

Essay-Wettbewerb 2020/21

Arne Vais, Akademisches Gymnasium Innsbruck, 10. Schulstufe, 6 Jahre Spracherwerb

74° 19 '4.872" N 98° 46 '15.6108" W

prologue

74° 19' 4.872" N 98° 46' 15.6108" W, 6:35 local time, May 6th 1985, Arctic Ocean

The specially manufactured DHC-6, often also referred to as the De Havilland Canada Twin Otter, had added external fuel tanks for extra range, as well as added skis, giving it the ability to land on rough snow. This would have worked in almost any kind of snow, however, the landing spot chosen for this mission was next to an ice boulder field; too risky in case of strong side winds. A group of locals had been sent out to carve a temporary runway.

Rolf had been dreaming about such a trip since he was at university, back in Norway. All those years spent in labs and long, often tedious, lectures would finally pay off, as he was about to embark in an expedition that would earn him a reputation as one of the pioneers of arctic research while collecting evidence for the effects of the rising temperatures in the northern Canadian expanses.

The machine glided smoothly towards the ground, which was a mere 30 feet away, as the pilot initiated reverse thrust in order to bring the aircraft to a halt. As the pilot was ready to engage the landing gear, an unexpected gust - almost at gale force - blew the craft off course as if it were made of paper. The aftermath: a crash-landing on rough terrain, two injured scientists and most of the technical equipment irreparably damaged. But despite the losses and falling behind in their schedule, the small team managed to set up a makeshift base and took measurements that were to become invaluable in the years to come.

timeline

1985 - A team of three scientists, Rolf V. and two colleagues, sets out to document climate changes in northern Canada. They crash-land due to adverse weather conditions but they manage to collect important evidence. Their findings will remain undisclosed for several years.

2017 - The diary with notes of climate change evidence from the 1985 expedition is found by Rolf's son, a student at AGI Innsbruck. Having accidentally discovered the data his father had collected and after having read the article on 'Massive Permafrost Thaw in Canada', he decides to pass the findings on to Stefan Reisenhofer, a climate scientist with the Austrian Bureau of Meteorology and Geodynamics.

2021 - Four years later, while being actively involved with arctic research on climate change himself, the young student decides to submit the following essay to the Canadian Studies Centre of the University of Innsbruck. His aim is to raise awareness on the importance of

permafrost thaw and to urge everyone to take action focusing on the article that changed his life.

The Frozen Realm

A Landscape Under Transformation

No one can deny having heard of climate change and how it affects our planet. No one can pretend to turn a blind eye to the devastating effects of rising temperatures, already evident in most countries. Yet, only a handful of us have been really engaged with the issue by taking an active stance and joining environmental protection initiatives. Most of us just watch the news reports from the comfort of our living rooms, silently supporting various appeals to have measures taken by governments before it is too late. Sadly, as long as the effects are not dramatic in our part of the world, we do not see the need to get actively involved.

Indeed, in some countries climate change is just another story in the news. However, there are many regions where the effects of rising temperatures have caused irreversible damage and drastic measures should be taken without further delay. One of these regions is undeniably the vast northern territories of Canada, which are literally melting at a fast rate; and what is melting is not only the ice caps, but also the ground. The permafrost. These huge areas of frozen land are thawing and the vulnerable ecosystem of a largely pristine nature is under threat. Many species of animals and plants run the risk of extinction and unless particular species are protected, the food chain will be severely disrupted and many a species are bound to become extinct.

Having read the article titled “Massive Permafrost Thaw Documented in Canada, Portends Huge Carbon Release”, I was struck by the fact that the Arctic warms at a rate twice as fast as the rest of the world. This has tremendous consequences. The permafrost, i.e. ground that has remained frozen for the last 10,000 years - since the last ice age - is decomposing and disintegrating at a fast rate. This can potentially release huge amounts of methane and carbon dioxide, in fact as much as double the amount of CO² that exists today in the whole atmosphere, and also causes carbon-rich mud and silt enter into streams, rivers and the Arctic Ocean with a direct impact on local ecosystems. Such sediments along with landslides have dramatic effects on the growth of aquatic plants, which in turn can cause the disruption of the whole food chain. What is more, studies have shown that terrain covered by the former Laurentide Ice Sheet is disintegrating in an area of as much as 40 to 60 miles, while coastlines are collapsing because of thawing permafrost and huge waves that claim 60 to 70 feet of land each year. Most notably, permafrost thaw directly impacts local populations as harm has been caused to the lake trout, a vital food source for many communities. And as if this were not bad enough, serious damage to infrastructures such as roads, power lines, water pipes and building foundations is already evident and poses a real threat to numerous communities and northern settlements.

According to several studies by leading scientists, there are areas where the landscape is changing so fast that in many cases it has become unrecognisable. In the lapse of ten years, once pristine Arctic terrain has turned into what is called thermokarst; vast expanses dotted with waist-high depressions and ponds, also known as hummocks. A landscape reminiscent of the aftermath of a bombardment. In addition to these gradual changes, and rather more alarmingly, scientists have also been documenting ‘crazy liquefaction’; instead of just a couple of centimetres of thawing each year, rapid soil disintegration is exposing deep permafrost that otherwise would have remained protected and insulated. In fact, one fifth of Arctic permafrost is supposed to be very vulnerable to rapid warming, while 80% of such quickly thawing areas have been found to contain approximately 70kg of carbon per cubic metre. Not to mention that there are serious concerns about the re-emergence of ancient bacteria, that could unleash unknown diseases, once permafrost - a sort of huge natural freezer - thaws. Four such ‘ancient viruses’ have been discovered since 2004. No wonder then, that permafrost is regarded by many as a Pandora’s Box for bacteria.

Scientific evidence that the ground is literally melting is compelling and several studies have documented the fast rate at which the permafrost is thawing. Personally, I fear that it is already too late to reverse this process, however, I am convinced that the Canadian government in collaboration with experts working in various scientific fields has taken and can take further measures to minimise the negative effects of the changing condition of the ground for both the inhabitants and the natural ecosystems. For example, new methods and innovative engineering solutions can be implemented when it comes to man-made constructions such as buildings, roads, bridges, railways and other infrastructure. Also, with suitable environmental protection projects many species can be saved. Some areas can become protected national parks with study centres and museums that can attract people from all over the world, while elsewhere sustainably organised local agriculture and production of raw materials can provide new sources of income to the inhabitants and attract new settlers in areas previously unsuitable for permanent human habitation.

In view of the above, no matter how bleak the future may seem, I opt to remain optimistic about the large-scale landscape changes that northern Canada is experiencing. I am convinced that a lot can be done to reverse the catastrophic consequences of rising temperatures with adequate planning, scientific interventions and local initiatives with the support of the Canadian government and the collaboration of the scientific community. I, therefore, urge everyone in key positions to make decisions and take measures now. Both locally and globally. And who knows, in the decades to come, instead of a huge environmental disaster, we may witness a controlled landscape transformation with the big white north becoming more accessible to all of us; a favourite destination for sustainable tourism, recreation, alternative land management and scientific research.

(990 words)

epilogue

2028 - Rolf's son followed in his father's footsteps and is now teaching glaciology at the University of Innsbruck. For those fascinated with ice and anything that has to do with the arctic, his essay remains a strong statement, reminding us that it is never too late to take action against climate change. His belief: we may not be able to stop global warming, but we can certainly do a lot to minimise its negative effects in the near future and help reverse the trend in the long term.

My personal message: stay optimistic, set realistic targets and act today!

NB: The background story, including the prologue, timeline and epilogue, is purely fictional.

sources:

Berwyn, B. (2020, November 30). Massive permafrost THAW documented in Canada, Portends huge carbon release. Retrieved March 05, 2021, from <https://insideclimatenews.org/news/28022017/global-warming-permafrost-study-melt-canada-siberia/>

Green, M. (2019, June 18). Scientists amazed as Canadian Permafrost THAWS 70 years early. Retrieved March 07, 2021, from <https://www.reuters.com/article/us-climate-change-permafrost-idUSKCN1TJ1XN>

Permafrost is thawing in the arctic so fast that scientists are losing their EQUIPMENT | CBC News. (2019, May 03). Retrieved March 10, 2021, from <https://www.cbc.ca/news/technology/permafrost-melting-1.5119767>

Rdamore. (2019, June 26). What is permafrost and What does it mean for Canada as it thaws. Retrieved March 11, 2021, from <https://globalnews.ca/news/5408373/what-is-permafrost-canada-climate/>

Permafrost. (n.d.). Retrieved March 09, 2021, from <https://www.thecanadianencyclopedia.ca/en/article/permafrost>