67◦ 19′ 57.8″ N, 20◦ 45′ 2.9″ E, 474 m/h, Tjautjas

Tjautjas, a small village 160 km southeast of Kiruna. I came here following my interest in Urban Brändström who I met briefly at the parking lot outside Kiruna Truck, where he handed me a key and a list of coordinates. I had hoped that we could spend some more time together, but as he prepared me to the fact that it wouldn't be possible, I realized that I wasn't interested in him after all, but rather in the places he had created; a system of tiny research stations set up in a grid in the open landscape. Reading about his research, I had developed a desire to visit these sites, as if I needed to try them out for myself in order to understand.

This is part of what I do, I explore things by trying them out in different relationships, or by positioning myself in relation to them. I suppose it's an experimental attitude. Maybe I am a little envious of Urban Brändström. Of how he, as a scientist, can approach the world equipped with the most amazing instruments, in the context of a system where what is valid and meaningful is already defined and agreed upon. Or maybe it's about this constructing of small stations out in the wilderness, equipped with a camera in the ceiling. To create your own observatories and then sit there on the tundra with a cup of coffee while the instruments monitor the sky. The satisfaction in that, a finger pointed into the universe without having to negotiate what it means. Or does he think about what it means? What does he think then? Such were the questions I had intended to ask him in an interview. Or maybe — maybe it was that blurred picture of his chair and his coffeecup outside one of the stations that triggered my attention, the only trace of anything personal I have found in his research. Maybe I was looking for material that could form a story about him.

Before I go on, there is some things I would like to explain: In my work I tend to arrange images in a way that applies more formal parameters like motion, texture and rhythm rather than narrative, and that seeks to invoke presence rather than representation. Nonetheless, I see in my work a potential deriving from storytelling, as I am constantly engaging with stories; listening, finding, making up, telling. Also, as a Norwegian, I have grown up in a country whose image as a nation has been formed through stories, not only through the strong tradition of folktales but more also of the legendary and true stories of heroic achievements and great adventures carried out under extreme conditions in the name of knowledge and science. The great polar heroes were essential in the mobilization of the notion of the norwegian, leading up to the dissolution of the union with Sweden in 1905. The vivid tales from their courageous endeavors appear inseparable from their scientific discoveries. Their archetypal portraits seem etched into my ideological subconscious as symbols of creative genius, of the human, and most important of all, of knowledge, represented by their weather-beaten faces draped in fur collars.

One hundred years later artists are mobilizing, particularly in the polar regions, to the

management and production of knowledge about nature. Artists tools seem on certain levels to carry a huge potential for more efficient and meaningful knowledge production. Artists set up their own bases, develop their own instruments, collect their own data, and feed them into their own models. A number of artist run initiatives mediate access to personal 'scientific' knowledge. Some advocate for intimate science and engage themselves to accommodate peoples need and right to access to their own environmental data. One example is Marco Peljhan's *Makrolab* that was relocated to Antarctica in 2008. Artists from around the world were invited to work in this mobile lab, that had already toured in the European art-world for years, and examine the world as it appeare through technical instruments, engaging with the landscape like a real scientist, present in the wilderness like a real explorer.

Urban researches the aurora borealis. Growing up in Kiruna, he has witnessed their mesmerizing performance every winter since he was a boy. For his PhD, he put up a grid of nine, custom built micro-research-stations in the northern part of Sweden, in order to continuously photograph the northern lights from the ground, from different places in the landscape. This is still his job. His work caught my attention because it was echoing the work of the norwegian physicist Kristian Birkeland who set up two provisional micro-stations on two mountain peaks in Finnmark in 1899 and photographed the aurora simultaneously from both sites, hoping that the pictures, when set in relation to each other, would reveal how high up in the atmosphere the auroras were. It was he who first proved that they were caused by magnetic interference, which in turn was caused by solar storms, and that these seemed to occur in cycles. It is also interesting to note that his thesis, "The Norwegian aurora borealis Expedition 1899-1900, was adorned with the pure Norwegian flag (without the union label) even though it was printed in 1901, four years before the resolution of the Union.

Urban's micro-stations have a transparent dome in the ceiling, usually equipped with a camera. This one was easy to find because the landscape here is so flat. I am disappointed that he has taken down the camera, he didn't mention that he would. He has also replaced the glass dome with a metal lid, which causes the small cottage to look less like an observatory and more like an electrical substation. But I understand him, it is not possible to photograph the northern lights at this time of year as the sun is up continuously. When it has set again, 9 minutes past midnight on the 17th of July, the darkness will gradually return and he'll put the cameras back up. The auroras however, they might there now, invisible in the bright light.

I realize that it is not very nice to be a lurker, but I must admit to lurking on a mailing list for people interested in electromagnetic interference. Most contributors are people who construct their own receivers for such very low frequency phenomena. Further equipped with antennas and headphones, they sit around the globe and listen to the crackling sound of tensions in the air. Thunderstorms, earthquakes, auroras, gamma ray bursts, meteorites, all kinds of events in the atmosphere seems to create such disturbances. Science is not necessarily in accordance with all of the explanations for the acoustic phenomena that occur,

but i don't think their purpose is to produce knowledge that can be said to be objective or universal. Maybe it's a way of engaging with the world in a way that also engages their personal as well as shared knowledge. Some are also interested in photography, and pictures and audio files are sent out to the list of participants who discuss the technical conditions for making them as well as possible explanations for the phenomena captured. "Did you hear that?" they might ask each other in the wake of a storm that passed Ohio.

How can poking an instrument into the atmosphere mean that you connect with some kind of meaning that you would otherwise not take part in? I admit that I am attracted to the gesture, and that I share the urge to approach the world in a way that is meaningful in relation to my own practice, but I find it difficult to understand this relationship between landscape, data and knowledge. I suppose that on a basic level, that is probably why I ended up on a marsh in Tjautjas this summer. I think about how the data takes on a different meaning when you collect it yourself. I know that it is like that with berries, but I cannot put my finger on what it is about. Isn't there something problematic about this faith in data, whether scientifically produced or not? Sure enough berries don't produce knowledge, but essentially, neither does data, not until you start to using the information for anything, feed the data into models. [1]

It is deliberately that I have come in this period, in light of the midnight sun now when Urban's system isn't operational. The fact that he takes a break in his data gathering, opens the place for me. I can be alone and do my own project, gather my own images and think about what that means. The fact that the northern lights are invisible seem a clear benefit, images of them are impossible to work with and I imagine their beauty would distract me. Not that I don't understand the urge, to hunt for the northern lights, and then to capture their image as a souvenir when you finally experience them. Fridtjof Nansen solved it through black and white drawings and Urban is using monochrome ccds for making his images. I admit that the contrast between his boring/dry research material and the spectacle of the northern lights appeals to me.

The Tjautjas station is exactly like the two others I've been to; tidy. It looks like a hunters cabin, but not. It has a formal feel, impersonal, almost like a tiny office. I can't even enter as the glass dome covers all the space on the floor, but it is too small to sleep in anyway. I've set up my tent about fifty yards from the station, to use it as a power supply. This made me understand that the station is located right here for the same reason. There is a small water-plant less then a kilometer from here, at the edge of the lake, and Urban has undoubtedly chosen this particular site because it's right in the wilderness but with access to electricity not far away. One can just make out traces of digging in the landscape. Suddenly I realize that he has probably never spent the night here. There is a certain distance between the

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It seems though, that if we extend the list of relationships to include people, with bodies, it all opens up and I can better understand; images, stories, gestures, identities, memories, rhythm.

station and the territory it is placed on. I even bet he brings sandwiches wrapped in paper and a thermos with coffee but prefers to eat them in the car. He leaves no personal traces and he has made sure that the station is well protected from the environment by setting up three yellow warning signs on its facade. As if seeing them for the first time I shudder in the cold silence and wonder if it is the environment or the station that is the hostile element.

I have a compass and a small lever, and thanks to Johannes Kepler, who in 1609 described how the celestial bodies move around the sun in elliptic trajectories, I know, that right here, at *67 degrees and 19 minutes north, 20 degrees and 45 minutes east*, and right now, on the *15th of june 2012 at 18.55*, the sun is right up there, at 281,7 degrees from the north and in a 20,54 vertical angle. Unfortunately there are no straight lines here, and the magnetic field from the tracker itself causes the arrow in my compass to bounce whenever I get close to it. So I need to actually see the sun in order to be sure that it is right, but every time it appears from behind the clouds or the trees, it turns out to be slightly off from the center of the image, drifting towards the upper part of the picture frame. It must mean that I am pointing to low, but the again, I am so far north that I can hardly push it any higher. The ST-1 is aligned to the north-south axis, and set to the right latitude and inclination so it should be right. Maybe I am on the border of what even this machine can achieve. I am getting frustrated and extremely tired. Every time the sun appears at the wrong place revealing the drifting of the tracker, it seems that data I collected up until now, is completely useless. I know very well by now, that in order to have usable data, my equipment must be calibrated properly first. And I want the sun to be spot on, right in the middle of the image, every time it appears. But whenever I grab the camera to reposition it, my gestures cause a rupture in the smooth stream of images, revealing that I am there, and that I am still working hard at it, using my hands rather than precise mechanics, to get it right.

I think of Urban, he wrote about the difficulties of calibrating the system and especially the positions of the cameras. I suppose it takes a couple of weeks every fall, although I doubt that he has ever spent the night out here. I think of Kristian Birkeland, of the struggles he had to go through at Haldde, the mountain peak in Finnmark. The slightest hint of metal near his sensitive magnetograms must have caused the needles to jump and render his data completely useless. And I wonder how he would determine the positions of the cameras. I will have to look into that. I can't really explain my attraction to Birkeland, but he seems to be a bit different. He was fundamentally experimental in his approach, he knew things by trying them out even if he was studying something as ephemeral as the auroras, and he seems to have been clumsy and overworked rather than heroic. I've never seen a picture of him in a fur collar. But according to Lucy Jago, who has written a biographical novel about him, he was actually on his way to the photographer, dressed in fur and thick leather garments as a proper explorer, when he was attacked and bitten by a rabied dog in the streets of *Arkhangelsk*. He had to cancel the expedition and return to civilization for treatment. I admit that I have not bothered to verify this, but nonetheless its certain that the iconic image of Birkeland is not the

heroic portrait, but rather one that is taken in his laboratory at the University of Oslo where he performed his experiments to the public, hoping to collect financial support for his research. Less adventurous than the polar expeditions it didn't have the same imaginary potential and was more difficult to finance. In his performances, Birkeland actually produced small scale auroras inside a glass vacuum chamber, using a kind of gun or cannon to fire charged electrons at a small magnetized globe, while he was wearing what looks like a turkish fez on his head.

It has occurred to me that the lack of formal systems for verifying and assuring the quality of the knowledge produced in the arts has its deserved counterpoint in the elaborated and overarching system for doing so in the natural sciences. It is probably important to allow such oppositions, and even to consider what they mean. I find it interesting to learn that what seems to have been the first international scientific conference, was the conference on the metric system, held in Paris in the midst of the Revolutionary Wars in 1798-1799. [1] The metric system must be the absolute cornerstone of these procedures for assuring the comparable quality of data, providing a decimal-based tool, a reference, to make sure all measurements of length could refer to the same standard units shared by "all people, for all time". Although the artifact constituting this international reference for measuring length, the Meter, has been replaced by an equation that defines it according to the speed of light, the image of the object, the standard meter, sitting in the next to the Kilo, standard reference for mass, in a vault in a castle in Paris is a strong one.

Although I am familiar with Duchamp's standard meters, that are both random and experimental, I had never before I started this project thought about how elaborated the processes of calibration are, when you try to tune into the world while keeping a steady focus using a reference. This process of tuning my devices according to the position of the sun, seems to involve a persistent negotiation. I have four things to go by; First I have the position of the tracker on a specific location in the soft, humid marsh at Tjautjas, adjusted to a perfect horizontal level using more or less all the solid and flat items I could find in my luggage. The resulting (but unfortunately not permanent) horizontality is confirmed by the level, and I have further aligned the trackers base to the North - south axis using the compass. Secondly I have the mathematically derived position of the sun as a set of coordinates that I can, at least theoretically, set the tracker according to using it's turning knobs while consulting a compass. This has as mentioned turned out to be impossible due to the magnetic fields of the motors. Then I have the actual position of the sun, not really open to negotiation, and finally, I have the position of the camera on the tracker that should follow the perspectives defined by it, and

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1 The Congress on Definitive Metric Standards, 1798-1799: The First International Scientific Conference?
Author(s): Maurice Crosland Reviewed work(s):
Source: Isis, Vol. 60, No. 2 (Summer, 1969), pp. 226-231
Published by: The University of Chicago Press on behalf of The History of Science Society Stable URL: http://www.jstor.org/stable/229911
Accessed: 09/10/2012 15:09

that offers me a point of view, a viewfinder in which it reveals whether the sun is in the right position in the center of the image, or not. Of course, I also deal with the adjustments related more directly to the images I want to capture; to the camera's aperture, shutter speed and light sensitivity, affecting the visual qualities of the resulting picture, as well as to the timer that triggers the camera to capture an image at a regular interval, and to the solutions for storing the images, first onto memory cards in the camera, that fill up every two hours or so, and secondly transferred onto a hard drive, inside the tent.

As a result, I am engaged in a continuos negotiation of place; of the vertical and horizontal spatial relationships, of vision and of light; of the tracker's and the camera's mechanical and optical conditions, and finally also of more direct relations between my hands, my gestures handling the device, and something that is continuously changing, the appearance of the sun in the skies. While being an absolute un-negotiable given in this set of parameters, the sun behaves rather evasive as a point of reference, hiding behind clouds, trees, and mountains only to appear, at a cruelly rare interval, and reveal that I am out of place. There is very little time for thought, and no resting with a cup of coffee - a finger pointed into the universe while the instruments monitor the sky; no reflecting upon what it means.

Looking back at it, I believe my interest in references and their role in the production of information was triggered almost twenty years ago when I was reading Gregory Bateson as a student of cultural anthropology. His understanding of a point of reference as the part of a relation that reveal that the other part is different (by being different from it) has resonated in the back of my head ever since. This attitude implies that things acquire meaning according to how they appear in relation to other things, and, I seem to remember that he stated, it is by this being different from the thing they are perceived in a relation with, that they carry information. It is difficult for us, Bateson further claims, to talk about process because our language is based on words like *it*, and *it* cannot describe process. While this whole ontological debate could probably become an interesting one if I opposed his thoughts to those of Bergson and other philosophers of becoming, suffice for now to say that I like Gregory Bateson's writings because, like me, he was a practitioner. I like the way his ideas are articulated as specific insights that appear in specific contexts, through specific practices. Further on, as an artist working with video, I have often taken advantage of the tension between on one hand, the continuos process that is offered by video as a medium, and on the other, the twenty-five images that constitutes a second of video. In order for motion, movement or process to become apparent through these twenty-five images, they must be different from each other. In a way then, we are dealing with twenty-five *it*'s, twenty-five points of reference. Between each and one of them something has moved, shifted or been amplified. Information, Gregory Bateson stated, is the difference that makes a difference. [1]

1 "What is it in the territory that gets onto the map?" We know the territory does not get onto the map. That is the central point about which we here are all agreed. Now, if the territory were uniform, nothing would get onto the map except its boundaries, which are the points at which it ceases to be uniform against some larger matrix.

As proposed by philosopher Poincaré in 1902, the internationally approved scientific references, or standards, aren't representations of the absolute truth, but based on conventions. Such conventions are the result of long, international processes, and followed by a continually occurring procedure of calibration to ensure that the reference, the standard, is distributed throughout the entire community. Calibration events can last for weeks, while completely random incidences happening elsewhere, like an invisible stream of sand being sucked into the atmosphere during a storm in Sahara, can get in the way between the sun and the instruments of the 85 meteorologists, gathered on a mountain in Switzerland to calibrate their instruments, and thereby destroy their data and render their measurements useless.

I guess the arbitrary nature of knowledge is what Duchamp was trying to make us understand when using random to produce a standard like he did in 1913. Although this work is an important reference point in itself, in the arts, I am just beginning to understand that it isn't only about the arbitrary or the random. It is about performance. When he stretched out his hands, one meter apart, and dropped the thread, he produced a meter that he would use as a measure, a basic geometric unit, a Meter, a unit that he would then use as a standard reference when making his other works, like the large glass. And it wasn't only random, it was also personal. A direct result of the movement of his hands. He was demonstrating that his gesture is as good as any other convention. And then he dropped another one meter thread. And then another. So in the end, he has the result of three gestures, three experiments, three performances, and they are all equally valid, for him, as a reference, as a measure.

Back to our field_trip: After days and nights of trying to get everything right by adjusting my instruments every twenty minutes, the tracker and the camera finally seems to be perfectly calibrated and perfectly aligned. Set up in a strict relationship between the marsh and the sun, the camera follows the sun, up and down in the sky, around and around. I may finally start, catch a sequence of high quality observational photographs of the landscape and the sun without being distracted by the movement of the earth. The camera takes a picture every 8 seconds. Trees, clouds, bugs, and mountains may move in and out of the flow of pictures, but the sun and me, we are finally aligned, ready to stare into each other without drifting anywhere. But now clouds start gathering in the sky, and before I know it, the rain is pouring down again. I consult the weather forecast and decide to pack my gear and move on to the next site, Nikkaloukta, where the sun seems to be shining and where a new process of calibration awaits.

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What gets onto the map, in fact, is difference, be it a difference in altitude, a difference in vegetation, a difference in population structure, difference in surface, or whatever. Differences are the things that get onto a map.

A difference is a very peculiar and obscure concept. It is certainly not a thing or an event. This piece of paper is different than the wood of this lectern. There are many differences between them - of colour, texture, shape, etc... Of this infinitude, we select a very limited number which become information. In fact, what we mean by information - the elementary unit of information - is a difference which makes a difference (Bateson, G. (2000), Steps to an Ecology of Mind, Chicago: University of Chicago Press, s 457-459).

Back home, with 148.000 photographs, I look up Gregory Bateson again.
He wrote about the process of perception:

“Whoever creates an image of an object does so in depth, using various cues for that creation. But most people are not aware that they do this, and as you become aware that you are doing it, you become in a curious way much closer to the world around you. The word "objective" becomes, of course, quite quietly obsolete; and at the same time the word "subjective", which normally confines "you" within your skin, disappears as well. It is, I think, the debunking of the objective that is the important change. The world is no longer "out there" in quite the same way that it used to seem to be. Without being fully conscious or thinking about it all the time, I still know all the time that my images - especially the visual, but also auditory, gustatory, pain, and fatigue - I know the images are " mine" and that I am responsible for these images in a quite peculiar way. It is as if they are all in some degree hallucinated, as indeed they partly are. The shower of impulses coming in over the optic nerve surely contains no picture. The picture is to be developed, to be created, by the intertwining of all these neural messages. And the brain that can do this must be pretty smart. It's my brain. But everybody's brain - any mammalian brain - can do it, I guess.

I have the use of the information that that which I see, the images, or that which I feel as pain, the prick of a pin, or the ache of a tired muscle - for these, too, are images created in their respective modes - that all this is neither objective truth nor is it all hallucination. There is a combining or marriage between an objectivity that is passive to the outside world and a creative subjectivity, neither pure solipsism nor its opposite. [1]

1 Bateson, G., 1978, ‘Afterword’, in J. Brockman (Ed.) About Bateson, London: Wildwood House pp. 244-245