

# A Letter to the Young People of the World



The Goddess of Clean Energy

A Bold New Education  
for the 21st Century

John Slade

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The next generation.

**Autumn Semester—the Problem  
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**A Global Online Library**

**A Weaving of Schools**

**A Global Generation Growing Up Together**

**Clean Energy, Prosperity, Democracy, and Peace**

**The Renaissance of the 21<sup>st</sup> Century**

## Introduction

If we clear away the unrelenting noise, if we clear away the smoke of a dozen wars, if we clear away for one evening the urgent demands waiting for us tomorrow . . . we can discover that we stand together before one of the most important decisions that people have ever faced on their long human journey.

Yes, we have a choice, between unprecedented catastrophe, and unprecedented progress. We *can* make the right choice, if we see who we are, and how ready we are to make the decision which will guide us for at least a century.

Young people of the world, you are the first global generation in human history.

You have unprecedented systems of communication.

You have, more than any generation before you, an unprecedented awareness of the world as a planet on which life has flourished for eons, and on which life is seriously threatened today.

And you have, in every country around the world, an unprecedented determination to build a better world. You no longer ignore somebody else's war somewhere on the other side of the planet, but ache in your heart for the day when peace will finally come.

You have the ability to free yourselves from the shackles of the 20<sup>th</sup> century—the poverty, the pollution, the plunder, the racism, the wars—and to build a future that calls upon the *best* that is within us.

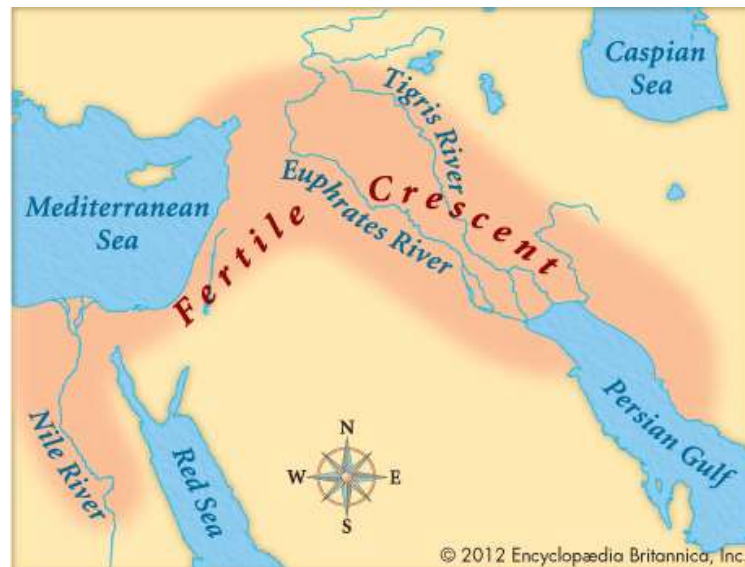
Yes, you can build the Renaissance of the 21<sup>st</sup> century.

## Chapter One

### The Arctic Ice Cap

Let's take a look at two events which have occurred within the past three million years. These two events may at first seem distantly related—or entirely unrelated—but the relationship between a geophysical phenomenon and our long human journey is crucial to our future survival.

Three million years ago, our human ancestors walked upright on the plains of eastern Africa, where they made tools from stones and mastered the uses of fire. Eventually, they migrated north into what is now the Middle East, and thence west into Europe and east into Asia. They steadily evolved—the fossil skulls which we find today show an increase in the size of their brains—and thus they turned their attention from hunting and gathering what food they could find . . . to growing a unprecedented range of food themselves.



Between two rivers, progress blossomed.

In one particular region, where two major rivers—fed by the snow and ice in the mountains of Turkey—flowed down onto a broad plain, our ancestors developed irrigation, drawing water from the rivers into a growing network of canals. They also domesticated both plants and animals, and thus grew a surplus of food. This reliable abundance of food enabled them to turn their attention to other things beyond mere

survival. Because they stored increasing quantities of wheat—the large seeds could be kept in baskets during dry periods, then planted when the rains returned—they needed a system of writing to keep track of annual harvests. The first writers in human history were not poets, nor historians, but accountants who kept track of wheat, barley, flax, peas and lentils, as well as cows, goats, sheep and pigs.

The people who lived in the Fertile Crescent did not stop with agricultural abundance and writing. They built cities of increasing size and complexity. They developed a code of law to keep the growing populations under control. They traded with other people who arrived in caravans from the west (Europe) and from the east (Asia). And they invented the wheel. It seems that the more they did, the more they could do; progress became a concept in their daily lives.

The Fertile Crescent—which encompassed the modern states of Egypt, Palestine, Israel, Jordan, Cyprus (a nearby island in the Mediterranean), Lebanon, Syria, and Iraq, along with parts of southern Turkey and western Iran—became the Cradle of Civilization, blessed with rivers fed by snow and ice in the mountains, blessed by abundant sunshine, blessed by land rich with nutrients, and blessed, especially, with people who developed a system of mathematics which not only helped them in their business transactions . . . but enabled them to track the movements of the sun and the moon and the stars.

These extraordinary people, with their ever-evolving cultures, were aided by the stable climate of the Holocene, a geological epoch which began about 12,000 years ago, at the end of the last ice age. The great sheets of ice which had covered northern Europe and Asia had melted, leaving remnants of ice high in the mountains. The world was still cold enough that snow could replenish this ice, winter after winter, and yet the world was warm enough that the ice could melt, summer after summer, to feed the great rivers flowing down to the plains.

Domesticated plants and animals from the Fertile Crescent made their way into the world. Writing and mathematics and codes of law made their way into the world. The fruits of a Golden Age—marred by unrelenting wars—became the foundation of our modern world today. The torch was passed from Babylon to Athens, to Rome, until, many chapters later in the record of human history, people today grow their wheat, and shear their sheep, and hire accountants to keep electronic business records, and argue cases in court, and point their rockets toward the stars. The early flute, made from a reed, and the early drums, made from animal skins stretched over a gourd, have become a symphony orchestra. The early letters,



made with a sharp stick on the damp surface of a tablet of clay, have become the great libraries of the world. Progress is as much a part of our daily lives as our morning cup of coffee.

\* \* \* \* \*

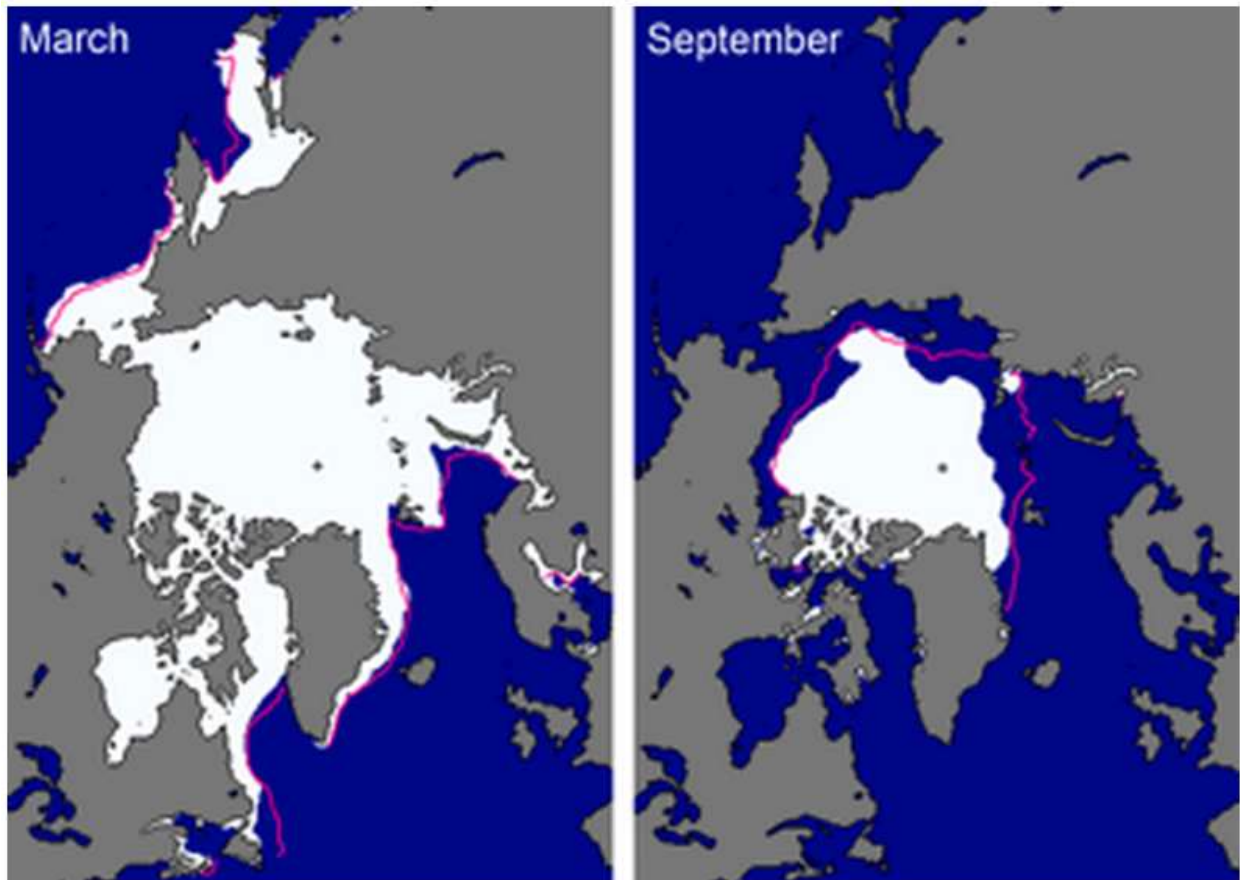
During the same three million years of human development, something else was happening in the world. Planet Earth has always experienced extended periods of warming and cooling, caused by various factors such as the wobble of its axis or the gravitational pull of distant planets in the solar system. About three million years ago, Earth became cool enough that a curved cap of ice formed at the top of the planet, where it floated on the Arctic Ocean.<sup>1</sup>



The Arctic ice cap, ringed by northern lights.

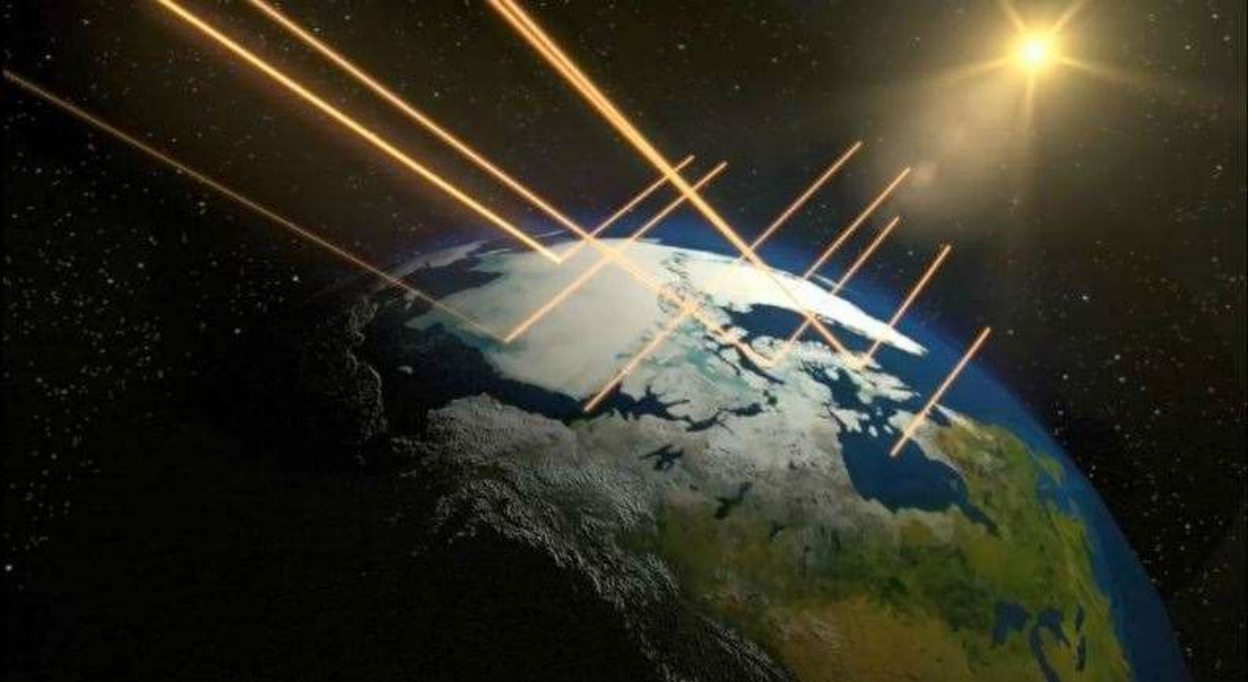
During the Arctic winter, when Earth's axis pointed away from the sun and the top of the planet was dark, the cap of ice expanded until it reached the northern coastlines of Asia, North America, and Europe. During the Arctic summer, when

Earth's axis pointed toward the sun and the top of the planet was brightly lit all day and all night, the cap of ice shrank, exposing the open water of the Arctic Ocean to the warming sunshine.



Arctic sea ice in 2013; winter maximum in March, summer minimum in September.  
The dot represents the North Pole.

The Arctic ice cap, a thin sheet of white ice and snow, *reflected* about 90% of the sunlight back into space. The open water of the Arctic Ocean, wrapped around the edges of the ice cap, *absorbed* about 90% of the sunlight. The reflective ice cap has helped to maintain fairly stable temperatures on planet Earth for three million years, by reflecting sunlight which otherwise would have warmed the Arctic Ocean, and thus the planet itself.



The Arctic ice has long reflected light from the sun, keeping the Earth cool.  
But now the huge curved sheet of ice is melting.

Like the Holocene, the geological epoch which has provided the Fertile Crescent (as well as the rest of the world) with a stable climate for twelve thousand years, the Arctic ice cap has provided the planet with a balance of temperatures—neither too hot nor too cold—for three million years, during the period of our long human journey.

But now, as you know, the Arctic ice cap is melting. It no longer reaches as far south during the dark winters, and shrinks more and more to the north during the sunlit summers, thus exposing more and more open ocean water to the warming rays of the sun. As the Arctic Ocean becomes increasingly warm, it melts the sheet of ice—only a few meters thick—from underneath, so that the ice cap is not only reduced in surface area, but becomes thinner, and more delicate, as well.

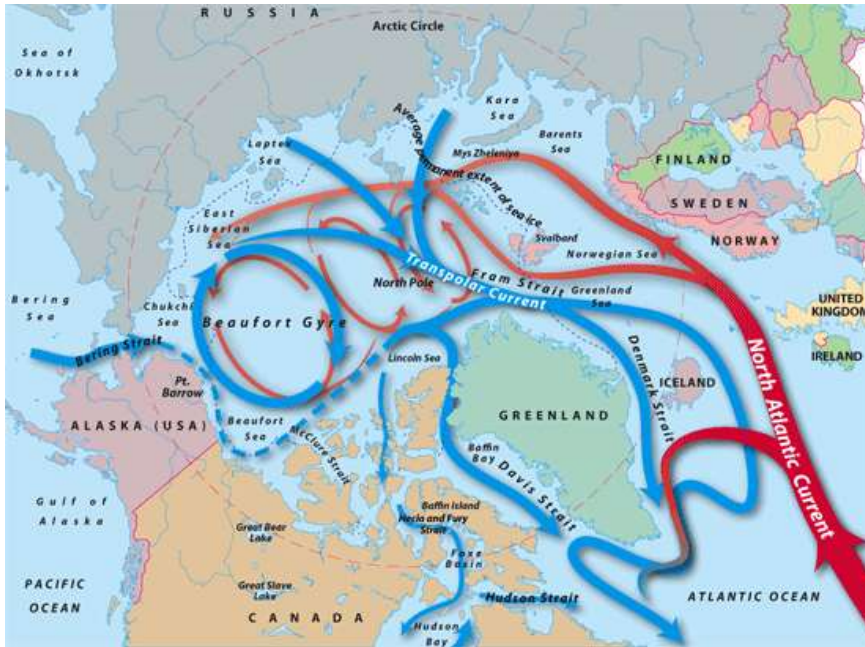
The more the ice cap shrinks, the warmer the ocean becomes. And the warmer the ocean becomes, the more it melts the ice from underneath and the more the ice cap shrinks. The entire process accelerates, as we have seen with satellite surveillance since 1979.



The shrinking of the Arctic ice cap,  
from summer of 1979 to summer of 2012.

Several currents pass through the Arctic Ocean, including the northern portion of the Gulf Stream (called the North Atlantic Drift as it reaches the top of the planet). These currents—becoming colder and thus *more dense*, as well as saltier (from the evaporation of surface water) and thus *more dense*—sink at the top of the planet and continue their courses like great rivers flowing at various depths, all the way down to the floor of the ocean basin. As the Arctic Ocean warms, the currents flowing through it pick up increasing amounts of unnatural heat, then carry that heat on their journeys around the planet.





Currents flowing through the Arctic.



Currents flow like giant rivers around the planet.  
Red on the surface, blue down deep.

Two centuries of manmade pollution have wrapped our planet with an ever thickening blanket of carbon dioxide and methane. Much of the heat in our warming atmosphere has been absorbed by the oceans, which initiated the shrinking of the Arctic ice cap. Now as the ice cap shrinks, uncovering more and more open water, geological factors combine with our pollution to warm the Earth further still.

The domino effect has begun: it has already reached the tundra, where the permafrost—a vestige from the last ice age—is now thawing. The thawing layer of subterranean ice is already releasing increasing amounts of methane, produced by bacteria from the decay of ancient plants long buried beneath the permafrost. The methane adds to the blanket of greenhouse gases wrapped around the planet . . . and again the process accelerates.



Ancient ice, now melting beneath the tundra.  
Beneath the ice are planetary amounts of methane.

How long before the Arctic ice cap has shrunk to half of its original size?

It already has.

How long before the ice cap disappears entirely?

We don't know.

How warm will the Arctic Ocean become, when it is no longer capped by the protective ice?

We don't know.

How much unnatural heat will the ocean currents which pass through the Arctic Ocean carry around the planet, on the surface and deep below?

We don't know.

How much methane lies trapped beneath the permafrost, waiting to be released into the atmosphere?

We don't know.

How warm will planet Earth become with the release of planetary amounts of methane?

We don't know.

And this is just the beginning. There are more dominoes than we even know about. The warmer the atmosphere above the Arctic Ocean, the weaker the jet streams; the weaker the jet streams, the more wildly will our weather fluctuate.

The warmer the oceans, the more powerful the hurricanes.

The warmer the atmosphere, the more moisture it can carry, and thus the more rain it can release, creating unprecedented floods.

And drought? In twenty years, "drought" will be the most frequent word on the front pages of electronic newspapers around the world. The great rivers of the planet, no longer fed by melting ice and snow in the mountains, will become troughs of mud.

And on and on. Climate change is coming like a freight train, and we are all standing right on the tracks.



Precious life on a perfect planet.