Bergvesenet

Postboks 3021, 7002 Trondheim

Rapportarkivet

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		Reidar H Andersen	Muting	

Tittel

Rapport om Eidsvollaktivitetene.

Forfatter	Dato	Bedrift
Andersen, Reidar H	13.12 19	Norske Gullgruver A/S Reidar H Andersen

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Fagområde	Dokument type	Forekomster
Geologi kjerneboring	Rapport	Utsjøen Holtsjøen Brøstad
Råstofftype	Emneord	
Malm/metall	Au	

Sammendrag

Foreløpig rapport med kart over gangsystemet og borhullplassering ved N. Holtsjøen. Et lokaliseringskart og profiler vedlagt for arbeidene i Utsjøområdet.

Vedlagt ligger også en engelsk artikkel om bruk av "søkevinkler" i malmleting. Slike søkevinkler gjorde Wilhelm Tveter bruk av for å registrere gullførende kvartsganger.

Reidar H. Andersen
Bjerkealleen 9
1322 HØVIK

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PR 318/94 A

BERGVESENET
v/Bjarne Lieungh
Postboks 3021 Lade
7002 TRONDHEIM

Høvik 12/8-1994

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Rapp. BV 4003

RAPPORT FRA EIDSVOLL

Takk for meget hyggelig møte i Eidvoll gulldistrikt.

Her er rapporten som jeg lovet om situasjonen ved Utsjøen og Brustad. Jeg tillater meg også å legge ved en artikkel om bruken av søkevinkler eller ønskekvist. Håper dette kan gi litt forståelse for hvorfor vi benytter søkevinkler ved kartlegging av årer. Det er jo så lite å se på overflaten. Vedlagte kartskisse fra Wilhelm Tveter over åresystemet for Brustadområdet er funnet ved hjelp av søkevinkler. Dette er bekreftet med boringer, røsking og påvisning av skjerp utført av "gamlekara".

Du finner også vedlagt de fotoene du tok av gropa ved Louise.

Med vennlig hilsen

Reidar H. Andersen

P.s. Vi starter kjerneboring uke 34

J.nr 1396/94
og J.nr 1436/94

RAPPORT OM EIDSVOLLAKTIVITENE

Dette er en samle-rapport for Eidsvoll (Utsjøen og Brustad).

Det som kanskje har skapt litt forvirring med aktivitetene i Eidsvollområdet er at noen av aktørene går igjen i ulike prosjekter som ikke hører sammen. Forholdet blir forhåpentlig klarere i følgende statusmelding:

Brustadområdet:

WGAB (Wärmland Guldbrytning AB) har samarbeidet med Wilhelm Tveter. Dette samarbeidet er opphørt slik at ingen formelde bånd er knyttet mellom partene. Aktivitene medførte en del inngrep i naturen som skulle ryddes opp. Tveter har på eget initiativ påtatt seg oppgaven for dette for å opprettholde det gode forholdet til grunneierne. Arbeidet regnes å være ferdig i løpet av august.

W. Tveter, Bjarne Olsson (maskinentrepenør og boreekspert fra Arvika) og undertegnede har inngått en avtale om å fortsette der WGAB slapp. Mutingene er som kjent tatt ut av undertegnede.
Vi vil som tidligere meldt fra om, foreta kjerneboring langs veien til Brustadgruven mellom Løntjern og Løntjernbråten (se vedlagt kart). Dersom disse kjerneprøvene gir klare indikasjoner om gode muligheter, vil vi umiddelbart søke om prøvedrift. Området har meget god adkomst og skulle ikke medføre alvorlige trusler mot naturen. Samtidig med prøvedriften ønsker vi å utprøve nye miljøvennlige ekstraksjonsmetoder. Vi har innledet samtaler med et firma som eies av Hydro. Dette er Megon og som er kjent for ekspertise innen "solvent extraction" etc. Vi ønsker også samarbeide med andre for å utvikle småskala bryteteknikker.

Utsjøområdet:

Denne aktiviteten startet på bakgrunn av at noen hadde stor interesse av å finne den gamle gullgruven ved Utsjøen. Det aktuelle området ble tatt ut ved intuisjon eller "syn" av en av medeierne i Norske Gullgruver A/S. Dette ble fulgt opp med prospektering av W. Tveter og undertegnede.

Vi kunne overhode ikke finne noen sprekker eller spor av kvartsganger i overflaten, men sterke sprekksoner ble fanget opp med søkevinkler. Disse sprekk- eller malmsonene ble bekreftet med et WADI-instrument. Dette instrumentet måler elektromagnetisk stråling som kommer fra mineraliseringen i sprekkene. Denne elektromagnetiske strålingen oppstår ved induksjon av kraftige lavfrekvente radiobølger som sendes ut fra radiosendere som kommuniserer med bl.a. u-båter. VLF

Da vi ikke fant noen inngang på land, konkluderte vi med at den måtte ligge ute i sjøen. Utsjøen ble demmet opp etter gruvedriften tok slutt, så antagelsen var ikke usannsynlig. Det var derfor ønskelig å tappe ned sjøen. Dette har imidlertid blitt møtt med tildels hard protest fra naturvernere og fiskeinteresserte.

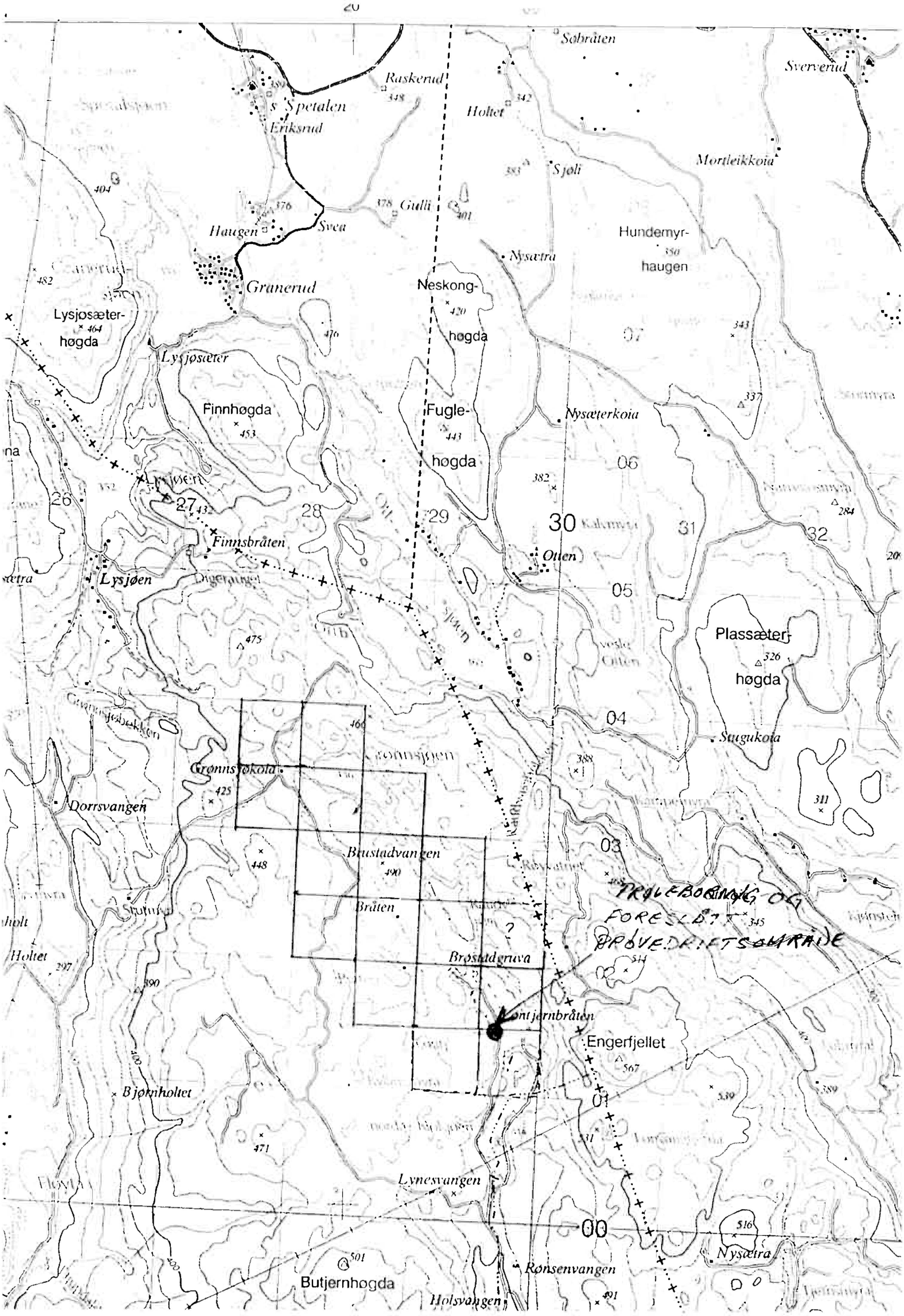
Vi foretok så boringer på et område vi mente kunne inneha gruvegangen. Boringen avslørte sprekksonene som antatt uten å finne gang eller mineralisering av betydning (se skisse av boringsprogram). Analysene viste generelt 0,1gram Au pr. tonn.

Etter denne boringen tok pengene slutt og NGG A/S har lagt aktiviteten på is inntil ny kapital kan reises.

NGG A/S er ikke med på prosjektet ved Brustad. W.Tveter, B. Olsson og undertegnede er kun aksjonærer i NGG A/S.

Høvik 12/8 - 1994

Reidar H. Andersen



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Holtet
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Mortleikkoia
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Hundemyr-
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PRØVEBORING OG
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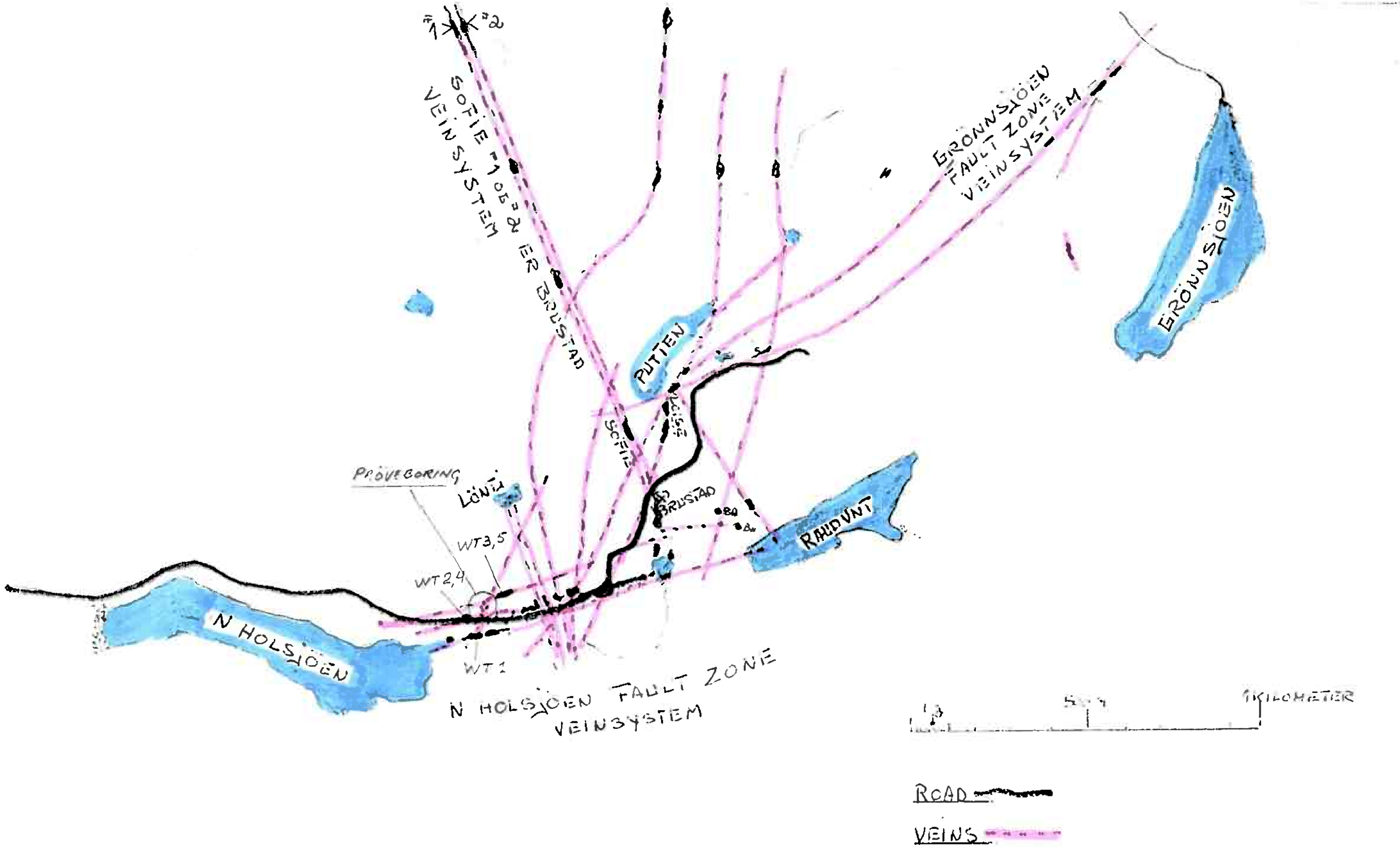
PRØVEDRIFTSOMRÅDE



#1
#2
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GRÖNNSJÖEN
FAULT ZONE
VEINSYSTEM
GRÖNNSJÖEN
PUTTEN
SOFIE
PRÖVEBORING
BRUSTAD
WT3,5
WT2,4
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N HOLSJÖEN
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VEINSYSTEM
1KILOMETER
ROAD
VEINS

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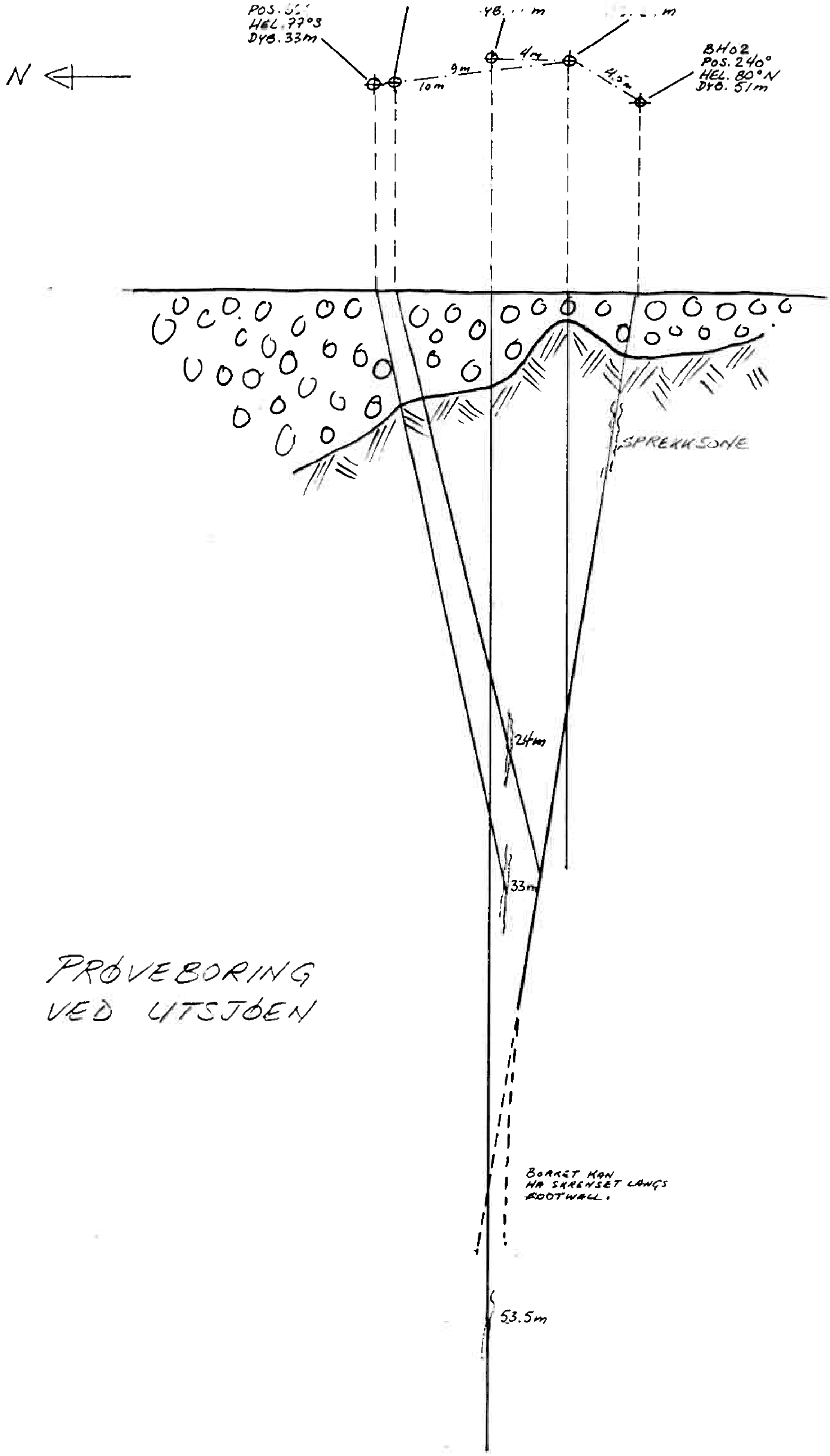
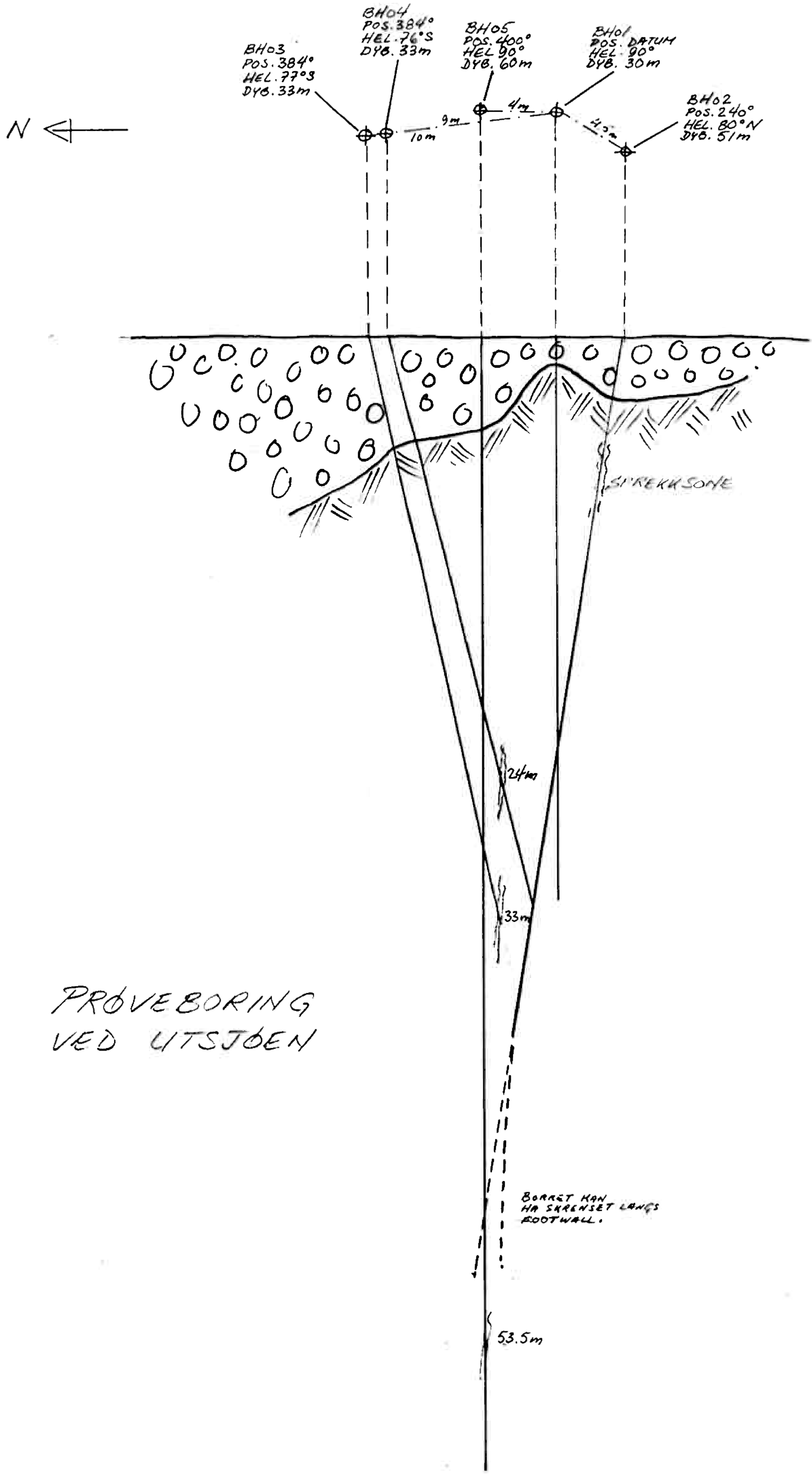
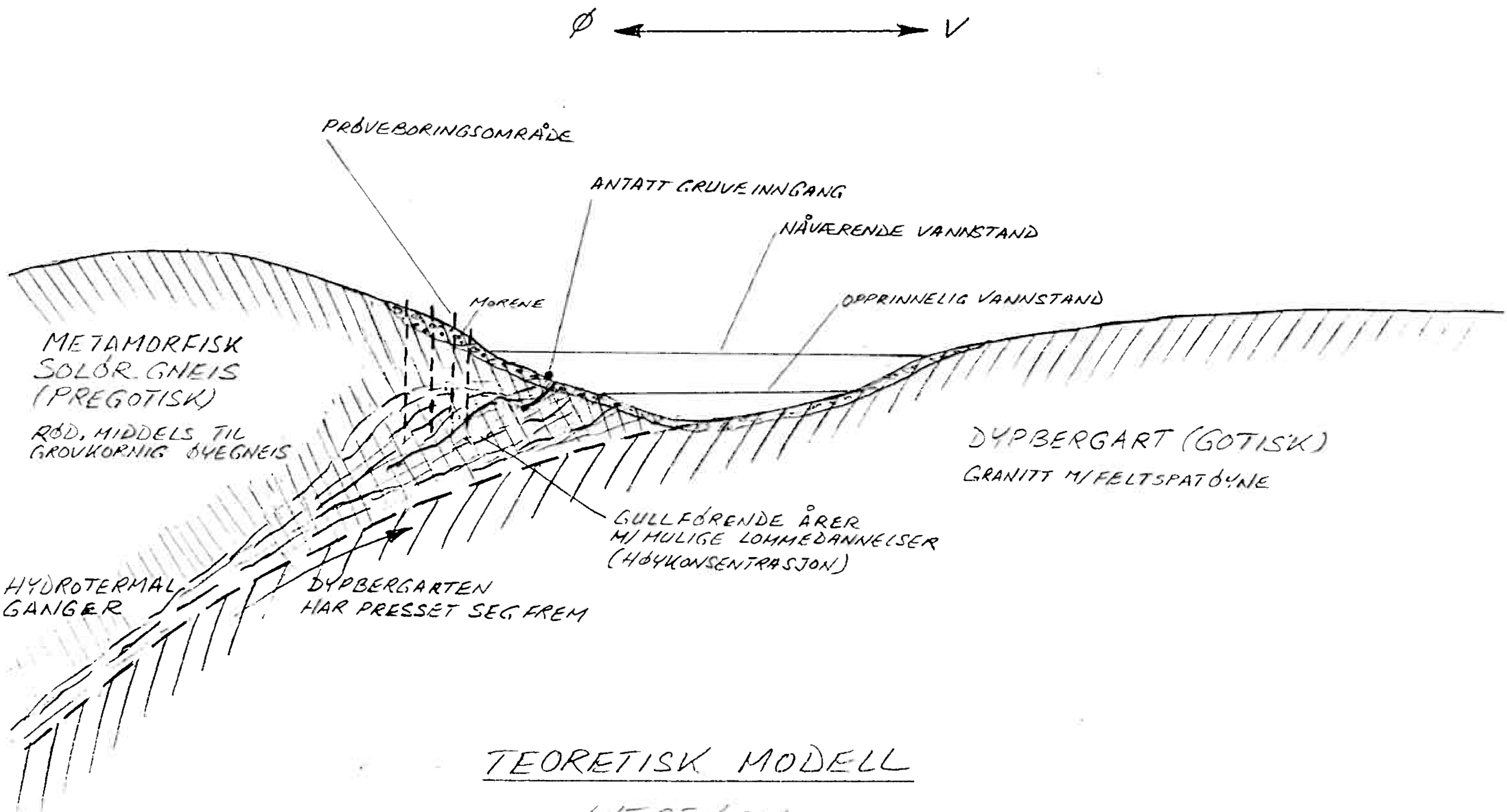


PRØVEBORING
VED UTSJØEN

BILAG 1



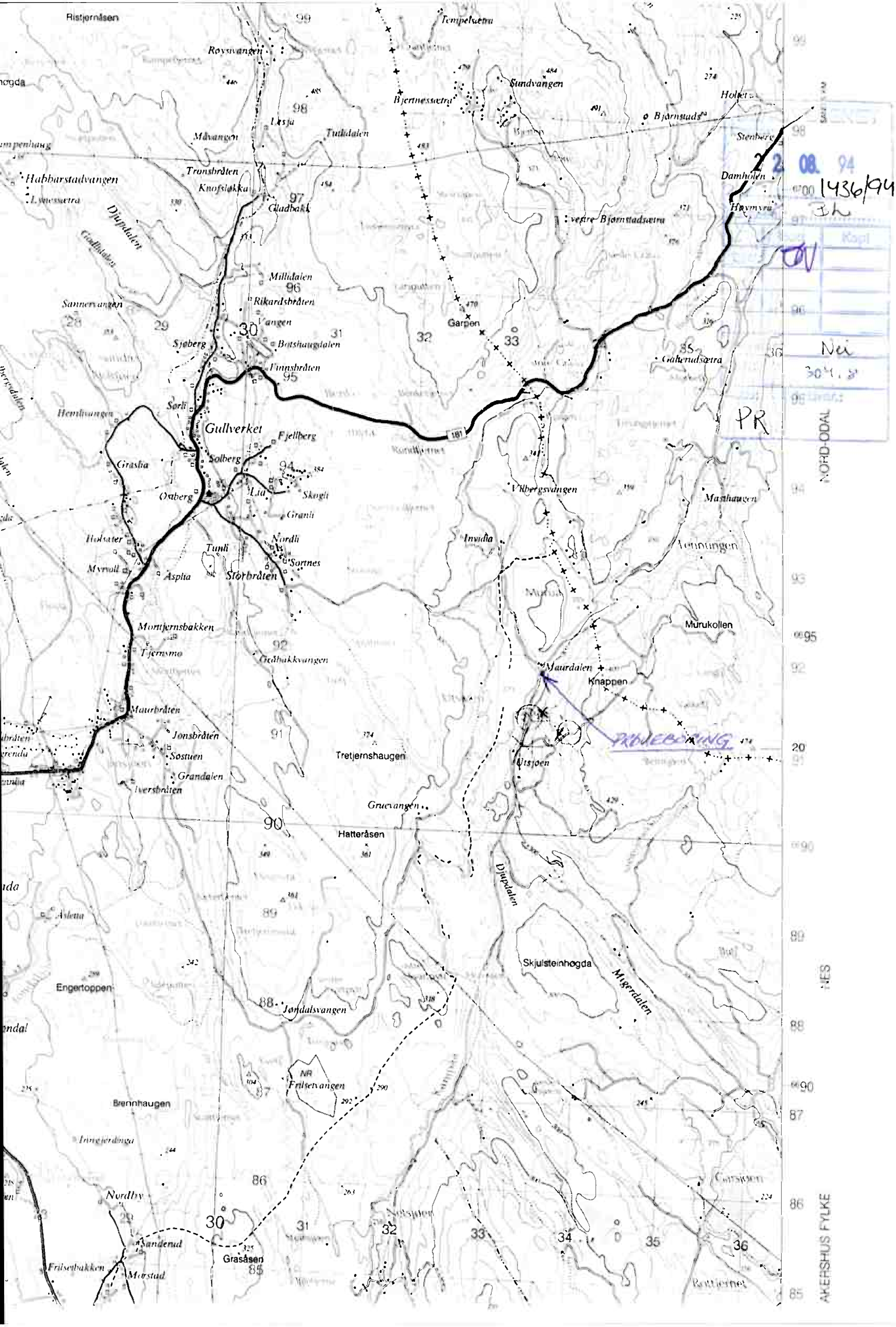
PRØVEBORING
VED UTSJØEN



TEORETISK MODELL

UTSJØEN

BILAG 2



Ristjernåsen
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Bjertnessætra
Holtet
Bjørnstadsætra
Stenberg
Løsja
Tulldalen
Måvangen
Habbarstadvangen
Tronsbråten
Knofsløkka
Gladbakk
Damhølen
Høymyra
vestre Bjørnstadsætra
Djupdalen
Millidalen
Rikardsbråten
Vangen
Sannervangen
Sjøberg
Botshaugdalen
Garpen
Gulerudsætra
Finnsbråten
Sørli
Hemlivangen
Gullverket
Fjellberg
181
Solberg
Graslia
Lia
Skogli
Østberg
Granli
Vilbergsvangen
Masthaugen
Holsæter
Invidia
Nordli
Tunli
Sortnes
Myrvoll
Asplia
Storbråten
Murukollen
Montjernsbakken
Tjernsmo
Gulbakkvangen
Maurdalen
Knappen
Maurbråten
Jonsbråten
Søstuen
Tretjernshaugen
PRØVEBORING
Utsjøen
Grandalen
Iversbråten
Gruevangen
Hatteråsen
Djupdalen
Åsletta
Skjulsteinhøgda
Migerdalen
Engertoppen
Jordalsvangen
Frilsetvangen
Brennhaugen
Nordby
Sandenud
Grasåsen
Frilsetbakken
Morstad
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A sense of direction for dowsers?

Scientists have long been sceptical of dowsing, suggesting that, at best, it might be explained in terms of an unconscious response to visual clues. Recent findings suggest that a feeling for magnetism could explain it

Tom Williamson

Paul Broadhurst/Fortean Picture Library

AT FIRST sight, few activities seem more foolish than dowsing. The idea that someone walking along holding a forked rod can detect mineral veins or other underground features sounds absurd. A series of investigators—the latest being that intrepid scourge of the paranormal, James Randi—have shown that dowsers sometimes make claims they cannot substantiate. Most scientists accordingly view dowsing as nothing more than self deception resulting from autosuggestion and certainly not worth serious attention.

A closer look at the evidence, however, shows that the sceptics' position is not as well founded as its supporters claim. What is more, a variety of recent findings now point towards a startling alternative explanation for the phenomenon. Dowsing may turn out to be a manifestation of a hitherto unrecognised human faculty: a sense of magnetism.

Sceptics sometimes argue that dowsing must be nonsense because its practitioners claim unlimited powers. But, over the centuries, most dowsers have confined themselves to searching for mineral veins and flowing ground water, which are associated with geological features such as faults. The claims of the more reputable dowsers have a degree of unity which suggests that there may be a simple explanation.

Critics also claim that there is little to suggest that dowsing really works. The evidence is certainly inconclusive. To take dowsing for water as an example, several surveys have compared yields of dowsed wells with those of wells sited by conventional methods. Sometimes, dowsers have done better and at other times worse than other water finders. However, even where dowsers have performed well—and some have had excellent records—critics still say that the results could owe more to their knowledge of local conditions than to any mysterious ability to detect "underground streams".

Most critics admit, however, that the field evidence is by its nature inconclusive. They rest their case instead on the results of controlled experiments, to which the subjects come unprepared. One approach has been to test the consistency of dowsing responses: if people really can detect underground features, their rods should move in the same places. The results have been mixed. In one experiment, carried out in New Zealand in the late 1940s, the chemist P. A. Ongley asked dowsers to locate "underground streams". He then asked them to find the streams again with their eyes closed, to check each other's findings on the positions of streams and to perform other such tasks. None of the dowsers did much better than chance. However, in 1970, Duane Chadwick, of Utah State University, conducted a more sophisticated study, involving more subjects. In three out of four experiments, he found that dowsers' rod movements showed a highly significant clustering—much higher than in control tests devised to allow for the subjects' responses to visual cues.

A different tactic has been to invite people to make claims for dowsing and then to devise appropriate experiments to test them. In one oft-cited test, carried out by the American Society for Psychical Research in the late 1940s, dowsers found water but failed to predict its depth and yield as well as a geologist and a water engineer. In another famous experiment, carried out on behalf of Britain's Ministry of Defence in 1971, dowsers failed to distinguish between a series of buried wooden, concrete, plastic and metallic objects. Neither could they determine whether or not water was flowing in buried plastic pipes or locate other hidden water pipes. In 1979, the magician James Randi offered \$10 000 to anyone who could successfully trace the course of water flowing through a series of buried pipes. Four dowsers tried: none did well enough to claim the prize.

How relevant are such experiments to dowsing for mineral veins or flowing ground water? Obviously, they have some bearing. They show that some dowsers have grossly inflated ideas of their own abilities and suggest that we should view all claims for dowsing with caution. On the other hand, the results leave open the possibility that dowsing may involve response to cues, such as small magnetic changes, that were not measured in the tests.

Gene Simmons, a geophysicist at the Massachusetts Institute of Technology, recently came up with a good example of how magnetic sensitivity could play a part in successful dowsing for water. Simmons conducted surveys of gravity and magnetic fields around two dowsed wells near Boston, Massachusetts. Unlike most other wells drilled in the crystalline rocks of the district, the holes yielded large quantities of water, at least 140 000 litres per hour. Simmons found that the dowsers had sited both holes within a narrow magnetic anomaly only a few metres wide. The anomaly resulted from a fracture zone that was channelling the flow of ground water, hence the exceptionally high yield of the wells.

The theory that people can respond to magnetic cues could also explain how dowsers may find veins of metal ores. These veins are usually associated with faults or fracture zones, which often produce magnetic anomalies, and in some cases ore minerals are themselves magnetic. Support for the idea comes from the Soviet Union (*New Scientist*, 8 February 1979, p 371). Since the early 1970s, geologists there have used dowsing on a large scale and have drilled thousands of test bores on the basis of dowsing. The geologists report that dowsers show most frequent rod movements over sulphide or chromite ore bodies, diamond pipes, certain faults and fracture zones, steel pipelines, underground cavities and beneath electricity cables. These are just the places where magnetic changes occur.

Dowsing is also used in other disciplines such as archaeology. Particularly in the Soviet Union, but also elsewhere, dowsers are helping archaeologists to locate buried features such as ditches, foundations, graves, old excavations and drainage systems. These features create small magnetic changes that are usually detected with highly sensitive instruments such as proton magnetometers. Supporters of dowsing claim that it is cheaper and often more convenient than conventional surveying. As an example, Richard Bailey, of the University of Newcastle upon Tyne, recently used dowsing to help to find buried foundations in a number of churches in northern England.

If dowsers can detect small magnetic anomalies, they should also be able to help in surveying the ground beneath building sites, because pipes, cables, drains, culverts and the like all produce such changes. Many civil engineers and construction workers do use dowsing to trace these features—there is even a flourishing trade in the L-shaped metal rods that these workers prefer to the traditional water dowser's V-shaped tool. Ian Killip and his colleagues at the Department of Building and Civil Engineering at Liverpool Polytechnic have investigated the potential of dowsing in this application. Killip has been sufficiently impressed by the results to develop a systematic method of dowsing for the construction industry. He claims that the technique offers a cheap and quick alternative to geophysical methods.

Needless to say, sceptics have not been convinced by the case histories reported by geologists, archaeologists and civil engineers. They argue that if we were to investigate each apparent dowsing success, we could probably find an ordinary explanation. Some good results might be due to chance, others to the dowser's background knowledge and yet others to an unconscious response to visual cues. There is no need, in the sceptics' view, to invoke anything so exotic as a sensitivity to magnetism.

Until recently, this might have been a reasonable argument. Apart from the clues provided by dowsing itself, there was little evidence to support the outlandish idea that we might be able to sense small magnetic changes. But, in the past 15 years or so, several independent lines of evidence

Doubts about dowsing go back a long way. The engraving, from 1704, shows "the dowser unmasked"

have changed the picture completely.

The first line of evidence comes from controlled experiments with dowsers themselves. In 1949, Solco Tromp, a Dutch geologist, claimed that dowsers' rod movements often coincided with the positions of small magnetic disturbances. In 1962, Yves Rocard, a French physicist, made a similar claim, as did Valery Matveev, a Soviet geophysicist, in 1967. But all this work could be criticised. There were few controls, the numbers of subjects were small and, perhaps most telling of all, the investigators apparently already believed in dowsing and, therefore, in the eyes of sceptics, their objectivity was open to question. Then, in 1970, as part of the study mentioned earlier, Duane Chadwick of Utah State University conducted a series of experiments that fully met the critics' requirements. He tested a large number of subjects—150; he carried out control experiments; and, in Chadwick's own words, "Few people could have approached the subject of dowsing with more scepticism than the principal investigator of this project." The results were startling: the dowsers' rod movements showed an apparent link with tiny changes in the intensity of the Earth's magnetic field.

Despite these intriguing results, scientists were at first reluctant to take the magnetic theory of dowsing seriously. In the early 1970s, the notion that any animals—let alone humans—could sense small magnetic changes was regarded with almost as much distaste as dowsing itself. There has since been a revolution in scientific attitudes to this question. The concept of magnetic sensing has shed its aura of disreputability and become well established, having been demonstrated in an astonishing variety of organisms. Bacteria living in the darkness of muds on the ocean floor use a magnetic sense to tell up from down. In the absence of visual cues, honeybees rely on their sense of magnetism to build their combs in a north-south direction. Scientists have trained tuna fish to swim through a frame in response to magnetic cues. Numerous species, including many birds—such as homing pigeons and robins—and, apparently, some rodents, use a magnetic sense to help them to navigate when other cues, such as the position of the Sun or stars, are not available. Perhaps most intriguing of all, whales seem to use the magnetic stripes that were produced during the spreading of the ocean floors as cues in long-distance navigation (*New Scientist*, 12 February, p 46).

Humans also navigate, so do we, too, have a sense of magnetism? As we are not aware of such a sense, it would have to be an unconscious one. Robin Baker, of the University of Manchester, has carried out experiments suggesting that we do indeed possess a faculty of this kind (*New Scientist*, 18 September 1980, p 844).

In one experiment, Baker drove blindfolded students by tortuous routes up to 50 kilometres away from the university. He then asked them to point the way home. Intriguingly, he found that the students gave good estimates of the direction while still blindfolded, but that they became disorientated when the blindfolds were removed.

In a second experiment, Baker took a busload of blindfolded schoolchildren to an unknown destination 5 kilometres southwest of their school. Half of the children had bar magnets attached to their heads; the others, although they thought they were wearing magnets, wore dummy magnets instead. When they arrived at their destination, Baker asked the children to estimate their compass direction from the school. The bus then drove on to a second destination 5 kilometres southeast of the school, where Baker repeated the question. He found that, whereas the children wearing dummy magnets gave good estimates of the direction of the school at both sites, those wearing true magnets gave answers that were consistently 90 degrees anticlockwise of the true direction at the first site, and were disorientated at the second—suggesting that the magnets had disrupted their ability to sense direction. Although other workers have been unable to repeat Baker's findings, the results may have implications for the magnetic theory of dowsing.

How then, do animals—and possibly dowsers—sense magnetic changes? The answer seems surprisingly simple: by means of tiny magnetic compasses. Some mud-dwelling bacteria are actually microscopic living compass needles. Each contains a chain of minute crystals of magnetite, about 50 nanometres across. The torque exerted on the chain of crystals by the Earth's magnetic field is strong enough to point the whole bacterium in the right direction.

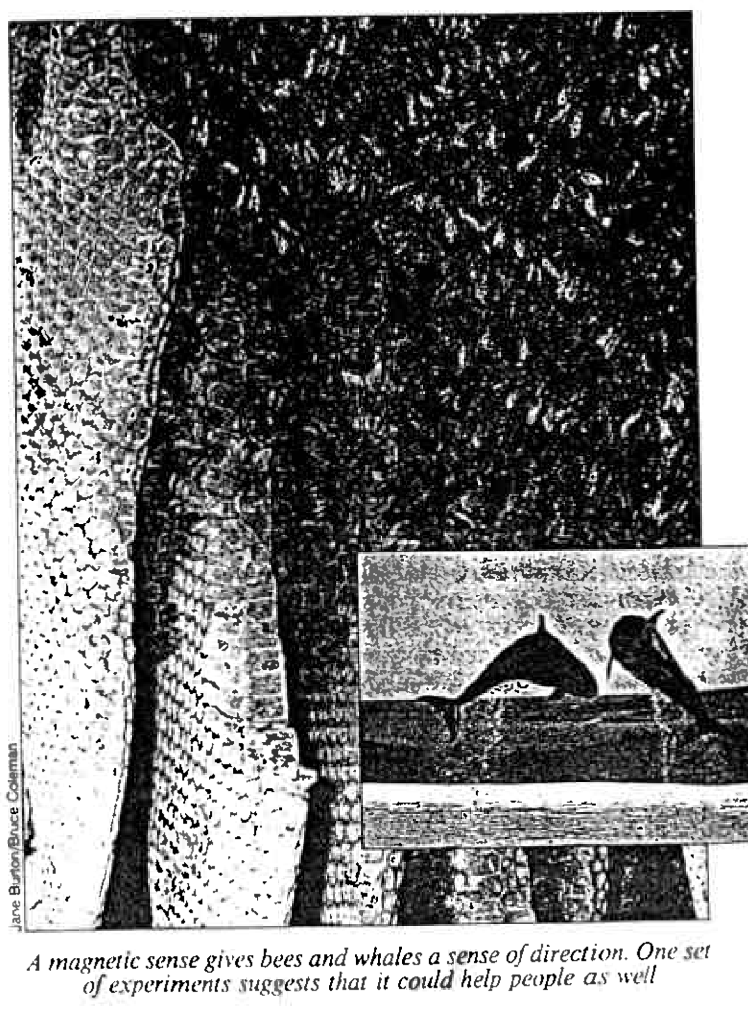
Small grains of magnetite have been found in many of the other species that show magnetic sensitivity. In several vertebrates, including the chinook salmon and yellowfin tuna, there is evidence that the magnetite is in the form of chains of tiny crystals, just like those in bacteria. The chains seem to be able to rotate, precisely as they should if they function as microscopic compass needles.

Although magnetite has sometimes been found in muscle tissue, the most common site seems to be in tissue associated with the ethmoid bone in the front of the vertebrate skull.

Martyn Chalmers/Oxford Scientific Films

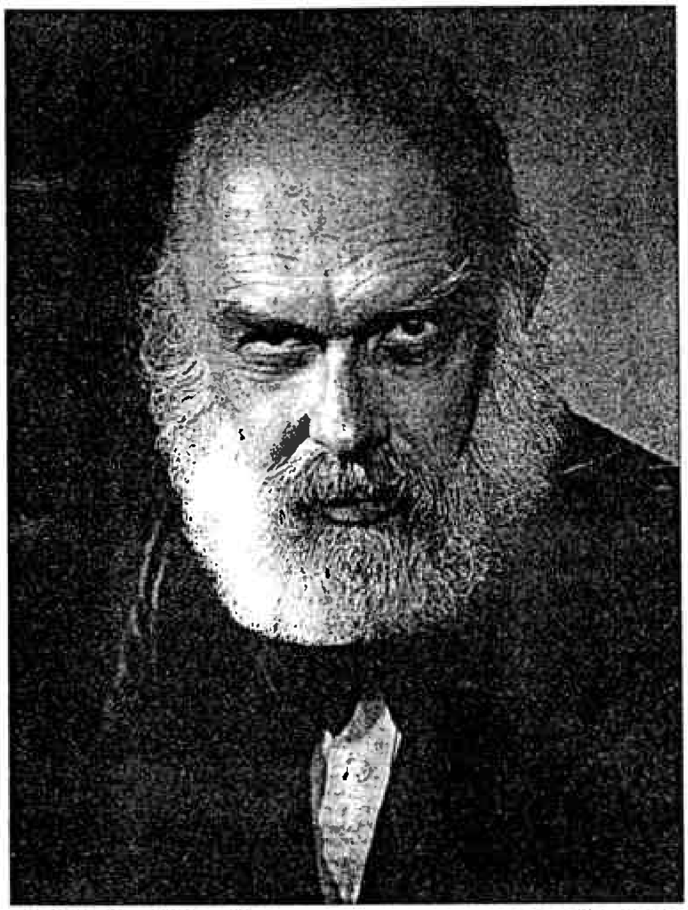
Martyn Chalmers/Oxford Scientific Films

Homing pigeons use a sense of magnetism to help them to navigate in the absence of other clues. Could humans, too, have a magnetic sense?



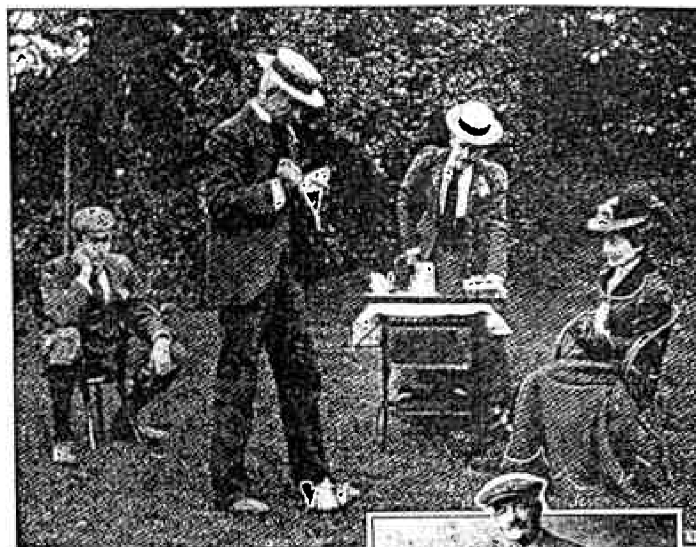
Jane Burton/Bruce Coleman

A magnetic sense gives bees and whales a sense of direction. One set of experiments suggests that it could help people as well



Fortean Picture Library

Magician James Randi (top) has yet to be convinced that dowsing works. In medieval times, people thought otherwise



Mary Evans

Dowsers at work and at play. Above: a Victorian dowser plays hunt the teapot. Right: B. Tompkins, a professional water finder, takes the business more seriously

These findings suggest that humans might have similar sensors. Indeed, Baker and his colleagues have found magnetic material in the very thin bones of the sinus complex, in the front of the skull.

These findings clearly call into question the critics' dismissive attitude to the magnetic theory of dowsing. But sceptics have one last card up their sleeves. To detect underground features, the dowser needs a quite extraordinary degree of magnetic sensitivity—almost on a par with that of the best magnetometers. It is barely conceivable, sceptics say, that such a masterpiece of evolution could be hidden away somewhere in the human body.

What the sceptics underestimate, though, is the ability of nature to maximise sensitivity by integrating large numbers of microscopic sensing elements. Michael Walker, of the University of Hawaii, and colleagues at the California Institute of Technology and the National Marine Fisheries Service in La Jolla, have recently calculated the theoretical magnetic sensitivity of one particular vertebrate, the yellowfin tuna. They estimate that the tuna's minute sensor may contain about 85 million crystals of magnetite, organised in chains. Assuming that suitable receptors could detect the movements of these chains, Walker and his colleagues calculate that the system could detect changes in magnetic fields as small as one nanotesla (less than one twenty-thousandth of the Earth's field). A comparable system in humans could easily be sensitive enough to account for the results of Duane Chadwick's experiments on dowsing at Utah State University.

If we do have ultra-sensitive magnetic sensors of this kind, what might be the link between the rotation of the magnetite particles and the small muscle contractions which cause the dowser's rod to flip? David Presti and John Pettigrew, of the California Institute of Technology, have suggested that the magnetite particles could be embedded in muscle tissue, and that their rotation could be recorded by receptors, known as muscle spindles, which play an important part in controlling muscle movement. Presti and Pettigrew's idea implies that the dowsing reaction may be a simple reflex response, not involving (even subconsciously) the dowser's brain.

Alternatively, the magnetic information could first pass to the subconscious brain—perhaps primarily for use in direction finding—which would then instruct the dowser's muscles to contract. Oddly enough, the essence of this idea was initially proposed by the sceptics themselves. Opponents of dowsing have long tried to explain the apparent successes of the technique by saying that dowsers' muscles might contract in response to their unconscious reception of any available sensory cues. As well as visual information, sceptics have invoked minute auditory, tactile and even olfactory cues. If it turns out that we do indeed possess magnetic sensors, critics would have to extend this list to include magnetic stimuli. In so doing, they would have to abandon their scepticism and admit that there really is a scientific basis to dowsing. □

Tom Williamson is a geologist with a special interest in mineral exploration.