CHAPTER 7

Solar Reflections: On the *Sun Mirror* in Rjukan

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Abstract: The *Sun Mirror* (2013) by Martin Andersen is a mirror machine placed upon a mountain top. It reflects sunlight down to the town square in Rjukan, a small Norwegian town that is located in the shade for almost six months each year. Based on a century-old idea, the mirror realised the dream of Rjukan's inhabitants to see the sun in wintertime. What makes the idea of a man-made sun mirror still relevant in the 21st Century, 100 years after its first mention in the heyday of the Second Industrial Revolution? This chapter contextualises the *Sun Mirror* by discussing ecological aesthetics and argues that despite its technological structure, the mirror opposes treating nature as a recourse for human exploitation. Rather it makes visible the properties of the sun (the sun's temporality and rhythm) and promotes the sun in itself as life-giving and vital for us humans.

Keywords: solar power, industrialisation, technology, ecological design, natural rhythms

Introduction

In a small Norwegian town called Rjukan the sunlight is completely absent from October until March. Unlike further north, where the sun does not reach over the horizon in winter, the sun's rays in Rjukan are blocked by a high mountain peak [figure 1]. One of the first industrial towns in Norway, Rjukan is located in the Vestfjord Valley in the southern part of the country. Because of its location, the sun has held a great symbolic presence and affected the lives of the inhabitants of Rjukan since the town was founded in 1905. In this town there is no horizon in sight, only a strip of sunlight

Citation of this chapter: Fallberg, L. G. (2021). Solar reflections: On the *Sun mirror* in Rjukan. In I. Halland (Ed.), *Ung uro. Unsettling climates in Nordic art, architecture and design* (Ch. 7, pp. 79–87). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.127.ch7

Figure 1. Photograph of Rjukan in wintertime shade. The shadow line on the mountain is visible. 2019. Photo: Liv Gunhild Fallberg.

creating a physical division across the mountain ranges. The closer it gets to October, the higher the separating line between light and shadow moves up the hillside. The opposite happens in spring. Houses placed higher up in the valley can enjoy the sun for approximately a month longer than the houses built at the bottom of the valley (Taugbøl & Andersen, 2015, p. 74). The inhabitants know very well when the sun hits their own window edge (Fjeldbu, 1995, p. 5). On March 12, the sun's rays finally reach the old workers' bridge after a long winter. This is one of the annual highlights for the inhabitants of Rjukan and each spring a grand celebration called *Solfesten* [the Sun Festival] is organised to pay tribute to the sun.

When artist Martin Andersen moved to Rjukan in the early 2000s and saw how the sunlight disappeared behind the mountain in late autumn, an idea came to his mind, and in October 2013, the *Sun Mirror* was officially inaugurated. The structure consists of three rectangular mirrors connected to a machine that rotates them to the exact angle of the sun throughout the day (Visit Rjukan, 2018). The mirror is located 450 metres above the town and reflects 80–100% of the sun that hits its surface [figure 2]. The sunlight is reflected down in the form of a carefully composed circle of light into the middle of the town square and covers around 600 m^2. All three mirrors focus on the same spot, making the circle of light as bright as possible [figure 3].

Figure 2. Martin Andersen. (2013). *The Sun Mirror*. Rjukan, 2019. Photo: Daniel Larsen. © Martin Andersen/BONO 2021. All rights reserved. The image is not covered by the CC-BY license and cannot be reused without permission.

Figure 3. The *Sun Mirror* lights up the Christmas tree in Rjukan, 2019. Photo: Liv Gunhild Fallberg.

The Town of Modern Industrialisation

At the beginning of the 20th century, there was general optimism related to technology and Rjukan was the centre of industrial advances in Norway: between 1907 and 1911, Sam Eyde's company 'Norwegian

Hydro-Electric Nitrogen Limited' (today Norsk Hydro) built the world's largest hydroelectric power plant for the production of the newly invented fertiliser 'Norwegian saltpetre.' Consequently, Rjukan was planned, built and placed in order to be close to the hydroelectric energy source, Rjukan Falls. Thus, the town was built in the shade.

The idea of a technologically advanced sun mirror may seem adventurous and progressive but, in fact, Andersen's idea was not new at all. Already in 1913, a local man named Oscar Kittelsen proposed to build rotatable mirrors on the north side of the valley, in order to collect the light and disseminate the beams throughout the town (Fjeldbu, 1995, p. 5). While the original idea of a sun mirror never saw the light of day, due to the lack of necessary technology to construct it (finding a way to make the mirrors move in accordance with the sun), Norsk Hydro built instead an aerial cable car, *Krossobanen*, to easily transport the inhabitants up to the mountains so that they could see the sun. By having the possibility to see the sun and the light, the workers' quality of life would increase, so they would be fit and healthy and therefore more productive at work.

The *Sun Mirror* solves a problem, which is to bring the sun to the inhabitants of Rjukan. Nevertheless, there is a difference between the idea of a sun mirror in 1913 and 2013. When Andersen re-introduced the idea of a sun mirror, the cultural and economic preconditions of the industrial town had changed. Today, Norsk Hydro has withdrawn from the site, but the town still remains. And today, inhabitants can take rather short drives up the mountain in their private cars to where the sun is visible in winter. A sun mirror in Rjukan is not necessary in the same way as before.

The world has changed, too. New industries and technology have been created, and humans have made an even greater impact on the Earth. Throughout the 20th century, the technological optimism of modern society was increasingly questioned, and today we realise the effects of previous centuries' mass exploitation of natural resources and ideologies of unrestricted growth as an economic premise. From our post-industrialist perspective, we see the consequences these changes have had on human life, including how we have had to adapt to the

rhythm of the machine. As many have argued, our mechanised society has led to a feeling of alienation (see, for instance, Ellul, 1970, p. 325).

Ecological Design

In the 1960s, notions of ecology and protection of the diversity in the natural environment started to gain currency as a reaction to the simplified view of nature celebrated by industrialisation (Carson, 2012 [1962]). *Ecological aesthetics* is an umbrella term for different practices, including design, architecture and art, with a common theme to do something for ecological prosperity (Erzen, 2004, p. 22). Most importantly, ecological aesthetics values the artistic *process* rather than the result, and it values the identity of the site and the connection between nature and culture (Strelow, 2004, p. 11). In the words of Sim van der Ryn, 'Ecological design is a way of integrating human purpose with nature's own flows, cycles, and patterns' (van der Ryn & Cowan, 2007 [1996], p. 40). In addition to being ecologically consciously produced, ecological design has an ethical side: it widens our relationship to place and our knowledge about nature and its beauty. In a similar way, ecological art and aesthetics tries to convey a new understanding of the environment, which increases awareness of environmental problems (Erzen, 2004, p. 23).

At first glance, one might get the impression that the mirror *tames* the sun for the benefit of people; that is, humans have taken control over the sun. Our species has long made use of nature's resources for our own benefit and survival. What has changed since the Industrial Revolution is the over-exploitation of natural resources causing irreversible changes to the planet. By means of modern technology, humans have treated the earth as what philosopher Martin Heidegger calls 'a standing reserve,' that is, a never-ending supply linked to industrialised capitalism (Heidegger, 2003 [1954], p. 16). The hydropower plant at Rjukan is an example of modern technology that extracts energy from nature, stores and conserves it, so we can use it to our own advantage. Yet the *Sun Mirror* stands out from this kind of technology. The aim is not to extract energy from the

Figure 4. The *Sun Mirror* seen from the town square. Rjukan, 2019. Photo: Liv Gunhild Fallberg.

sun—but rather to promote the sun in itself as life-giving and vital for us humans.

The sunrays that shine on the town centre come from the real sun, but they are artificially brought there via a mirror controlled by technology [figure 4]. The mirror construction makes the sun visible as a primary element; it is not a physical thing you can hold or take with you. It is fragile, the light can disappear in a second, as it is affected by the weather: wind, rain, snow and cold. The *Sun Mirror* is dependent on the visibility of the sun, but the sun fluctuates. The mirror cannot work when the sun is not present, either at night or behind clouds. The mirror and the people who want to experience the sunlight rather become subject to the rhythm of the sun. In order to be operative, the *Sun Mirror* is dependent on fluctuating and contingent properties.

We can sense the primary elements, but they are not bound. By focusing on the elements, we become aware that nature exceeds humans and is therefore not reducible to something humans can control (see Boetzkes, 2010, p. 104). The mirror reveals the limits of our ability to use nature as a standing reserve.

A New Rhythm

Already in the beginning of the 20th century, in the heyday of industry and technological progress, the inhabitants of Rjukan understood the importance of natural light. The sun rises and sets in the morning and in the evening. But also in a larger cyclical repetition every autumn and every spring. The *Sun Mirror* breaks away from our everyday rhythm governed by the mechanics of the clock and the regularity of the calendar and makes the rhythm of the sun visible. By stepping into the sunspot in the town square, you break out from the shade and your everyday rhythm. You experience the sun in a time and place you would not normally be able to, with a different base and point of view.

By synchronising with the rhythm of the sun, the *Sun Mirror* points to our relationship with nature: to how our rhythms work together, how we are dependent on following the movements of nature and not always a mechanical pulse. Thus, the mirror opens up for reflection on the sun as an essential need. In the tradition of ecological design, the *Sun Mirror* is made to meet a human need, but in doing so, it takes into consideration the natural rhythm of the sun, making the least amount of imprint on the earth, while still managing to solve this human need. By taking nature into consideration—as a necessity for the *Sun Mirror* to function—the design brings forth its vision in its everyday function. It conveys a message, an ethical attitude.

Rjukan's mirror displays the sun as it is: with its characteristics, volatility and temporality. The fragility of the mirror reminds us of the fragile relationship between humans and the earth; the need to re-connect with it and to re-think our interaction with it. The changes in the climate we are experiencing—and causing—cross the exploitation line. To avoid dark days ahead, we must work together with the properties of nature to change the way we see the world. Seen in the light of ecological aesthetics, the reminder invoked by the *Sun Mirror* sparks hope for brighter days [figure 5 and 6].

Figure 5. The *Sun Mirror* seen from the sunny spot in Rjukan's main square 2019. Photo: Liv Gunhild Fallberg

Figure 6. The *Sun Mirror* lights up the main square in Rjukan, 2019. Photo: Liv Gunhild Fallberg.

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