Ice, Art, and Being Human
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In the depths of human consciousness, there is a collective notion of a time long past. It is a time before we had the knowledge or the insight to understand how the world works, and it was a time before we had the capacity to influence the world around us. We were innocent and we called this state paradise. One can read the narrative of human history as mirroring the development of a person from the carefree innocence of childhood into adulthood, with the knowledge and responsibility that entails. Yet, one could also make the claim that this narrative of humanity's childhood is a collective, accurate memory of events of such enormous proportions that we are still struggling to come to terms with it, in our mythologies and religions, thousands of years later. The collective memory so deeply etched into our consciousness is a memory of ice and the effect ice has had, not just on the climate, but on our entire civilisation.

Ice is as wonderful as it is unusual; it is different from nearly any other substance we know. When water freezes, it expands; most other substances occupy less volume in their solid state than as a liquid. Ice melts under pressure; most other solids melt when pressure is removed. Ocean water absorbs almost all the solar energy that reaches it; ice reflects it. The earth is close enough to the sun that most water is warm enough to remain liquid, yet the temperature is still cold enough that ice can form at the poles and at high altitudes. It takes large quantities of energy to melt ice; conversely, when water freezes, large quantities of energy are released. As water melts and freezes again, it helps limit temperature fluctuations from one season to the next and from day to night, making it possible for humans to live at almost any latitude.

The ice contained in the Antarctic and Greenland ice sheets was not formed in the same manner that ice is formed on a lake or to create the ice cubes in your gin and tonic. It formed through hundreds of thousands of years of accumulated snow, compacted into glacial ice under its own weight. Glacial ice is made up of visible layers, each a snapshot of the snow that fell during a given year. Likewise, the bubbles trapped in the ice contain samples of the atmosphere as it was at the time the snow fell. Ice contains memories of how the climate and the atmosphere have changed over hundreds of millennia, presenting the progression of time in the layers of ice in much the same way that the rings of a tree reveal its age. Ice allows us to track changes in temperature from one ice age to the next. We can calculate how strongly the winds blew and from which direction, and we can learn about the movements of ocean currents throughout human history.

Since the Cretaceous period, the earth's climate has changed from tropical, and almost without seasonal variation, to relatively cold and dry. The Antarctic ice sheet gradually developed, and the world slowly, but steadily, drifted towards a new climate; the ice ages were imminent. Ecosystems reacted to the environmental changes. New species emerged, while others disappeared. As woodlands gave way to savannah and steppe, new species that would come to play a decisive role in the earth's development evolved. Grasses spread and diversified, some into the early ancestors of today's grains. Grasses gave sustenance first to grazing animals, and later made agriculture and domestication possible. The genus Homo – our genus – arose on the African savannah concurrently with the onset of the ice ages. Humanity, it can be said, owes its very existence to ice and its movements.

The climate record in the ice shows that the average temperature on earth has fluctuated by as much as eight degrees centigrade during the period of human development over the past half million years. At the end of the most recent ice age, some 10,000 years ago, the climate entered into an unusually stable period. The climate grew warmer (much like it is today), and, most importantly, it became more predictable. Average

temperatures since that time have varied by less than two degrees. The stability of the climate made it possible for humans to predict the future. As a result, we could use our intellect to make plans and to exploit nature's resources optimally. Humans developed agriculture, and the first civilisations arose in the fertile lowlands along the coasts. It was during this period of climatic stability that our civilisations took root.

Back then, sea level was 120 metres lower than it is today. With the climate growing warmer, the ice sheets rapidly receded. As water levels rose, the first civilisations were wiped out. Within the deepest layer of humanity's collective memory is a recollection of how those first cultures disappeared and how we created new ones. All civilisations have myths of a great flood that destroyed its people. Understanding, coming to terms with, that incomprehensible event has preoccupied us ever since.

Each summer, the Greenland ice sheet sheds tremendous amounts of melt water from its surface as glaciers lose millions of tonnes of ice into the sea, where it gradually melts. These processes add water to the ocean, but, at the same time, water vapour rises up from the ocean and becomes snow that falls back onto the ice sheet. For thousands of years, the amount of snow that fell and the amount of ice that calved from glaciers or melted from the edges of the ice sheet maintained equilibrium, and the amount of inland ice in Greenland remained stable. But since the turn of the millennium, Greenland has been losing ice much faster than the ice has regenerated. The ice sheet is now losing hundreds of cubic kilometres of ice every year, making it a significant contributor to global sea level rise, which is today already at a rate that is more than three millimetres a year.

We are on the verge of a new, man-made flood. Its effect on sea levels may be less dramatic, but its influence on humanity will be far greater. This time we understand why and how it is happening. It is human activity that may finally bring the ice ages to an end, including the period of climatic stability that made civilisation possible and is necessary for it to persist.

Science and technology have made it possible for us to throw the climate off kilter. We understand why this is happening, and so it is also within our power to prevent it from happening – we must act. How can it be that even though we have this tremendous knowledge, we have not yet acted?

When Adam took that bite of the apple, he gained knowledge, but he also lost his innocence. The link between knowledge and guilt pervades our whole understanding of responsibility, sin, and punishment. We all agree that a crime committed through negligence is not as serious as one that is pre-meditated, even though the outcome might be exactly the same. On the other hand, we feel a moral obligation to take responsibility for our actions. We are judged more severely if we fail to foresee the obvious adverse effects of our actions, even if we intend no harm.

One of the biggest challenges in addressing the extent of the already widespread effects of climate change is the general unwillingness to accept that science can help us understand the connection between the way we act and the future of the planet. Climate-change sceptics don't address whether human activity affects the planet. Instead, their approach is to reject the existing body of knowledge. They claim that science cannot comprehend the connection between the combustion of fossil fuels and the climate. If we are ignorant, then we are also innocent. If we don't know, then it is not sin. The dream of Edenic ignorance is a very pleasant place to hide.

The serpent in paradise was our inherent urge to understand ourselves and our place in the world. We were tempted into becoming human and not remaining ignorant residents of Eden, regardless of how blissful that might have been. It is through this urge to understand that we have discovered ourselves. Every child yearns to grow up, and we have realised that our true role in the world is to understand it.

What we know about the climate, energy, and the environment is far more than adequate to tell us that we must change our behaviour. We know enough about what changes need to be made that we have no excuse for waiting. Change does not happen overnight, which makes it even more important that we start now.

Yet we must also have understanding for past negligence because guilt will not inspire us to take initiative. Our modern energy-intensive society, which is based on fossil fuels, has been built up through great inventiveness, courage, and intellect. We win little by assigning blame. If we want to alleviate the climate problems we are facing, we must make use of the same qualities that caused the problems to emerge in the first place to develop new and sustainable sources of energy.

Facts are one part; just as guilt does not inspire initiative, people will not act on facts alone. We are inspired to act by emotional and physical experience. Knowledge can tell us what we should do to achieve our goals, but the goals and the urge to act must arise from our emotions.

All of us know the experience of being moved by a piece of music, a book, or a painting. Such works of art serve as an impulse that leaves its mark on us. Experiencing art is not a matter of learning something new; rather, it allows us to discover something in us with which we suddenly identify, and through the connection we establish, we are better able to express who we are. This is why viewing a painting can be liberating. This is why it sometimes feels as if it were the book that is reading you or why your heart seems to communicate better with your head after seeing a play. The power of art is that it can make emotions explicit and make abstract sensations tactile, so that we can better understand what they are. Art speaks not only to the senses we can describe in language but also to those we are unable to express. Art allows us to feel ideas and thoughts. The knowledge we obtain through experience informs our actions, globally and locally. Art is an integral, vital part of society, and there is a long tradition of artists using art to make thoughts, emotions, and ideas visible that are not just sensations but are relevant to society.

One of the challenges of our time is that people feel disconnected from – perhaps even insensitive to – the world's great problems. We do not see ourselves as agents in a global society. Climate change, poverty, war, and illness are all challenges that vie for our attention. The overwhelming avalanche of information in society today, coupled with the PR efforts aimed directly at us, as individuals, have resulted in many of us accepting that something has to be done. Yet there is a huge gap between what we know and what we feel. How can we translate knowledge into action, and really change our behaviour? Of course, it is necessary to present the facts and data supporting climate change science, but this is not where action begins. Only by embodying knowledge can we gain a sense of responsibility and commitment.

Culture is a powerful ally in the struggle to effect change. Culture is almost always about turning knowledge into action. Unlike commercial communication, which sees its audience as consumers of goods and services, the cultural field is generous, based on a spirit of mutual trust; it invites people to be recipients and co-producers at the same time. Art deals with the relationship between personal and shared experiences. A good work of art creates a community in which disagreement is welcome. Regardless of whether we agree or not about an artwork's message or mode of expression, it is still something we experience together. A work of art can contribute to the creation of a sense of community or reciprocity, and it can motivate us to do something together, to become conscious and active members of a global we, without surrendering our personal, emotional experiences.

Art is the key, and science, the tool for ensuring humanity a wondrous future here on earth.