EDGE MEDIA
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Programme One: From the Pyramids to the Digital Age

The following transcript contains all to-camera presentation, narration and interviews from the programme first broadcast on Edge Media TV's Controversial TV (Sky channel 200) on 18th April 2009. To ease readability as a transcript, most other parts of the script have been removed.

TITLE SEQUENCE

UNIVERSITY OF NOTTINGHAM: JUBILEE CAMPUS: DAY

CHRISTOPHER BARNATT (CB) TO CAMERA:

Welcome to Challenging Reality. I'm Chris Barnatt, and in this series we're going to take a journey across time — across reality itself — on a quest to explore the greatest challenges and opportunities of the future. Along the way, we're going to examine how reality has altered in the past, and how human beings have both driven and coped with fundamental change.

Reality is that which is taken to be real — that which seems unquestionable — and hence that which can constrain creativity and progress. In this sense, we can think of reality as like a kind of forcefield that bounds our actions. Reach out beyond the conventional [TOUCHES FORCEFIELD WHICH SPARKS], and the forcefield of reality shocks us back into conformity. However, as we will shall see in this series, most barriers do not constrain us as greatly as we may have been conditioned to believe.

BREAKS THROUGH SPARKING FORCEFIELD AND WALKS ON.

In the face of fundamental challenges from global warming to the credit crunch, from the ethics of genetic engineering to our dwindling fossil fuel supplies, its quite staggering how many people still continue to act as if the future will be just like the present. This series therefore attempts to jolt us out of current reality. And to remind us just how radically things can change, we're going to start with an exploration of the changing face of wonder past, present and future.

STOCK MATERIALS: PYRAMIDS

For thousands of years our most wondrous achievements were individual, physical things that inspired a sense of awe. Whether they were statues, great walls, paintings, palaces or tombs, the most magnificent of ancient wonders were all

created — at least in part — to steal their place in history. Indeed, as an old Arab proverb reminds us, "Man fears time, yet Time itself fears the Pyramids".

INTERVIEW: DYLAN BICKERSTAFFE

Well, the Pyramids were constructed for the King. And the whole country, it appears, was engaged in an enterprise to actually post him off into the heavens to join the Sun. And it appears that the whole of society was involved in this enterprise. And we know from a worker cemetery which is just by the Great Pyramids at Giza, that a lot of the workers — we can tell from their bones — actually came from all over Egypt. So it was a whole country enterprise to actually build the King's tomb.

The Pyramids that we're all interested in — the ones at Giza, and the other great ones as Dahshur and Meidum, were built during the Fourth Dynasty of Ancient Egypt, so quite early indeed in the history of the country. And that's about 2500BC. So the big Pyramids we're interested in are very early indeed. They're four thousand, five hundred years old.

We don't really know how the pyramids were constructed. We know some of the techniques that were used. We know that they used ramps to drag the stones up to the site of the Pyramids. But we're not sure if ramps were actually used to take the stones up the sides of the pyramid and lift them up to the top. Because to build a ramp to reach the top of the Great Pyramid, for instance, you're building something over a mile long. And the volume of that ramp is four times the volume of the pyramid itself. So you've adding immeasurably to the amount of work you must do. And then there's all the quarrying that must be done as well. And some of the stones came from across the river, or from right up the Nile in Aswan. So there's an enormous amount of work involved. We know some of the things they did. But we really don't know exactly the techniques that were employed.

GRAPHICS MONTAGE: CYCLICAL TO LINEAR TIME

Ancient wonders like the Pyramids also had an impact on the reality of time. This is because most ancient civilizations spent their lives caught in the endless cycles of the natural world. For example, in Egypt the Nile would flood and ebb every year carrying mud and silt to fertilize the land. And just as the nights would grow shorter and then longer in a constant repetition of the seasons, so religious festivals would arrive on an annual basis, always to be conducted in an identical, timeless fashion. The past had been, the present was, and the future could only be influenced by the Gods.

For most ancient civilizations there was therefore change but no novelty. However, in building a pyramid, the ancient Egyptians began to win for themselves a place within Eternity. For the first time, human beings were setting markers in history. The perceived flow of time as an endless circle was therefore challenged, with a linear stream of events emerging shaped entirely by human action. A progressive history could clearly be traced from past times before the pyramids, to a present

when they were being built, and to a future in which the mighty tombs would dominate both skylines and minds.

WORCESTER CATHEDRAL: DAY

CB TO CAMERA, PLUS OTHER COVERAGE OF CATHEDRAL.

The Ancient Egyptians were of course far from our only ancestors to craft great physical wonders. For example, thousands of years after the building of the pyramids came the construction of the medieval cathedrals across Europe, such as this one here in Worcester.

Like the pyramids before them, cathedrals effectively enslaved those who built then, whilst simultaneously also freeing them from the constraints of the present. Thousands of masons dedicated their entire lives to sculpting detail high upon buildings which they knew they themselves would ever see completed. And yet they laboured with pride, secure in the knowledge that their descendants would behold the results of their craft and dedication.

Both pyramids and cathedrals still stand as reminders of great undertakings that could not have been completed in the here and now. Sadly today, many of the organizations that dominate our lives are run for short-term financial gains. So-called "long-term" targets are therefore rarely set for more than five or perhaps ten years into the future. This is, perhaps, inevitable in a world that worships not Gods, but dollars, pounds, euro or yen. This said, we should perhaps not forget that the greatest wonders of the past could not have been completed without their architects building and planning ahead for decade upon decade upon decade.

STOCK & CG MONTAGE

For most of human history, the greatest of wonders remained mighty buildings or entire cities — great statues and paintings, or other works of art. However, as the nineteenth century drew to a close, the whole nature of wonder started to change.

At this time science and industrialization were rising to new heights. A shift in the achievement focus of humanity therefore began to occur away from awe-inspiring physical things, and towards the application of ingenious processes. As the Age of Ingenuity rose, new wonders were not particular objects, but electric light, medicines or horseless travel. They were scientific discoveries, inventions and other acts of cleverness that challenged the reality of how people would live.

For example, we remember Thomas Edison for inventing electric light, rather than for building any individual filament lamp. In the same way, Alexander Graham Bell is famous for the creation of a new means of communication, rather than just one particular telephone handset.

CB STUDIO TO CAMERA

By the middle of the 20th century an almost blind faith was emerging in the ingenuity and wonder of scientific progress. An example of this can be found with the 1958 book *Atomic Energy: A Layman's Guide to the Nuclear Age*. Written at a at a time when atomic tests were being watched with no more protection than sunglasses, it makes confident predictions, with no safety concerns, for future nuclear motor cars, atomic aeroplanes, and even nuclear rockets.

NASA MOONLANDINGS STOCK

Talking of space travel, whilst on occasions our faith in its science may have blinded us to reality, it remains widely accepted that the greatest accomplishment of the 20th century was when we landed on the Moon.

Twenty thousand companies employing 400,000 people worked upon the twenty-four billion dollar moonlandings project. Indeed, rarely since ancient times had such a burden been placed upon a nation for the achievement of a single peacetime goal. As the Pyramids were to the ancient Egyptians, so the moonlandings programme became to the American nation throughout the 1960s.

By the July of 1969, the stage was set for history to be made. Watched on television by half a billion people, Apollo 11's Eagle landing craft began its perilous descent toward the lunar surface. With computer overloads and fuel shortages overcome, the long-awaited landing proved successful, and the Eagle's commander — Neil Armstrong — came to speak perhaps the most famous line of the 20th century: "It's one small step for man, one giant leap for mankind."

As Armstrong stepped onto the lunar surface, the great dream of the decade became a reality. A single footstep one quarter of a million miles out in space had also reminded us of our collective passion to challenge reality. And in doing so, it changed the way we think about ourselves.

UNIVERSITY OF NOTTINGHAM: JUBILEE CAMPUS: DAY

CB TO CAMERA.

No act of ingenuity since the moonlandings has so widely captured the collective consciousness of our entire planet. However, since 1969, millions of people have become electronically inter-linked by the sprawling global anarchy of the Internet. As we'll explore in Part Two, our pursuit of wonder has therefore begun to move into cyberspace . . .

END OF PART ONE

PART TWO

UNIVERSITY OF NOTTINGHAM: JUBILEE CAMPUS: DAY

Welcome back to Challenging Reality. In Part One, we examined how wonder has evolved from "awe" to "ingenuity". However, as the 21st century gathers pace, the nature of wonder is moving on again. In the future, what we most value is likely to be raw imagination. Or in other words, it won't be the "what" or the "how" that's most significant, but the "why"

TECHNOLOGY FOOTAGE

The catalyst for our emerging Age of Imagination has been digital technology. In less than 20 years the human race has become wired and now wireless, with individuals increasingly and permanently interconnected into the emerging global consciousness of the Internet. In the electronic realm of cyberspace, barriers to what is and may be possible are rapidly falling away. Anybody, anywhere with a computer and an Internet connection can now creatively contribute to the new digital mindscape in which homo sapiens now at least part live. And to experience the extent to which online tools may result in future wonders of pure imagination, we already have to look no further than the online virtual world of Second Life . . .

INTERVIEW: THOMAS CHESNEY

Second Life is a three dimensional virtual world that allows users to create their own content. So users can go in there represented by avatars — little cartoon versions of themselves — who navigate around this world and meet with other users. And you can go into this world and create your own content. So you can create buildings — you could create a skyscraper, a log cabin by the beach, a house for yourself to live in — or a retirement home, a business. Anything you can imagine you should be able to create inside Second Life.

CG / VR & GENETIC ENGINEERING MONTAGE

Today's online virtual worlds are viewed on standard computer displays. However in the future it's possible they will be interfaced directly into our brains. This said, it will increasingly not only be in virtual worlds where we will be limited purely by our imagination. Indeed, current developments in both genetic engineering and nanotechnology already suggest a possible future in which we will be able to program not just cyberspace, but physical reality and even life itself.

Genetic engineering alters living organisms by changing the information encoded in their DNA. Some fertility clinics already offer a commercial service that allows parents to choose the sex of their child. As genetic engineering slowly advances, the possibility that in future parents will be able to select many of the characteristics of their offspring therefore cannot be ignored. Indeed, some governments may even try to determine the genetic programming of their military, or even their entire population.

For several decades it's been possible to produce transgenic plants and animals by splicing genes from one species into the DNA of another. Already transgenically crafted GM crops are in the food chain, whilst transgenic plants have also been created to manufacture insulin and other medicines. Transgenic mice were also first created as long ago as 1986, with humanized rodents carrying human DNA now routinely bred for research.

NANOTECHNOLOGY CG

Genetic engineering may be controversial in reprogramming life itself. However, it is not the only rising science that may remove many of the limits to future human accomplishment. So-termed "nanotechnology" also involves manipulating materials at a very small scale, and offers just as great a potential to challenge reality.

PROFESSOR TONY KENT INTERVIEW

So nanotechnology is involved with the exploitation of physical, chemical and biological processes in materials and structures on the nanometre-size scale. Now a nanometre is a [British] billionth of a metre. To put that in perspective, if I had a machine that could take the Earth and everything on it and shrink it down to the size of a regular football, then my little finger would end up about a nanometre in size. So anything in the range of about one to a hundred nanometres is what we would describe as nanotechnology, and its an incredibly diverse field, with applications in medicine, aerospace, electronics and computing, even through to cosmetics.

There's basically two approaches to producing nanostructures. One is the so-called top-down approach, where you take a larger object and reduce its size or produce smaller-scale structures on it. And the other one is the so-called bottom-up approach, where you take atoms and molecules and assemble together your nanostructure from those. The top-down approach is typified by the technology used to make silicon chips. And indeed most of us have these kind of structures in our mobile phones and our home computers. The other way is to build bottom-up, as I say, from atoms and molecules. There are techniques, for example, based on assembling DNA molecules together to make larger nanostructures. There are self-assembly techniques, and special crystal epitaxial growth techniques which enable assembly of very small structures, thin layers [of atoms].

NANOTECHNOLOGY GRAPHICS & FOOTAGE

Over 800 consumer products are already based in whole or part on nanotechnology. These include microprocessors, computer memory, plasma screens, car paints, make-up, sun screens and longer-lasting batteries. It is therefore hardly surprising that many predict the next technological revolution will be that of nanotechnology. Indeed, predictions have even been made of a future in which self-replicating nanobots will manipulate the atoms of one material into another, and in which nanobot doctors will be injected into our bodies to repair damage and fight disease. Such visions currently remain science fiction. However, a

future in which a converged science of genetic engineering and nanotechnology will offer a great many possibilities is nevertheless slowly edging closer.

"FUTURE WONDERS?" GRAPHICS

The cutting-and-pasting of genes between species to create new types of plants, animals and even human beings will eventually become commonplace. An increasing number of parents will also be able to select the genetic traits of their offspring. New forms of computer hardware are additionally likely to be created that will interface directly into our brains. And whether or not nanobots are involved, new nanotechnology processes will one day allow at least some products to be crafted to our specification atom-by-atom.

CB STUDIO TO CAMERA

All of these emerging scenarios have already been heralded as both nightmares and dreams — as potentially ground breaking, and at the same time immoral. And that's the point. Back in the days of the Pharaohs, wonder was encapsulated in stone. Then last century it became a matter of scientific cleverness. But increasingly, in the future, wonder will be a function of *acceptable imagination* dependent on our beliefs and ethics. This is because what is most "wondrous" will increasingly be judged on the basis of whether it ought to have been permitted in the first place.

MONTAGE

Whether or not new online worlds are created on the Internet is largely irrelevant to the rest of the human race. However, if even a very small number of people start to genetically re-engineer the human species — or to "contaminate" the "natural" world with self-replicating forms of nanotechnology — then this is something that the rest of us cannot simply ignore. Indeed, unless the majority sit up and take informed and active notice, then new realities will continue to be created that many people will find unacceptable.

Collective responsibility is the greatest challenge for the 21st century. Building pyramids or taking the first steps on the Moon may not have been easy. But yet, they may prove to have been child's pay in comparison to our challenge today of agreeing on the acceptable boundaries of reality in the face of so many potential and ethically irreversible possibilities.

CB STUDIO TO CAMERA WITH GREETINGS CARD

I have here a birthday card. But not just any type of birthday card. Because if you open this one up, it plays you a tune. If you could take this card back in time to Ancient Egypt, then it's likely it would be revered as an individual, physical wonder. Indeed, even twenty or thirty years ago, and the creation of an electronic sounding device capable of being embedded into a card would have been considered an

ingenuous wonder. Inhabitants of the 1970s and 1980s would probably also have worried about how they could have changed the battery.

Today, of course, we know that musical greetings cards are created to be thrown away once their novelty has diminished. Battery replacement is therefore simply no longer an issue. Indeed, the only thing remotely wonderful about a musical greetings card is the fact that anybody thought it up in the first place.

MONTAGE

How musical cards would have been heralded across the ages nicely sums up the evolution of wonder from the "what" to the "how" to the "why". The human race has already created both weapons, and unsustainable industrial practices, capable of destroying the natural world. Developments on the near horizon may even result in a remodelling of ourselves. In the future, we may therefore well reach a point beyond which further technological innovation may neither be wise or socially acceptable. Humanity is fast becoming the Lord of Nature we have for so long fought to become. We therefore need to start asking if we have enough collective wisdom to stop ourselves before we're inflicted with the old curse of "what we wished for".

UNIVERSITY OF NOTTINGHAM: JUBILEE CAMPUS: DAY

In this programme we've travelled from the Pyramids to the Digital Age to trace the evolution of wonder from the "what" to the "how" to the "why". Next time, we'll examine past-present-future progressions associated with geography and knowledge. But for now that's it for this programme, and remember — the future, is in your hands . . .

END CREDITS

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For more information, please see www.ExplainingTheFuture.com/reality