountain. Photo by the Geological Department at the Black Angel Mine.

the Cover Zone almost stopped. Swift attention to the problem was required. I was Chief Engineer at the time and was given the task of designing a solution as soon as possible. I figured that if an explosive charge was placed at the bottom of the raise and the accesses were plugged as much as possible with waste rock, the raise would be cleaned. The very bottom of the raise from the production level to the chute at the haulage level was used to store ore and the portion of the raise up from the production level was used for exhaust. The situation is illustrated by the simplified sketches 1 and 2.



Sketch 1. Simplified Cross Section showing the Cover Zone exhaust raise, the Black Angel Mountain and the Qaamarujuk Fiord.



Sketch 2. Simplified Long Section showing the method to clean the Cover Zone exhaust raise.

The remaining question was how big an exosive charge would be required. None of what I had learned in school or elsewhere addressed this design issue. This was before the internet days and the communications with the outside world were via slow and unreliable Telex. We did not even have a useable telephone connection. Not to mention any back-and-forth communication with outside experts would have lost time that we ill could afford to lose.

I was struggling in the office one Sunday (we normally had Sundays off) and tried to come up with some engineered solution as to the amount of explosive required. Complicating the situation was that we did not have equipment to tightly fill the drift to the back so some leakage would happen. Unable to come up with a calculation I was confident would be accurate I finally gave up and realized that I would have to guess. One empty oil barrel full of ammoni-

Photo 4. The ground station of one of the cable cars. Photo by Tony Keen.

um nitrate fuel oil mix (ANFO) and primed with two 2X16 inch sticks of dynamite ought to have enough power to blow the raise clean I figured. Now with a plan I headed over to the Mine Captain's office to explain. As I left the office I all of a suddenly got very nervous. "What if one barrel was not enough"? This would be kind of disastrous. Better add another barrel. The meeting with the Mine Captain went well. He said he could have it all done next Sunday when nobody worked in the mine, just in case. The following Monday he was heading up to the mine to explain to the Shift Boss. The mile long ride on the cable car up to the mine gained 600 m elevation and was a bit scary, at least for the first 10 or so times. A somewhat flimsy cabin was slung under the wires with a sliding door and a small steel bar as protection. The door was rarely closed and just the steel bar preventing anybody from falling out of the car. Please see photo 4.

The Mine Captain had travelled up and down many times and the trip did normally not bother him at all. For some reason he did not like the trip this time, he had one burning question in his head: "What if two barrels was not enough"? The Black Angel Mine was a very close society and rumors and failures spread very quickly. Comments of failures were biting. On the way up the Mine Captain decided to add one more barrel. The shift boss was called in to a meeting and the procedure to clear the raise was explained.

Later the shift boss appointed a team to do the work but before doing so he had one nagging question in his head: "What if three barrels was not enough?" The crews were losing bonus due to the slowdown in production so he decided to add one extra barrel.

The crew leader appointed for the job realized that we did not have equipment to completely fill the drift to the back and it was a bit uncertain how big this gap would be. There would be considerable leakage and besides he was of the opinion that "them engineers do not know what they are doing anyhow". He decided to add two

extra barrels to ensure success.

The ANFO was mixed at a mix station located close to the entrance to the mine. It was a long and slow journey to where the raise was located. The miner in charge of the mixing and transportation made completely sure ha had enough ANFO so he did not have to make the trip twice. In the end close to seven barrels were placed at the raise before the drift was closed off with waste packed as close to the back as the scoop trams used for the job would allow.

The blast was set for one o'clock on the Sunday when nobody was working in the mine. I started early and walked a couple of kilometers across the ice to a position I estimated was just below where the raise surfaced. I expected a load "kaboom" and a bright flash coming out of the mountain side but there was none of that. There was not a sound and no flash but only a very subtle shaking of the ice. I guess 180 m of snow filled raise makes for a good muffler. Immediately after the blast the whole mountainside seemed to erupt with avalanches.

Very soon an intensely white cloud soon obscured any view of the mountain side. I gazed up at that cloud and there was maybe a very faint yellowish gray tint in the center but it was so faint I did not know if it was just wishful thinking on my part. At this time neither I nor the General Manager had any idea that seven barrels had been set off instead of the planned two.

Monday morning, I took an early cable car up to the mine and started to walk towards the Cover zone raise. I soon realized that the blast had worked as I could feel the wind in my back. I wondered if there had been any damage to the rock by the raise. The crew had just finished loading out the waste plug in the drift when I got there. There was no damage to the rock, not a speck of snow or ice anywhere and as I gazed up that raise in the dark mine, I could see what appeared to be a bright disk of light up there, way up there. The disk appeared to be moving and a bit of a whistling sound could be heard as the air was rapidly exiting. Of course, the disk was not moving and it was probably just the air changing temperature and pressure on the way up that made it look like it was moving. The plan had worked beautifully.

I felt pretty good walking back out of the mine with fresh air in my face. I started to regard myself as some kind of explosive expert that could simply could "feel" the right amount of explosive required for an odd situation.

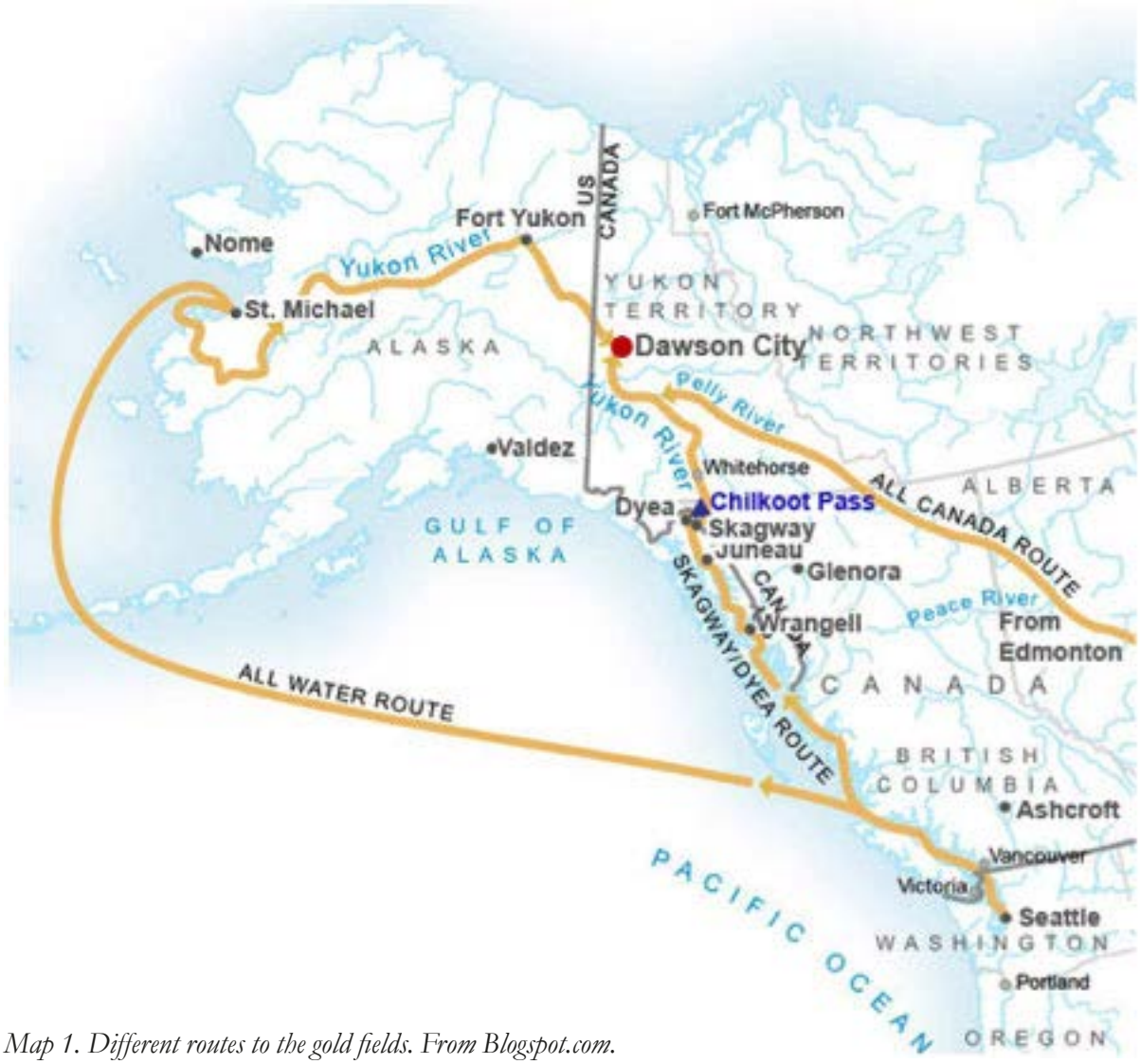
Back at the camp I was met by the General Manager. He shook my hand and congratulated me for having so "accurately and precisely" determined the right amount of explosive required, as he choose to call it.

The Black Angel Mine had its own liquor store and a bar where alcoholic beverages were served. Some time later I came into a conversation with a miner in the bar and discussing the raise incident I pointed out that it was amazing what "two barrels of ANFO" could do. Two barrels he replied "we put seven barrels there". I realized that this would require some careful investigation and I slowly and politely inquired up the chain of command to get to know the events that led to the seven barrels. All the people that had added one or more barrels proudly admitted that the added barrel or barrels they had decided upon made the difference between success and failure.

My opinion of myself as some type of natural blasting expert got a very severe dent. Years later working for a large engineering firm and explaining the story to the firms most senior blasting expert the dent got a little smoother. He was of the opinion the blast would have worked with two barrels as well. Unlike me he was a true explosive expert.

The following summer we hired a construction crew from Switzerland that were used to work in steep mountain terrain. They constructed a roof over the raise that would allow the avalanches to pass over the raise without plugging up the air flow.

With these lines I close my article and hope you have enjoyed the reading.



Map 1. Different routes to the gold fields. From Blogspot.com.

The Klondike Gold Rush, then and now

Mats Heimersson

Three prospectors working the Rabbit Creek, a tributary of the Klondike River in Yukon in northern Canada, struck very rich placer gold deposits. They staked four claims in 1896. This was the maximum three prospectors could stake. Two claims for the person who discovered the gold and one each for the other two. Place gold is gold located in the soils, sands and gravels overlying the bedrock. Hard rock or bedrock gold is gold in the bed rock itself. Rabbit Creek meets the Klondike River not far from where the Klondike River meets the Yukon River. It did not take long for Rabbit Creek to be wholly staked by locals and renamed to its present name, Bonanza Creek. Both Bonanza and the even richer Eldorado Creek, a tributary to Bonanza Creek were fully staked by locals in 1896, before the news reached the outside world. The three prospectors and the other claim owners worked the claims to the end of the summer, when freezing temperatures shut down their operations. Initially, the gold

Map 2. The present-day roads, railroad and Chilcoot Trail between Skagway, Whitehorse and Atlin. Photo by the author from a tourist brochure.

strike was only known locally. However, when ships arrived the following year in Seattle and San Francisco with large amounts of gold the word was out starting the largest gold rush the world has ever seen. People walked off their jobs in droves and headed north. As the poet Pierre Barton said "the gold strike was far enough away to be romantic and close enough to be accessible".

Of the estimated 100,000 stampeders (as the gold seekers were called) who headed north, only about 30,000 made it. Many gave up and quite a few died. There were several different routes to reach the goldfields. The most popular was by steamboat to Dyea and then by foot up Chilkoot Pass and on to either Lindeman Lake or Bennet Lake where a boat or raft was built using local timber. Dyea has a shallow harbour. Skagway, that has a deep harbour was used as well with the trail up White Pass and on to Bennet Lake. Dangerous and shallow rapids between Lindeman and Bennet Lake made Bennet Lake the preferred boat or raft building site. Then followed rowing and sailing across a number of lakes and a long trip down the Yukon River.

The all-American route or all water route, by steam ship to the mouth of the Yukon River and then up the river to Dawson City was comfortable but exceedingly expensive, making it out of consideration for most stampeders. The all-Canadian route was a long overland distance in the roadless wilderness with many river crossings and took up to 18 months to complete. The main starting points were Ashcroft in present day British Columbia and Edmonton in present day Alberta. Edmonton still celebrates the "Klondike Days" in July each year.
Map 1 shows the different routes.
Map 2 shows the present-day roads as well as the rail road and Chilkoot Trail and the communities between Skagway, Whitehorse and Atlin.

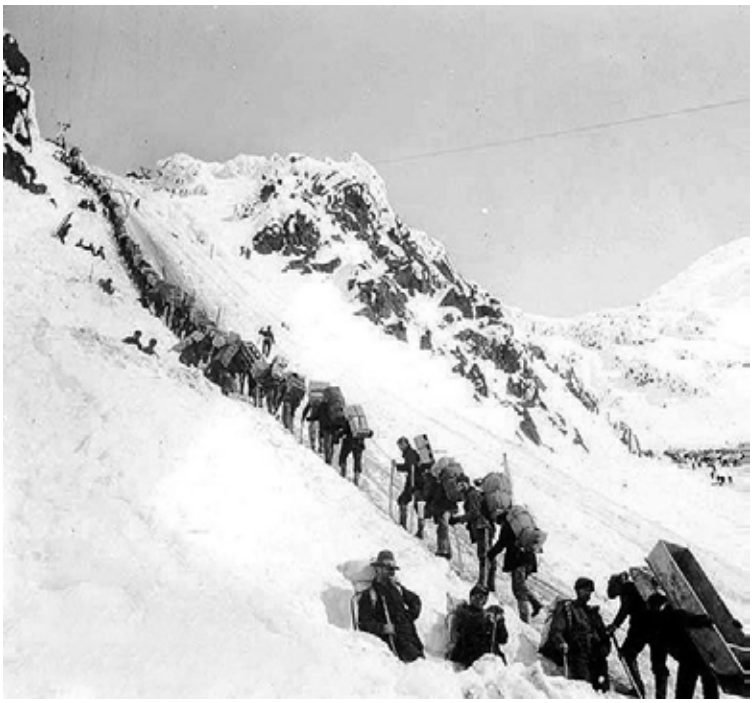


Photo 1. Stampeders climbing up a wintry Chilkoot Pass. Photo by Erik A. Hegg.Photo

Soon the area close to Bennet Lake was deforested requiring harvesting logs further away. Atter the boat or raft was completed followed rowing or sailing across a number of lakes, about 150 km, that form the headwater of the Yukon River. And on down the Yukon River past Whitehorse to Dawson City and the near by Klondike Goldfields, a river trip of about 680 km.

The stampeders climbing up Chilkoot Pass with their heavy back packs were photographed by the Swedish America emigrant Erik A. Hegg, please see Photos 1 and 2.

The Canadian government realizing that mass starvation would set in due to the lack of food production and supply in the Yukon required that each of the gold seekers bring one year's supply of food, which is a bit more than half a ton. This and the other supplies required (tent, clothes, shovel, pick, gold pan, cooking utensils and so on and on) meant that about one ton had to be brought in for each gold seeker. During the initial gold rush this had to be carried on the back in several back-and-forth trips to Lindeman or Bennet Lake, a distance of about 53 km. A tramway to haul supplies up Chilkoot pass was built and used by those who could afford it. As with everything else that was for rent, the prices were extravagant.

Photo 2. The stampeders climbing a wintry Chilkoot Pass. Photo by Erik A. Hegg.

Photo 3. A raft navigating the rapids through Miles Canyon. From Pinterest.

Photo 4. The present-day dam, spillway, turbine #4 and the fish ladder at the Whitehorse Power Plant. Photo by the author.

Animals of all kinds were used as helpers. Horses, mules, donkeys, oxen, dogs, and even sheep were put to work with many dying along the route. One canyon up the White Pass route was so filled with dead horses that it was called the "Dead Horse Canyon.". A small town soon sprang up by Bennet Lake, Bennet City. A combined general store, hotel and brothel there was operated by a Mr. Friedrich "Fred" Trump, the grand father of the American Ex-President Donald Trump.

The boat ride down the Yukon River faced very dangerous rapids in Miles Canyon near Whitehorse and in Whitehorse itself. Indeed, the name Whitehorse comes from the White Horse Rapids so named as the rapids resembled galloping white horses. Many boats and rafts overturned which often meant loss of all equipment and supplies, and sometimes, the lives of the gold seekers. After many losses, a pilot system was introduced requiring experienced pilots to steer the boats and rafts through the rapids. Two horse drawn rail roads were built, one on either side of the river, allowing the rapids to be bypassed.

There were other less dangerous rapids at Five Fingers Rapids further down the Yukon River. Photo 3 shows a raft navigating Miles Canyon.

Today the rapids through Miles Canyon and the Whitehorse Rapids have been considerably tamed. A dam and a large power plant have been built on the outskirts of Whitehorse providing power for much of Yukon. Photo 4 shows the power plant's turbine 4 and the spillway along with a fish ladder built to allow salmon to reach their spawning grounds. The photo is taken in the early summer when the need for electrical power for heating is low and the amount of water from snow melt is high, hence, the large amount of spill water. Turbines 1, 2 and 3 are located further down stream and are not shown in the photo.

Two railways were started, one from Skagway

and one from Dyea. However only the one from Skagway was completed, and in 1900 was operational all the way to Whitehorse. At that time the gold rush was largely over and many unsuccessful gold seekers left for new gold finds in Nome, Alaska and in Atlin, British Columbia. Photo 5 shows disillusioned stampeders leaving Dawson City and boarding a sternwheeler to travel downriver to the new gold finds in Nome, Alaska.

Much snow accumulates in White Pass in the winter and along with snow plows, a steam powered slow blower was used. Photo 6 shows an early locomotive, Photo 7 shows operation in the winter and Photo 8 shows the snow blower.

Parts of the White Pass and Yukon Route are still operational in the summer to serve the tourism industry. The railway has been upgraded and the more dangerous parts have been rerouted. Photo 9 shows a present diesel-powered train on this route. In the background is the original cantilevered bridge over the canyon.

At present time the Chilkoot Trail is popular as a tourist trail and conveniently placed cabins provide for overnight stays. One danger along this route are the many bears, both Grizzly and Black. There are also super marathon competitions along the 53 km route with the record time being 5 hours and 27 minutes. Longer relays are also run from Skagway up the White Pass and on to Whitehorse.

From Whitehorse steam-powered, flat-bottomed sternwheelers began to operate to Dawson City. Sternwheelers were preferred instead of "side-wheelers" as it allowed the rotation of the wheel to be reversed in case the ship got stuck on a sand bank, thus both washing away the sand, plus providing reverse power. The river and the sand banks constantly changed which made navigation complicated. The fuel for the stern wheelers was wood and large supplies of logs of suitable lengths for the ship's boilers were located on intervals along the river.

Photo 5. Disillusioned stampeders leaving Dawson City for a ride downriver to the new gold finds in Nome, Alaska. Photo by Larss & Duclos.

Photo 6. An early locomotive on the White Pass and Yukon Route. From wpyr.com.

Photo 7. Operation of the snow blower on the White Pass and Yukon Route. Photo unknown.

Photo 8. The steam powered snow blower with its tender and caboose, now a museum item in Skagway. From Expedia.

Photo 10 shows the sternwheeler SS Klondike in operation on the river. The Alaska Highway was completed during World War 2 connecting Whitehorse to the rest of Canada and to Alaska. In-between 1950 and 1960 a road, the North Klondike Highway, was completed from Whitehorse to Dawson City which made the sternwheelers obsolete. Finally, in 1978 a highway was finished connecting Whitehorse to Skagway. Parts of this had been built together with the Alaska Highway during the second world war. Two of the sternwheelers, SS Klondike and the smaller SS Keno, were preserved in Whitehorse and Dawson City as museums. The remaining sternwheelers had no useful business after the North Klondike Highway was completed and they were hauled up beside the river just outside Dawson City and left to decay on the so-called sternwheeler graveyard. A great deal of lumber and parts were captured or robbed from these. Photo 11 shows SS Klondike in its museum berth in Whitehorse and Photo 12 shows a decaying sternwheeler in the sternwheeler graveyard.

Cities sprang up quickly along the route to the goldfields in the Klondike. The area of these goldfields is historically bordered by the Klondike River to the north, the Yukon River to the west, the Stewart River to the south and an outlier of the Rocky Mountains to the east. The Klondike Goldfields are about 40 x 80 km in size. In Photo 13 the historical borders are displayed on a map surrounded by the nuggets from the many rivers and creeks in the goldfields. In the Klondike small creeks are often called "pups". These nuggets are for sale in the Klondike Nugget and Ivory Shop, a jewellery shop in Dawson City.

Cities grew quickly during the goldrush and some were deserted and abandoned even quicker. Dyea, Skagway, Bennet City and Whitehorse are on the way to the goldfields while Dawson City, Granville, the North Fork and Paris are in the goldfields. Dyea faded away as Skagway grew larger due to its deep harbour. Bennet City died quickly when the railway was finished. Granville, the North Fork and Paris were gradually abandoned as the gold production was reduced after the initial gold rush and required less manpower due to mechanization. Whitehorse (population 28,000) is today the capital of the Yukon. Skagway (population 1,200) is mainly a

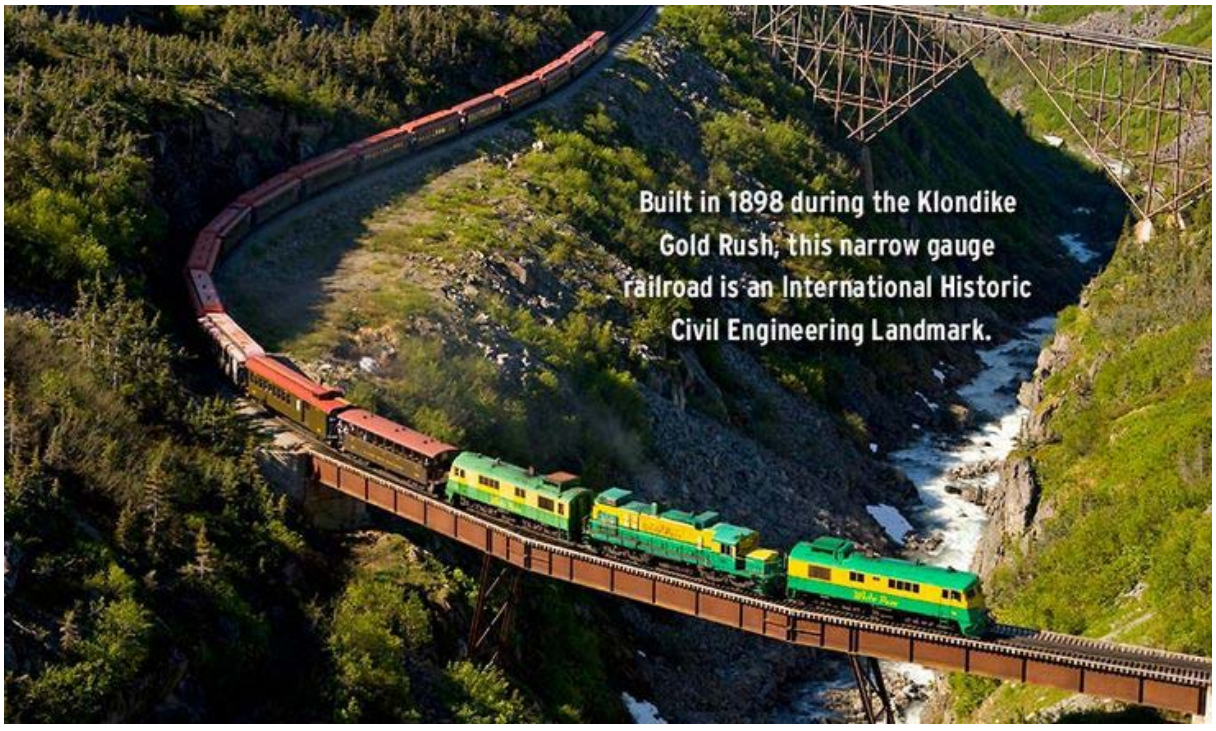


Photo 9. A present-day train operating on the scenic White Pass and Yukon Route. This train operates from Skagway to Carcross in the summertime transporting tourists. In the background the now abandoned original cantilevered bridge. From Pinterest.

Photo 10. The Sternwheeler Klondike in operation on the Yukon River. From Pinterest.

Photo 11. The Sternwheeler Klondike as a museum at its berth in Whitehorse. Alamy stock photo.

Photo 12. End of an era. The Sternwheeler Graveyard just outside Dawson City. Photo unknown.

Photo 13. An 1898 map of the Klondike Goldfields and nuggets from the many creeks and rivers in the Klondike for sale at The Klondike Nugget and Ivory Shop, a jewellery shop in Dawson City. The Klondike goldfields occupy about 40X80 km. Photo by the author.

tourist town. However, copper and lead/silver concentrates from hard rock mines in Yukon are also shipped from Skagway to buyers all around the world. Dawson City (population 1,400) is the second largest city in the Yukon (some readers may object to the word "largest") and is a combined tourist and gold mining service town.

Sweden and Yukon are almost the same size when it comes to area. Sweden at 0.45 million square kilometers and Yukon marginally larger at 0.48 million square kilometers. When comes to population there is however a "bit" of a difference. Sweden's population is 10 million people and Yukon's is 39 thousand. Of these 39 thousand 28 thousand lives in the capital Whitehorse. Yukon is very sparsely populated even by Swedish Lappland standards.

The birth of Dawson city was rapid and the city was initially just a tent city although the population quickly swelled to 30,000. Photo 14 and Photo 15 shows the beginning of the city. The sanitary conditions in the early days of the city were not good and many diseases were common.

In present-day Dawson City there is much effort is to keep the early look by renovating old buildings and keeping the false facades. Photo 17 shows the way Front Street looks today.

The ground Dawson City is built of is largely permafrost. As this melt, the older buildings tend to lean sometimes to the point, they become dangerous to be in. Photo 18 shows two older buildings leaning precariously.

Bars, saloons, gambling halls, dance halls, theatres and brothels developed quickly in Dawson City. In the dance halls lonely gold miners could dance with a girl after paying the hefty price for doing so. Gambling and prostitution were allowed despite that both were illegal. They had a calming influence on every day life. Churches were also built. Gold dust and nuggets were

Photo 14. Dawson City early in the gold rush. Photo unknown.

Photo 15. Dawson City. Larger buildings are starting to be erected.

Photo 16. The Fourth of July celebrations on Front Street in Dawson City in 1899. Photo by Erik A. Hegg.

Photo 17. Front Street in Dawson City the way it looks today. Photo by the author.

Photo 18. Melting permafrost makes some buildings in Dawson City uninhabitable for safety reason. Photo unknown.

Photo 19. A recent Can Can dance show in Dawson City. Photo From theinsatieblrtraveller.com.

used for payment and as one bar owner claimed: "It pays to sweep the floor at closing to catch all the gold dust spilled".

A performing dance show that was popular at the time was "Can Can". This is still popular today. Photo 19 is from a recent show in Dawson City.

An old plaque (Photo 20) from a present-day restaurant in Whitehorse highlights what life was like back then.

Life in Dawson City was largely law abiding. The Royal Canadian Mounted Police sent hundreds of officers to the city to ensure that this was the case. Not so in Skagway where there were only very few officers. Early in the gold rush the city was run by a con man and gangster named "Soapy" Smith. His name originated from his previous con of selling soap where some bars had a dollar bill draped underneath the wrapping. Somehow, he marked these bars and accomplices of his purchased them and then loudly announced that he got one of the "dollar" bars. Sales boomed and Soapy Smith made a lot of money.

One of his famous scams was to open a Te-

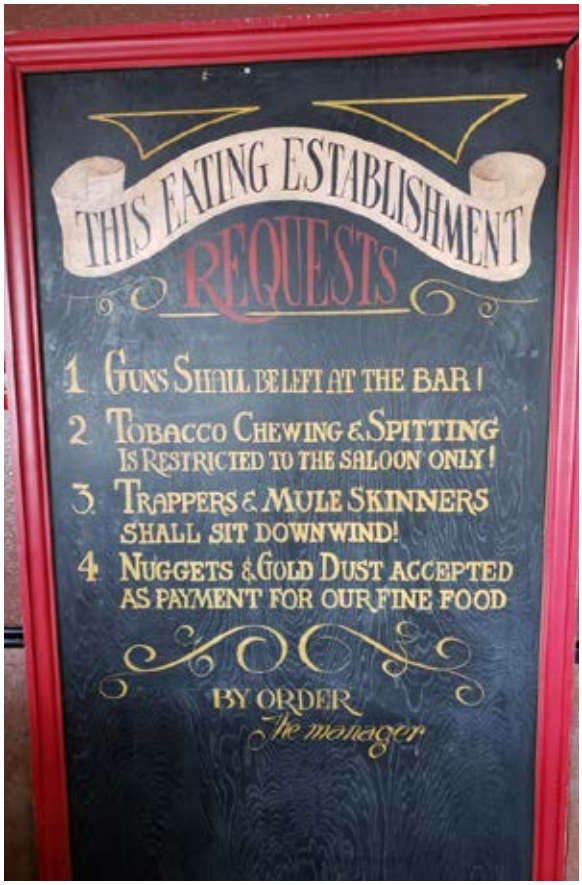
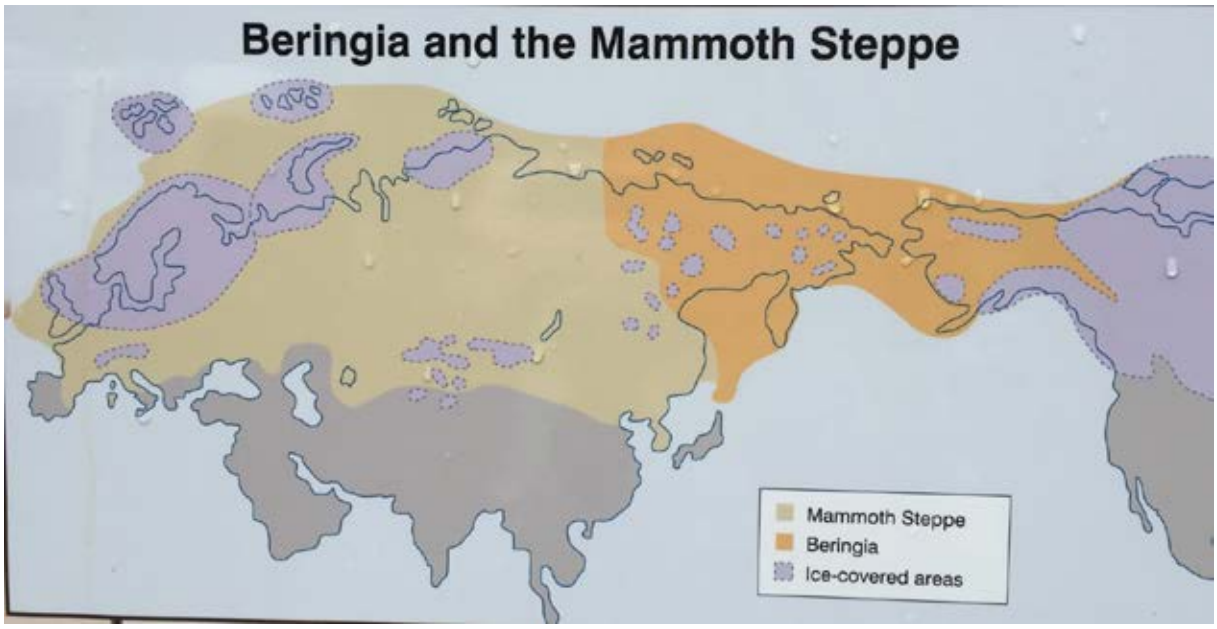


Photo 20. Dinner rules back then. Photo by the author.



Map 3. Areas covered and not covered by the inland ice during last glaciation. From Blogspot.com

legraph office in Skagway where concerned stampeders could send a Telegraph home to inform their families that everything was good so far. One concerned stampeder sent a Telegraph home to enquire how his young daughter was doing, very sick with tuberculosis when he left. In a couple of days, the reply came back telling the stampeder that his daughter had made a miraculous recovery and no longer had tuberculosis. Using this Telegraph service cost a lot of money.

At the time there was no telegraph line servicing Skagway and the whole Telegraph office was a scam.

A militant citizen's group that liked to be photographed with their guns and rifles in hand stated "We want law and order no matter how many we have to kill to get it". Eventually Soapy Smith's life style caught up with him and he was shot dead in 1898, aged 37.

Geologically, creation of placer gold deposits is a slow process. As the surface bedrock erodes the lighter elements are washed away and the heavier gold stays behind. This of course assumes there is gold in the bedrock. Decaying plant and animal matter may also produce chemicals that dissolve gold, albeit in very small quantities. One such chemical is cyanide. Once dissolved the solution may travel, and under different chemical conditions bind with other gold particles. Thus, larger and larger gold nuggets can be created.

If the area has been covered by the inland ice, which tends to happen regularly in parts of the world, forming placer gold deposits are scraped away too quickly (in a geological sense) to allow large placer gold deposits to form. Parts of Siberia, Alaska and Yukon were not glaciated during the last ice age and possibly also not during previous ice ages. Time allowed rich placer gold deposits to form where there was gold in the bedrock.

The glaciated parts of the world during the last ice age and those that were not glaciated are shown on Map 3. The area called Beringia (named so by the Swedish botanist Erik Hulten from the Danish sailor Vitus Bering, who sailed in the area in 1728) was too dry for inland ice to form. Some glaciers were formed in the mountains.

As can be seen in this map all of Scandinavia was covered by inland ice. I have often wondered what placer gold deposits would had been formed in the area of the gold rich Skelleftea Field in Sweden had this not been the case.

Large grass lands in Beringia supported animals that are mostly extinct today among them large cats and bears, rhinoceroses, bison,

musk-oxen, horses and the mammoth. Photos 21, 22 and 23 shows artists impressions what the land may have looked back then.

As the animals died their bones and tusks were covered by sediments and over time were fossilized. It is not uncommon for gold miners as they excavate to recover gold to also find the fossilized remains of animals. Photo shows 24 shows early gold miners and a recovered mammoth skull intact with tusks.

Today, fossil mammoth tusks are used to make jewellery. Photo 25 shows a necklace made from a fossil mammoth tusk. After a long stay in the ground the outer layer of the tusk absorbs various minerals from the ground giving it a tan color.

Recovery of gold from placer deposits is a relatively simple washing process compared to recovery from gold in the bedrock. The placer material is mixed with water and screened. The finer portion is directed to a sluice box where gold is trapped. A sluice box is little more than a box with riffles that makes up the traps. Often the bottom of the sluice box is covered with indoor-outdoor carpet to catch the finer particles. The coarse portion from the screen often

Photo 21. Artist's impression what Beringia may have looked like. From hakaimagazine.com.

Photo 22. Artist's impression what Beringia may have looked like. From Beringia.com.

Photo 23. Artist's impression what Beringia may have looked like. From Beringia.com.

Photo 24. Three early gold miners with an excavated mammoth skull intact with tusks. From Worldpress.com.

also has a trap where any large gold nuggets, if they are present, are caught. Photo 26 shows a present-day sluice box that has changed little since the early gold rush days although there are many different configurations of the riffles. Some early models just had two wood boards nailed together in a V shape trapping the gold at the bottom of the V.

Mining before the railroad from Skagway to Whitehorse was completed was largely by hand with shovel and wheel barrow. As the placers at the time were very rich the year 1900 marked the record production from the Klondike when more than 33 tons of gold were mined largely by hand. Since then, production has dropped off despite that more and more machinery were introduced. Production has continued to present day and in 2020 1.6 tons of gold were mined from 94 placer operations in the Klondike. Placer operations also exist in other parts of the Yukon and the total production was 2.8 tons from 180 placer operations. Many of the operations are small with less than 5 or 10 people employed, sometimes just one. Some are family operations and have stayed in business more than 100 years passing from father to son for generations. Photo 26 and 27 shows early sluicing where the mining was by hand.

Photo 25. A necklace made from a fossil mammoth tusk. Photo the author.

Sluicing required large amounts of water and for this reason was restricted to the lower parts of the valleys where flowing water was available. Gold was also located higher up the hill sides, so called bench gold and recovery of this in the early gold rush required use of "rocker boxes" that needed much less water than a sluice. Photo 28 shows miners using this way of recovering gold as they added small amounts of water from a pan.

Women also worked in the Klondike. One young woman operating a rocker box bears a distinct likeness with present day Swedish environmental activist Greta Thunberg. The two women are shown in photo 29.

Underground mining was also used in the early days. Crews dug out tunnels in the gravel, often on their knees. As the ground was frequently frozen these diggings were very stable - as long as they stayed frozen. Hot summer weather often partially thawed these excavations resulting in injuries or worse. Photo 30 shows operation in an underground mine. Panning out the gold appears to have been done right there.

I visited the Chechako Hill mine in the Klondike in 2021. The mine is located on a hillside where most of the gold bearing gravels are located close to bedrock. These gold bearing gravels can be covered by up to 45 feet of gravel with little or no gold. There is gravel that is so low in gold content that it does not pay to send it through the sluice plant. Regardless, this

Photo 26. A modern-day sluice box made from aluminium to keep it light. Photo by the author.

Photo 26. Mining by hand and sluicing in 1899 in the rich Eldorado Creek in the Klondike. In the back ground the small village where the miners lived. Photo Sam Dunn.

Photo 27. Early mining and sluicing in the Klondike. From Pinterest.

Photo 28. Operation of rocker boxes that required much less water than sluicing. Water is added from pots, as the man on the left just has done. Photo historycollection.ca. (Bilden något beskuren)

Photo 29. A young woman operating a rocker box in the Klondike and Greta Thunberg, the Swedish Environmental Activist. The two women look very much alike. From pinterest.ca.

gravel has to be excavated to reach the richer gravel near the bedrock. This "waste" gravel is stored in case the gold price increases and makes it feasible to sluice. In excavating the gravel side one old timer's underground tunnel was exposed. Photo 31 shows this.

Once the ability to haul heavy equipment became possible with construction of the railroad from Skagway to Whitehorse and the use of sternwheelers, large pumps made hydraulicking possible. High pressure water was directed to the gold bearing ground. In a well-run operation the effluent was sent directly to a sluice box. Photo 32 shows such an operation.

Most gold is typically but not always located just above bedrock. The early mining was by hand and allowed good selectivity to just mine and sluice the best gold bearing rock. After 1900 increasing use of larger and larger floating dredges occurred. The dredge was built in an excavation and when the construction was finished the excavation was filled with water from a river or the creek which floated the dredge. The material in front of the dredge was excavated and deposited behind the dredge. Thus, a dredge "walked" up- or down a river or creak. Dredges did not have good selectivity but what they lacked in selectivity they made up by their enormous capacity. They also made large scars in the land scape.

A drawing of a typical layout for a dredge is shown in Photo 33. A rotating screen with a relatively small opening about 1 to ¼ inch was typical as most gold in the Klondike was fine. This fine portion was directed to one or a series of sluice boxes. Sometimes the dredge had a

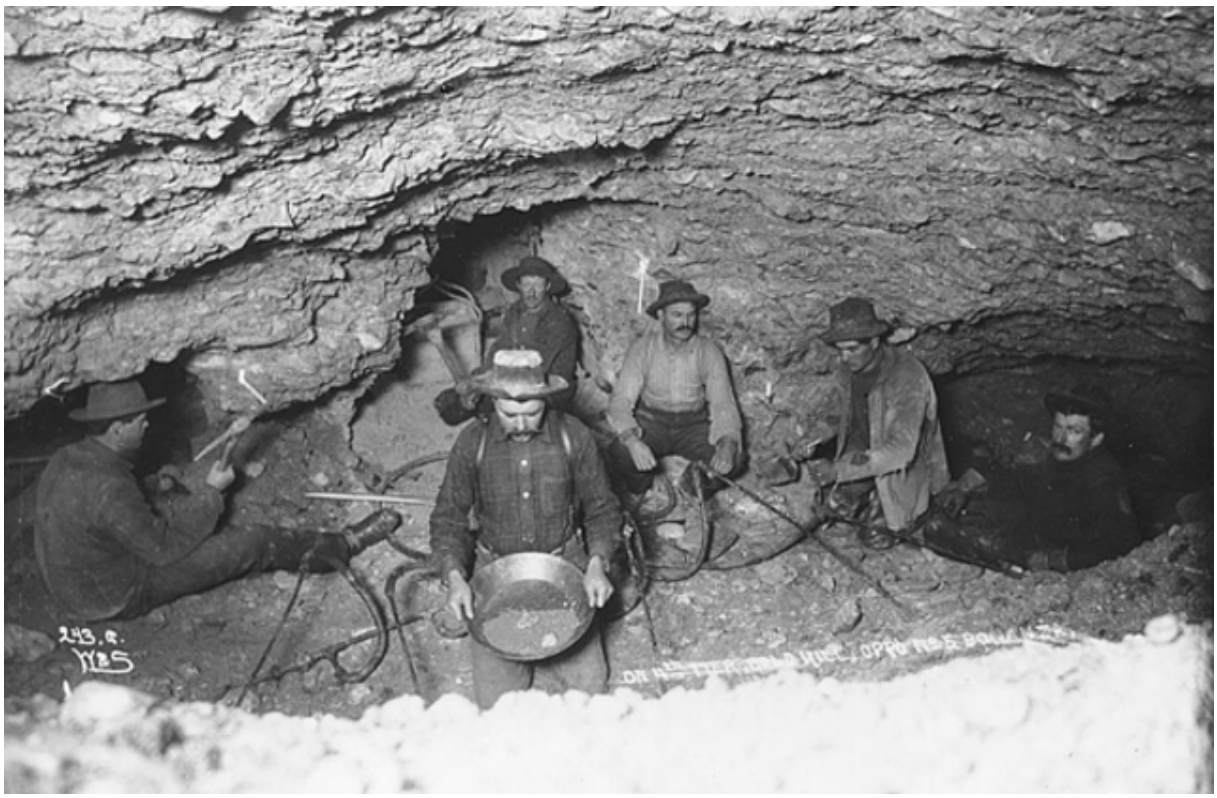


Photo 30. Underground mining in the Klondike. Mining is done by hand and the gold appears to be panned out right there. From Timetoast.

trap to catch coarser gold nuggets although many dredges did not. This meant that any coarse nuggets were not recovered and ended up in the dredge piles where they probably still are today.

The dredges left a typica pattern ("caterpillar pattern") in the coarse discharge that ended on top of the finer discharge. This made it harder for vegetation to establish itself. Ideally in reclamation work any rock piles should be covered with finer material that improves the conditions for regrowth. The scars in the nature that were dredged were large and especially so in the lower part of the Klondike River. Photo 34 shows a dredge operating in this river with the typical caterpillar ridges. Dredging in addition changed the channel of the river from one side of the valley to the other and back. Smoothing the piles by using a dredge is not easy as the dredge is not suitable for this type ow work. In any event at the time dredges were used there was no regulations requiring reclamation of the mined areas.

Today roads and an entire subdivision, the Dredge Pond Subdivision in Dawson City are built on top of the dredge piles. Photo 35 shows this.

Dredge #4 is the largest timber-built dredge in North America. It was built in 1912 and was decommissioned in 1959 and during which time produced 9 tons of gold. Regular stoppages for repairs were needed. During a flood It capsized and sank but was rebuilt. It even operated during one winter.

It has again been rebuilt and is now a museum not far from where the gold find that started

Photo 31. An old timer's tunnel exposed at the Chechako Hill Mine. Photo by the author.

Photo 32. A hydraulicking operation to mine a placer deposit. From Getty images, Hulton Archive.

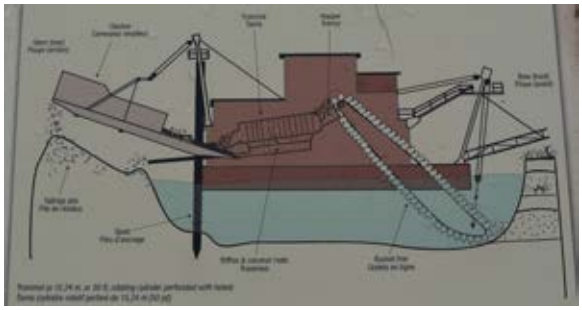


Photo 33. Typical layout of a Klondike dredge. From arrivedeh.com.

Photo 34. Dredging in the Klondike River. The distinct "caterpillar pattern" of the dredge piles is clearly visible. From northtoalaska.com.

Photo 35. Part of the Dredge Pond Subdivision in Dawson City as it looks today. The North Klondike Highway connecting Dawson City with Whitehorse is on the right and the Klondike River is on the left. From thenarwhal.ca.

Photo 36. The massive 8 stories high Dredge #4. When it was built it was the largest timber-built dredge in the world. I was decommissioned in 1959 and have since been restored as a museum. Photo by the author.

the Klondike Gold Rush, was made in 1896. Photo 36 shows the massive 8 stories high Dredge #4 as it looks today.

Today mining in the Klondike is made with rubber and track mounted backhoes, excavators, front end loaders, dozers, trucks and conveyors. There were 94 placer operations in the Klondike in 2020 and 1.4 tons of gold was produced. Picture 37 shows a modern operation.

With the lower grade paydirt available today compared to the early days in the Klondike the productivity and cost per yard consideration makes larger and larger machinery necessary. Photo 38 shows an attempt to increase productivity by having one excavator feeding three sluice plants.

Photo 37. A present-day sluice operation. From Yukon Placer Mining Industry report.

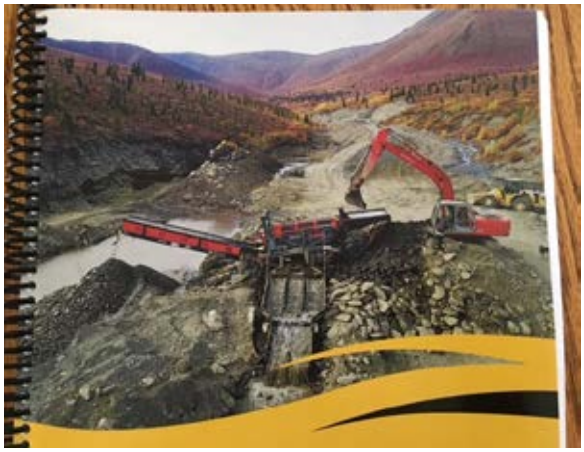


Photo 38. Production increase by having one excavator feeding three sluice plants. From Yukon Placer Mining Industry report from a photo by Hayden Cowan.

Photo 39. Weighing of the produced Gold. From Yukon News.

In any placer mining operation, it is an exciting time when the recovered and cleaned gold is weighed. The gold price at that time determines the value. There are many gold buyers in Dawson City and small operations often have an account. Once the final weighing is completed at the gold buyer's place of business the funds are transferred to the seller's bank account within hours. Photo 39 shows such an exciting moment.

The modern machinery used in the placer mining is also more suitable for reclamation than dredges. Stricter regulations also play an important role. Over time a well reclaimed area will allow vegetation to re-establish itself and make it hard to notice the area was ever mined. Buildings and machinery have to be removed, rock piles rounded and finer material placed on top to aid re-vegetation.

I was Mine Engineer during the start up of the Stekenjokk Mine in the south western part of Lappland in Sweden 1974-76. A long time later and many years after the mine was closed down, I visited and to my surprise had a lot of difficulty finding where the mine had been located. After having driven back and forth a couple of times where I thought the mine was, I stopped by a small sign by the roadside that was placed there to commemorate the mine. If it was not for this sign, I do not think I would have found the exact location.

After that I call a well completed reclamation job a "Stekenjokk Class Reclamation". The present-day reclamations in the Klondike are just that, Stekenjokk Class Reclamations.

The tourist industry in Dawson City has cleverly also developed a way to benefit from the mining era by drawing people to the town. A claim a comfortable driving distance from Dawson City and not far from the original discovery on Bonanza Creek is free for anyone for gold panning. No need to bring gold pans as one can be borrowed at the Information Center. Both services are free but the Information Center wants the gold pan back. Any gold recovered is for the panner to keep.

There are rules though. No mechanized equipment is allowed only a shovel, a pick and a gold pan. The time is limited to three days per year per person.

Photo 40. The author panning for gold in Bonanza Creek in the Klondike. Photo Dorothy Heimersson.

Photo 41. Tiny gold sand pieces from panning in Bonanza reek. Photo by the author.

Photo 42. A piece of gold bearing rock panned in Bonanza Creek. Photo by the author.

I have driven past this claim on Bonanza Creek many times and have observed people using a small hobby size suction dredge feeding a sluice box. This is against the rules but does not surprise me. As the saying goes "gold makes even an honest man a thief".

Photo 40 shows me panning at this tourist claim on Bonanza Creek. Panning for long times is hard on the knees and the back and finding a comfortable place to do so is important. Using a light weight aluminium foldable chair is a good solution. The summer Yukon sun can be hard on the skin and a hat is also a good idea, as can be seen on the many old timer photos in this article. The summers can get very hot and the winters very cold. Last winter the temperature dipped below the -50 C mark if only for a short time.

After a couple of hours panning, I did recover some minute small specs of gold sand. Not much to show for a couple of hours work but nevertheless proves that there is still gold in Bonanza Creek. It was a sunny day and the shiny yellow glitter in the black pan was unmistakeable.

Photo 41 shows some very minute particles of gold recovered by the author along with some small white mineral pieces, probably a tin mineral. The largest gold piece is just over a millimetre long and is located on the lower left.

I also caught a piece of rock that was clearly heavier than the other rocks and along with pyrite and chalcopyrite also contained gold. Photo 42 shows this.

There are two types of claims in the Yukon. Placer claims refer to gold or other minerals in the soil, sand and gravels overlying bedrock and Quarts claims apply to bedrock itself. The two types are not overlapping. A placer claim does not mean right to the minerals in the bedrock and vice verse. As gold is much heavier than common rocks, placer deposits tend to accumulate in the lower parts of the geography. The bottom of valleys, river and creeks are typical places for placer deposits to form. Most gold is also commonly found just above bedrock. Gold can sometimes be found higher up on mountainsides or just above layers of for example hard clay, but this not common. For this reason, a saying has been established: "Gold is where you find it".

Map 4 shows placer claims of a central part of the Klondike on a topographic map. Some of these claims but far from all are in production and some are for sale. Obvious is that placer claims follow creeks and rivers. There are also many areas open for claim staking.

The gold in the placer deposits originally came from eroded bedrock. The bedrock deposits can, in contrast to placer deposits be anywhere and most of the area in the Klondike is blanketed by quartz claims. Gold in bedrock has been found here and there but not in large concentrations. Despite extensive exploration over many years there are no bedrock mines in the Klondike.

The rich placer deposits have now been mined out. Or have they? Is it possible that among the creeks and rivers, valleys and hills in the Klondike there are still spectacularly rich deposits that the stampeders, the dredges and the present-day miners have all missed? Or possibly, there are deposits below the dredge piles that were too deep for the dredges to reach? The highest concentrations of gold are commonly found just above bedrock. It is possible to judge if the dredges reached bedrock, and thus caught the gold rich layer. Boulders and rocks are commonly rounded from wear moving in the running water. If the dredge reached bedrock some of it was broken loose and produced more angular shaped rocks. Just walking over the dredge piles and looking at the rocks gives an indication.

Could there be deposits so rich that only a handful of shovels will produce a haul as is shown in Photo 43?

I guess there is only one way to find out and that is to go looking for it.

In working with gold, it is easy to get gold fever. Just a small shiny particle in the dark gold pan is very contagious. There is a difference between influenza and gold fever in that influenza only lasts one or two weeks.

Map 4. Topographic map of placer claims in the central part of the Klondike. The different yellow colors refer to different classes of placer claims. Photo by the author of a map supplied by the Dawson Mining Recorder.

Photo 43. A rich haul of gold, mostly coarse. Photo unknown.

A railroad to Yukon

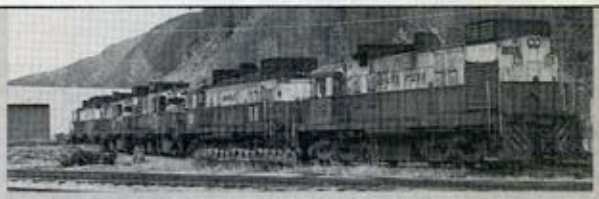
The discoveries of Klondike in Yukon, Canada and Kiruna in Lappland, Sweden are both late 19th century adventures. It was very hard work just to get to the sites, establish the mines and get started. And it was equally hard to get the profits out of the region.

The railroads were immensely helpful in both countries. In Yukon, the narrow-gauge railroad Skagway to Yukon started in 1899. In Sweden the standard gauge "Malmbanan" was built in 1882-87 and electrified 1915-20. The Yukon railroad was never electrified.

The excerpt below is copied from Railroad Model Craftsman, April 1991. The author is David G. Steer.

LARS TORSNER

A capsule history of the WP&Y



Gold was discovered near Bonanza Creek in the Yukon interior in the summer of 1896 and the arrival of the yellow metal in the southern markets triggered a stampede of men into the remote northland. The main flow of traffic passed up the Pacific coast to Skagway and from there on to Lake Bennett via either the White Pass Trail from Skagway or the Chilkoot Trail from nearby Dyea. From there the stampeders would travel over the lakes and tributaries of the Yukon River system to the gold diggings near Dawson. The bottlenecks in this route were the rugged mountains surrounding Skagway and the rapids on the Yukon River near Whitehorse. In 1897-98, the White Pass & Yukon Railway was organized and, by 1899 the track had stretched from Skagway to the shores of Lake Bennett. Prospectors no longer faced the arduous trek by foot over the rugged mountain trails with the year's worth of provisions required by the government to enter Canada. The railroad was opening up the Yukon. By August 1900 the 110 mile route was completed through to Whitehorse and legend of the gold seekers hiking the fabled "Trail of '98" was relegated to history.

Very quickly, the White Pass became more than just a railway. A fleet of river steamers operated on the northern waters to connect the mining communities. These were supplemented by coaches and, in the winter, by horse-drawn sleighs. By the 1930's the stern-wheelers were supplemented by motor transport and even a small airline.

In 1942 the railway was taken over by the U.S. Army Transportation Corps to assist in moving supplies for the construction of the Alaska highway. The Army brought with it a variety of locomotives and rolling stock from narrow gauge lines in the "Lower 48", and the WP&Y ended up with a roster that included equipment from the D&RGW, Silverton Northern, Eastern Tennessee & Western North Carolina, Colorado & Southern and the Sumpter Valley, to name just some of the lines. The Army pressed every bit of the equipment into service and in 1943 hauled ten times the traffic that the railroad had in 1941. This included over 30 trains in one day over the single track line. By the end of the war, much of the equipment was worn out.

In 1946 the railway was demobilized, and in 1951 the British interest relinquished control to a new Canadian White Pass & Yukon Corporation. Service was expanded and by 1955, the White Pass was a pioneer in providing container service from Vancouver via company coastal ships, the railway and road trucks to most points in the interior of the Yukon. In 1969 the opening of new mines, particularly the Cypress Anvil near Faro, caused an upgrading of track and facilities for ore service. By 1982, however, the mines were closed by the worldwide mining recession and the White Pass railway division also closed having lost more that 70% of its traffic. The completion of a paralleling highway also hurt the WP&Y's passenger and tour business.

When The Faro mine re-opened, a study was untaken to determine whether it was more economical to ship the ore out by rail or keep the road open all year. Despite the fact that the costs of the two transportation modes came out almost equal, in the final analysis the decision was made in favor of using the government maintained highway.

In the spring of 1988, the railroad did reopen the Alaskan portion of the line from Skagway to White Pass for excursions.

For 1991 the railroad will be running trains from May 18 to September 24 between Skagway and Fraser, B.C., where bus connections are offered for Whitehorse. In addition, the WP&Y offers rail motor car service between Fraser and Bennett for hikers on the Chilkoot Trail and both morning and afternoon excursions are offered for cruise ship passengers.

The trains are powered by the GE shovel-nose 90-class diesels. Additional motive power includes a steam engine, Mikado No. 73, which handles the yard switching and pulls the trains out of town to the shops where the diesels take over, and a pair of DL535E's used in work train service.

For more information on the White Pass & Yukon's 1991 schedules you can write to the railroad at P.O. Box 435, Skagway, Alaska 99840, or call 1-800-343-7373.—

DAVID STEER

RAILROAD MODEL CRAFTSMAN

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PRESSMEDDELANDE - 13 JULI 2022 09:15

Alicanto Minerals presenterar unik zinkfyndighet:

”Sala kan vara i startgroparna för en ny, grön gruvera”

Det svensk-australiensiska gruvbolaget Alicanto Minerals som prospekterar efter metaller och mineraler runt om Sala har hittat betydande fyndigheter av zink, silver och bly.

- Det är den största aktiva outvecklade tillgången av zink i Sverige. Fyndigheten kan sätta Sala och hela Bergslagen i centrum för Sveriges gröna omställning, säger Peter George vd Alicanto Minerals.

Fyndet omfattar 9.7 miljoner ton av zinkmalm, samt fyndigheter av silver och bly, vilket gör det till den största outforskade tillgången av zink i Sverige. Sala, vars stora gruvindustri avvecklades i början av 1960-talet kan därför bli aktuellt för en ny gruvera – en viktig pusselbit för industrins klimatomställning.

- Vi ser stor potential i Sala och kommer nu ta nästa steg och ansöka om en bearbetningskoncession för att kunna etablera en gruva, säger Peter George, vd Alicanto Minerals.

- Vi vill bygga vidare på Salas långa gruvtradition med en modern och helt elektrifierad gruva för fossilfri brytning. Vårt team har global erfarenhet men är ledande specialister på prospektering och gruvdrift i Sverige. Vi är stolta över att ha tagit första steget i en längre resa för oss och för Sala, säger Peter George vd för Alicanto Minerals.

Utan ankare, inget Söderfors.

Ankardebacle i örlogsflottan, Söderfors - och ett kungamord

Text och foto: Lennart Svensson

” I Norrland hava vi inom våra gränser ett Indien, blott vi förstå att bruka det”.

Nej, orden kommer inte från någon nutida exploatör av råvaror och andra naturresurser. Uttrycket myntades under Sveriges stormaktstid på 1600-talet – av dåvarande Rikskansler Axel Oxenstierna. Det han menade var att Sverige inte behövde, som övriga stormakter, lägga kraft på att leta kolonier i andra delar av världen – för behovet av resurser som skog, malm, vattenkraft och stora markytor. Sverige hade då, liksom idag, gott om dessa resurser inom egna gränser, särskilt från Dalälven och norrut. Ett sätt att ytterligare markera det koloniala synsättet på Norrland var det bottniska handelstvånget som Oxenstierna införde 1636 och som innebar att Gävle och andra hamnstäder i Norrland inte fick ha egen handel med utlandet. Handeln skulle gå via Stockholm.

Axel Oxenstierna kunde nog inte i sin vildaste fantasi ana hur brännande frågan om naturresurser i Norrland skulle komma att bli - 400 år efter det att han myntade uttrycket. Idag är debatten livlig, stundtals hätsk, kring skogens användning, kring gruvbrytning – och inte minst kring frågan om energi, vare sig det gäller älvarnas bruk till vattenkraft eller stora skogs- och havsytors bruk till vindkraft, eller

Söderfors.

för den delen brytning och slutförvar av uran till kärnkraft. Röster höjs med uppfattningen att Norrland förser svenska och utländska intressen med stora värden – utan att få tillräckligt mycket tillbaka, och att nyttjandet av naturresurser dessutom orsakar oönskad påverkan på miljön. Samtidigt sägs från annat håll att dessa naturresurser behövs för omställning till ett grönare samhälle och att investeringar utvecklar samhällen, välfärden och skapar arbetstillfällen, med nya skogs- och stålindustrier, vindkraftverk, datacenters – och batterifabriker. Användning av naturresurser är numera en ständig källa till högröstad debatt, så var det inte under stormaktstiden.

År 1675 var Sverige fortfarande en stormakt i Europa. Oxenstierna själv var inte längre med i leken, han hade utmanövrerats av Drottning Kristina, och avled 1654. Nu regerar Kung Karl XI över Stormaktssverige med allt vad det innebar av ständiga krig och andra prövningar av olika slag. Sverige hade lierat sig med Frankrike och Ludvig XIV, och när då Frankrike hamnade i krig med Holland och Brandenburg, blev även Sverige indraget. I juni 1675 led svenska trupper ett nederlag mot Brandenburgarna vid Fehrbellin. Hoppet stod nu till den svenska örlogsflottan som skulle skickas ut för att ge förstärkning till retirerande trupper och även för att slå till mot den revanschsugne huvudfienden Danmark. Flottans expedition blev dock ett stort fiasko. Först försenades avresan kraftigt på grund av försummelser i underhållet. När man väl kom iväg tvingades flottan att vända redan vid Gotland, efter det att det största örlogsfartyget, Regalskeppet Stora Kronan, hade förlorat flera av sina helt nödvändiga ankare i en oktoberstorm. Fartygets ankare var av för dålig kvalitet och utan ankare gick skeppet inte att manövrera. Skandalen var fullständig och paniken smög sig på landets ledning. En fungerande och kraftfull örlogsflotta var helt nödvändig för att försvara och upprätthålla Sveriges stormaktsintressen på andra sidan Östersjön. Det fick inte äventyras av ankare som inte höll måttet!

Ankare till örlogsflottan hade dittills till-

verkats vid en ankarsmedja på Skeppsholmen i Stockholm. Där smiddes ankarets olika delar ihop med handkraft av smeder, ett mycket slitsamt arbete. I takt med att skeppen blev större, krävdes större ankare, nu med vikter upp till flera ton styck. Man insåg snart att det skulle vara omöjligt att tillverka robusta stora ankare på Skeppsholmen, med föråldrade hantverksmetoder. Det var tvunget att rusta upp örlogsflottan, men hur skulle man lösa frågan om ankare? Import från fientliga makter var förstås uteslutet! En rad nya fartyg skulle byggas, år 1700 hade Sverige sin största örlogsflotta någonsin, 52 större fartyg, bestyckade med 3000 kanoner och en total besättning om 20 000 man. Den flottan krävde ankare som höll måttet, även i storm!

Vid Älvkarleö Bruk hade grundaren och innehavaren av bruket, Claes Depken, utvecklat en metod att smida ankare med hjälp av en vattenhammare, alltså att smida med hjälp av vattenkraft. Metoden var överlägsen den tidigare hantverksmässiga metoden och Depken fick en beställning på 12 nya ankare som skulle ersätta de som hade förlorats. Beställningen som levererades redan under vintern 1675/1676 övertygade flottan med sin överlägsna kvalité. Dessvärre hjälpte det inte Stora Kronan särskilt länge, skeppet förliste med 800 man i sjöslaget vid Ölands södra udde den 1 juni 1676. Katastrofen berodde den här gången inte på skeppets nya ankare, ankarna var av prima kvalitet. Katastrofen berodde snarare på befälens bristande erfarenhet av sjöslag, men det är en annan historia.

Claes Depken kombinerade sin myndighetsroll som Bergmästare, med framgångsrik affärsverksamhet i Norra Uppland och Gästrikland. Vid den här tiden hade han redan fått privilegier till - och grundat bruken i Älvkarleö och Harnäs (1659), Axmar (1660), Hyttö Masugn (1665) och Galtström i Medelpad (1672). Nu såg han chansen att grunda ytterligare ett bruk, specialiserat på att tillverka ankare till den svenska örlogsflottan. Platsen han valde blev Söderforsen vid Jörsön i Dalälven, på gränsen mellan Uppland och Gästrikland. Där fanns vattenkraft, närhet till prima järnmalm i Dannemora och gott om skog till träkol. Med nya privilegier grundade Depken Söderfors Bruk 1676, alltså direkt efter ankardebaclet 1675.

Den engelska parken i Söderfors med det Grekiska Templet.

I samband med att bruket grundades, adlades också Claes Depken och förärades det nya adliga och passande namnet för en grundare av ett ankarbruk vid en ström – Anckarström. Låter namnet bekant? Vi återkommer till det. Claes Depken var gift med Helena Honnon från Gävle, dotter till Hans Honnon, en köpman av skotskt ursprung som hade slagit sig ner i Gävle. Släkten Honnon har för övrigt en färgstark och händelserik historia i Gävle, men det är också en annan historia.

Tillverkningen av ankare vid det nyanlagda bruket Söderfors kom igång ordentligt på 1690-talet då bruket levererade ankare motsvarande uppemot 300 ton årligen, till utbyggnaden av örlogsflottan. Färdiga ankare skeppades först på pråm på Dalälven till det norra färjeläget vid Ön, Hedesunda. Därifrån vidare på landsväg till Gävle hamn och därifrån vidare till Stockholm med båt. Transporter av färdiga ankare och transporter av insatsmaterial som järnmalm och träkol krävde stora insatser av Söderfors Bruk. I anteckningar från tidigt 1700-tal kan man se att bruket avlönade 550 personer. Av dessa var 70 inblandade i själva tillverkningen av ankare, smältare, smeder och andra. Övriga, nästan 500 personer, var engagerade i transporter av olika slag, i oländig terräng, till och från bruket.

Söderfors Bruk har snart verkat i 350 år, och är det sista bruket, av de 18 uppländska så kallade Dannemorabruken, som fortfarande har verksamhet i större skala. Gemensamt för Dannemorabruken var att de försörjdes med

malm från Dannemora gruva. I sin krafts dagar var bruken i Lövsta, Forsmark och Österby de största. De förbrukade tillsammans hälften av malmen från Dannemora. Men bruket i Söderfors blev som sagt det mest uthålliga, med betydande verksamhet ännu i våra dagar. Utrymmet i en artikel tillåter inte att berätta så mycket om de 350 åren. Men vi kan i alla fall nämna de viktigaste ägarepokerna under historiens gång. År 1748 köpte direktören i Ostindiska kompaniet, Claes Grill, Söderfors Bruk. Släkten Grill behöll ägandet av bruket i 160 år, till 1907 då Stora Kopparberg förvärvade bruket. På 1970- och 80-talet hade Uddeholm och Fagersta olika ägarroller. 1992 blev det franska företaget Eramet ägare till Söderfors bruk, och driver fortfarande bruket under namnet Erasteel. Tillverkningen av ankare är nedlagd sedan länge, idag tillverkar Söderfors avancerade material, ämnen av snabbstål och gasatomiserat metallpulver.

Under den andra halvan av 1700-talet utvecklade Claes Grill och sonen Adolf Ulrik Söderfors Bruk till en ny nivå, både industriellt, men även socialt, kulturellt och naturvetenskapligt. Framförallt Adolf Ulrik var mycket naturvetenskapligt intresserad och lät 1786 uppföra ett Naturaliekabinett med en imponerande samling naturalier från växt- och djurriket. Samlingen var en av landets absolut förnämsta, vida överlägsen Kungliga Vetenskapsakademiens egen samling. När den Grillska samlingen överlämnades till Vetenskapsakademien i slutet av 1820-talet kom den att bli grunden till Naturhistoriska Riksmuseet. Familjen Grill arrangerade även många kulturevenemang, till exempel välbesökta musikaftnar på Bruket. Då spelades inte sällan stycket ”Divertissement på Söderfors”, av den erkände kompositören Johan Wikmanson. Adolf Ulrik tog även i slutet av 1700-talet initiativ till en förträfflig skildring av Söderfors Bruk, skriven på latin och svenska. Den översattes så sent som 1970 till engelska därför att den anses internationellt viktig, eftersom den är en av de äldsta företagsbeskrivningar som överhuvudtaget existerar. Den engelska parken i Söderfors med det Grekiska Templet, efter förebild av Theseus-templet i Aten, anlades även det i slutet av 1700-talet på initiativ av Adolf Ulrik.

Söderfors är idag något så ovanligt som ett litet bruk bortom allfartsvägarna, både med en kvalificerad industriverksamhet, och med ett stort skyddat byggnadsminne av bruksmiljön. Jag hade själv privilegiet att lära känna samhället på nära håll när jag under några år i brytningen mellan 80- och 90-tal arbetade som chef för ett annat framgångsrikt industriföretag i Söderfors, Habia Cable. Tiden i Söderfors gav mersmak, och jag gör fortfarande regelbundna återbesök till den unika bruksmiljön. Söderfors Bruk har gjort en 350-årig resa från en i all hast framtvingad etablering i jakt på naturresurser – till ett samhälle med flera högteknologiska industriföretag, tillika en storartad kulturmiljö.

Ja, hur var det nu med Anckarström? Grundaren av Söderfors Bruk, Claes Depken, adlad Anckarström, var gift med Helena Honnon från Gävle. Helena kom därmed att bli släkten Anckarströms urmoder. Helena hade tidigare varit gift med Bergsmannen Frans Futje i Falun. Claes Anckarström adopterade senare Helenas son från hennes första äktenskap, David, som då även han antog namnet Anckarström. Claes och Helena Anckarström fick även ett gemensamt barn, dottern Catharina. Fyra generationer efter Helena, avlossade Jakob Johan Anckarström det dödliga skottet mot Kung Gustav III, den 16 mars 1792 på Operan i Stockholm. Helena Honnon från Gävle var kungamördarens farfars farmor.

Artikeln har tidigare varit införd i Gefle Dagblad.

Källor;
Söderfors 300 år, Stora Kopparbergs Bergslags AB, 1976
Gavledraget
Wikipedia
Rötter.se

Bergsskolan i Filipstad. Foto: Bergsskolan.

Bergsskolan i Filipstad

15 pers närvarande

Text: Elisabeth Torsner

En av de sista föreläsningskvällarna under våren gick ordet till Filipstad och Bergsskolan. Bergsskolan bildades 1830 och är därmed nästan lika gammal som Bergshögskoleutbildningen på KTH. Bergsskolan fyller 200 år, år 2030. Huvudman är Jernkontoret, SweMin, totalt 9 företag och Filipstads kommun.
OBS! Absolut sista ansökningsdag för i höst **är 1 augusti!**

Jan Håkansson är ny rektor. Ny och ny, han har suttit i 4 år. Tekn.dr. Jörgen Andersson är lärare. I bagaget har han 14 år på Stålforskningen i Hagfors. Deras uppgift är att skaka liv i 200-åringen! Skolan gick i konkurs för 5 år sedan - det är därför mycket viktigt att man lyckas med vad man företar sig!!

Man ägnar sig åt tre områden
- Utbildning - Fortbildning - Projekt.
Man satsar på reell kompetens.

Utbildning

- Berg och Anläggningsteknik, 3-årig ingenjörsutbildning, 2-årig teknikerutbildning
- Metall och Verkstadsteknik, 3-årig ingenjörsutbildning, 2-årig teknikerutbildning
- Förberedande bastermin, med ca 15 elever
- Ca 100 program för studenter och folk från industrien.
- Man har lyckats skapa 122 praktikplatser på 36 företag. Studenter får önska praktikföretag.

Frågeställningar för eleverna

- Känna lukten av produktion, lärande i arbetet, LIA
- Utveckling - att bli en del i processen
- Ledarskap - studenterna får intervjua chefer

Fortbildning

Just nu har man 20 sökande till fristående kurser - ofta på distans. Dessutom har man skräddarsydda kurser för ett eller flera företag. Man är ”ganska framgångsrik”.

Projektmedel

MinPro stiftelsen 100 000 kr
Knutsbergsstiftelsen 100 000 kr - Upprustning av svepelektronmikroskopet.

Man vill vara den röda tråden mellan grundutbildning - fortbildning - företagsprojekt. Det innbär chansen att vässa erbjudandet!

Rekrytering av nya studenter (gymnasienivå)

- Hitta nästa generation av tekniker - Barnens bergsskola - hitills 740 deltagare. 8 - 12 år gamla
- Plugga vidare - förebild
- Laborationer - högstadiet coh gymnasiet
- Sommarforskarskola
- Fortbildning för lärare
- Bergsskole Q (idag 25 % kvinnor)
- SIAM - optimera processföretag - samarbete med ett litet/medelstort företag per månad.

Gränges Aluminium 125 ÅR, 2022-06-15

15 åhörare

Föreläsare: Patrik Sivesson, Acting Managing Director, Gränges Finspång AB. Text: Elisabeth Torsner

Patrik Sivesson, B86, tekn dr 1997.

Nu var det dags! Föredraget planerades redan till november 2021, men omständighter orsakade både byte av föredragshållare och tidpunkt.

Patrik höll föredraget framför ovanstående jätteförstoring av smala, slittade aluminiumband från Finspång.

Gränges har sitt ursprung i Grängesberg med järnmalmsgruva och privat järnvägslinje från 1896. Finspång började som kanongjuteri redan 1580 och den produktionen upphörde först 1913. I stället satsade man på aluminiumproduktion från 1922, sannolikt till Saab i Linköping. På 50-talet avskiljdes turbintillverkningen (idag en del av Siemens) och företaget blev det som idag kallas Gränges Aluminium. Man börsnoterades 2014. Tillverkning i Shanghai startade 1996 (vilket var mycket tidigt), man köpte 2016 de amerikanska produktenheterna av Noranda och senaste tillskottet 2020 är polska Aluminium Konin. Forskning och Innovation finns i Huntingdon, TN och i Finspång.

Gränges Aluminium har riktat in sig på material för värmeväxlare, både mobila i fordon

och stationära, material till specialförpackningar samt en minskande andel kallvalsade produkter. Man är No 1 eller 2 i världen på dessa områden på marknaderna i Europa, Asien och USA. Man levererar inte till flygindustrin och siktar inte heller på stor bandbredd. År 2021 sålde man 570 000 ton med ett resultat på 1 024 Mkr, dvs en vinst på 1,80 kr per kg. Första halvåret 2022 minskade försäljningen med 3,4 % men vinsten ökade till 732 Mkr, dvs det bästa resultatet någonsin.

Man har gjort en hel del för att förbättra produktionsutrustningen, man har investerat USD 85 Milj i Huntigdon, byggt ett nytt kallvalsverk i Finspång (samma väl beprövade konstruktion som i Shanghai) och satsat på nya Konin.

Vad är man duktig på? Först och främst varmvalsningen, därefter slittning från tjocklek 50 μm till 3,0 mm.

Plätering i flera lager tillför unika egenskaper, ofta kundanpassade.Innovativa lösningar som TRILLIUM, fem olika material i lager, som eliminerar kundens behov av avfettning, flussning och torkning innan lödningslinjen. Ett annat unikt koncept är DISPAL, som är ett pulverbaserat material som möjliggör spray-formning för satelliter och andra ovanliga applikationer, tex Königsegg racer-bilar.

Elektrifieringen av fordon kommer att leda till 40% större behov av lödda värmeväxlare, kanske t.o.m. 80% större behov för Plug-in hybrider. Här ser man en stor potential.

Man har arbetat länge med hållbarhet. ASI Aluminium Stewardship Institute började 2017 att samla in data på vad Al-industrin släpper ut. Gränges enheter i Finspång och Shanghai är redan certifierade. Hela bolaget började på 11,4 ton CO_2 per producerat ton Al, 2021 nådde man 9,3 och målet är 8,0 ton år 2025. Finspång är redan nu nere på 5,0 ton CO_2 per ton Al. Man erbjuder nu kunderna certifikat på hur mycket just deras inköp har kostat i CO_2.

Sammanfattningsvis:

- Tillväxt större än branschens genomsnitt
- Ledare på attraktiva marknader
- Fokus på hållbarhet
- Tydligt industriellt fokus
- Starkt resultat och kassaflödesgenerering
- Långsiktigt värdeskapande

Föreningen

Svenska BergsmannaFöreningen

Styrelsen för Svenska Bergsmannaföreningen 2022

ROBERT ERIKSSON
Ordförande

robert.eriksson@jernkontoret.se

GÖRAN CARLSSON
Vice ordförande

goran.carlsson54@hotmail.com

PAOLA ZETTERBERG-ERIKSSON
Kassaförvaltare

paola.zetterberg-eriksson@ovako.com

ULLA BACKLUND
Ledamot

ulla.margareta.backlund@gmail.com

MATS GARTZ
Ledamot

mats.gartz@gmail.com

GÖRAN HANSSON
Ledamot

GH@ferromax.se

TORBJÖRN STERNSJÖ
Ledamot

torbjorn.sternsjo@granges.com

ELISABETH TORSNER
Redaktör

elisabeth@torgesta.com

AMANDA EDLUND
Revisor

CARL PETERSOHN
Revisor

ÅSA HELGESSON
Revisorssuppleant

JOHAN ROSÈN
Revisorssuppleant

Svenska BergsmannaFöreningen

Kretsråd för Svenska Bergsmannaföreningen 2022

THOMAS LINDHOLM
POLAR
thomas.lindholm@geovista.com

CHRISTER NORDSTRÖM
POLAR
christer.nordstrom@telia.com

AKSEL ÖSTERLÖff
POLAR
folrets57@gmail.com

RUTGER GYLLENRAM
STHLM/ÖST
rgyllenram@gmail.com

GÖRAN HANSSON
STHLM/ÖST
GH@ferromax.se

MARIA KÖHLER
STHLM/ÖST
kohler.maria@gmail.com

SUSANNE M NORGREN
BERGSLAGEN
susanne.m.norgren@sandvik.com

GUNNAR RUIST
BERGSLAGEN
gunnar.ruist@outokumpu.com

PETER SAMUELSSON
BERGSLAGEN
peter.samuelsson@m3advice.com

FREDRIK CEDERHOLM
VÄST
fredrik.cederholm@gmail.com

ALEXANDER LÖF
VÄST
alleloef2001@hotmail.com

ANDERS JARFORS
SYD
anders.jarfors@ju.se

ÅSA LAUENSTEIN
SYD
asa@lauenstein.se

LENA MAGNUSSON ÅBERG
SYD
lena.magnusson.aberg@volvo.com

Svenska BergsmannaFöreningen

c/o Föreningshuset• Virkesvägen 26 • 120 30 Stockholm
tel 08-121 513 26 • kansli@bergsmannaforeningen.se • www.bergsmannaforeningen.se