Lovereading.co.uk
Helping you choose your next book

You loved your last book...but what are you going to read next?

Using our unique guidance tools, Love**reading** will help you find new books to keep you inspired and entertained.

Opening Extract from...

Everything You Need to Know About Everything You Need to Know About

Written by Daniel Tatarsky

Published by Portico

All text is copyright © of the author

This Opening Extract is exclusive to Love**reading**.
Please print off and read at your leisure.

Published in the United Kingdom in 2011 by

Portico Books
10 Southcombe Street
London
W14 0RA

An imprint of Anova Books Company Ltd

Copyright © Portico, 2011

Torino Scale copyright © 1999, 2004 Richard P. Binzel,
Massachusetts Institute of Technology.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the copyright owner.

ISBN 978-190603-299-9

A CIP catalogue record for this book is available
from the British Library.

10 9 8 7 6 5 4 3 2 1

Printed and bound by TBC

This book can be ordered direct from the publisher at
www.anovabooks.com

Contents_



Introduction *10*

01.0 Time & Space_

01.1 **Before The Bang** *14*
01.2 **The Big Bang** *16*
01.3 **In The Beginning** *18*
01.4 **The Composition Of Our Universe** *20*
01.5 **The Known Galaxies** *22*
01.6 **The Sun** *24*
01.7 **The Night Sky** *26*
01.8 **The Solar System** *28*
01.9 **Life On Other Planets** *30*
01.10 **The Planets** *32*
01.11 **Comets and Collisions** *34*
01.12 **The Creation Of Planet Earth In Four Easy Steps** *36*



02.0 Our World_

02.1 **The Structure And Composition Of Earth** *40*
02.2 **The Atmosphere** *42*
02.3 **The Continents** *44*
02.4 **The Air We Breathe** *46*
02.5 **The Weather** *48*
02.6 **The Power Of Earthquakes** *50*
02.7 **Volcanoes** *52*
02.8 **An Ocean World** *54*
02.9 **The Water Cycle** *56*
02.10 **Lakes and Rivers** *58*
02.11 **The Ice Age Cometh** *60*
02.12 **Seven Natural Wonders Of Our World** *62*



03.0 The Living Earth_

03.1 **Life As We Used To Know It** *66*
03.2 **And Then There Were Cells** *68*
03.3 **Photosynthesis** *70*
03.4 **The Life Cycle Of A Tree** *72*
03.5 **The Kingdom Of Insects** *74*
03.6 **The Kingdom Of Mammals** *76*
03.7 **The Kingdom Of The Sea** *78*
03.8 **The Kingdom Of Birds** *80*
03.9 **The Age Of Dinosaurs** *82*
03.10 **What Killed The Dinosaurs?** *84*
03.11 **The Food Chain** *86*
03.12 **The Lifespan Of Animals** *88*



04.0 Humans_

04.1 **The Evolution Of Man From Monkey** *92*
04.2 **Human Composition** *94*
04.3 **Deoxyribonucleic Acid (DNA)** *96*
04.4 **The Brain** *98*
04.5 **Skeleton And Muscles** *100*
04.6 **The Senses** *102*
04.7 **Where Your Organs Are** *104*
04.8 **The Cycle Of Life** *106*
04.9 **How The Body Works** *108*
04.10 **The Development Of Speech** *110*
04.11 **Memory** *112*
04.12 **From Fertilisation To Birth** *114*

Contents_ *cont.*



05.0 Environment & Society_

05.1 **Population Growth** *118*
05.2 **Staple Food Production** *120*
05.3 **The Science Of Art** *122*
05.4 **The Sound Of Music** *124*
05.5 **Great Reads In Time** *126*
05.6 **The Dawn Of Television** *128*
05.7 **The Introduction Of Cinema** *130*
05.8 **Sport's Date With History** *132*
05.9 **Languages Of The World** *134*
05.10 **Pollution And The Planet** *136*
05.11 **Our Changing World: Global Warming** *138*
05.12 **Seven Man-Made Wonders Of The World** *140*



06.0 Making History_

06.1 **The Spread Of Man Across The Globe** *144*
06.2 **The End Of Nomadic Man** *146*
06.3 **The Empires** *148*
06.4 **History Of Modern Warfare** *150*
06.5 **The Five Years Of The First World War** *152*
06.6 **World War II** *154*
06.7 **Powerful Leaders Of The Past 2,000 Years** *156*
06.8 **The Rise Of The Superpowers** *158*
06.9 **The Fall Of Communism** *160*
06.10 **The Countercultural Revolution** *162*
06.11 **The Modern Family** *164*
06.12 **The World Since 9/11** *166*



07.0 Science & Medicine_

07.1 **The Size Of Atoms** *170*
07.2 **Newton's Gravity** *172*
07.3 **The Periodic Table Of Elements** *174*
07.4 **Equations You Need To Know** *176*
07.5 **How Electricity Works** *178*
07.6 **The Inside Life Of Bacteria** *180*
07.7 **The Rules Of Magnetic Attraction** *182*
07.8 **The Unique History Of Measurement** *184*
07.9 **The Medical Trade** *186*
07.10 **What's Killing Us?** *188*
07.11 **The Speed Of Speed** *190*
07.12 **Science And Medicine's Finest Hours** *192*



08.0 Technology & Communications_

08.1 **The Science Of Progress** *196*
08.2 **The Evolution Of Transport** *198*
08.3 **The History Of The Printed Word** *200*
08.4 **The History Of Communication** *202*
08.5 **How A Telephone Works** *204*
08.6 **The Satellites In Orbit** *206*
08.7 **The Age Of Personal Computers** *208*
08.8 **The Growth Of The Internet** *210*
08.9 **The World Of Social Networking** *212*
08.10 **Travelling Through Space** *214*
08.11 **How Times Have Changed** *216*
08.12 **What Happens Next?** *218*

Author Biography / Acknowledgements *220*
Index *222*

01.10 The Planets_

Our Solar System is in the Orion arm of the Milky Way. There are eight planets in our solar system but the count has been as high as 15. This has changed as the definition of a planet has evolved.

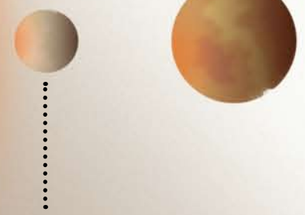
At the General Assembly of the **International Astronomical Union** in August 2006 resolution 5a set out a new definition of what a planet is:

(1) *A 'planet' [1] is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.*

As a result of part two of this resolution ...

(2) *A 'dwarf planet' is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, (c) has not cleared the neighbourhood around its orbit, and (d) is not a satellite.*

Pluto lost its status as a planet and is now classed as a **dwarf planet**.



Mercury

Average Distance from Sun:
58 million km (36 million miles)
Diameter: 4,876km (3,030 miles)
Gravity (compared to Earth): 0.38
Rotation time (in Earth days): 58.6461
Speed: 3.46km/h (2.15mph)

Mainly made of iron, Mercury is the second heaviest planet.



Venus

Average Distance from Sun:
108 million km (67 million miles)
Diameter: 12,107km (7,523 miles)
Gravity (compared to Earth): 0.88
Rotation time (in Earth days): 243.16
Speed: 2.07km/h (1.29mph)

Days on Venus are longer than years.



Earth

Average Distance from Sun:
150 million km (93,205,679 miles)
Diameter: 12,755km (7,926 miles)
Gravity (compared to Earth): 1
Rotation time (in Earth days): 0.9972
Speed: 531.45km/h (330.26mph)



Mars

Average Distance from Sun:
228 million km (141,672,632 miles)
Diameter: 6,794km (4,222 miles)
Gravity (compared to Earth): 0.37
Rotation time (in Earth days): 1.0256
Speed: 276.02km/h (171.51mph)

Olympus Mons is the Solar System's largest known volcano.



Jupiter

Average Distance from Sun:
778 million km (483,426,788 miles)
Diameter: 142,983km (88,846 miles)
Gravity (compared to Earth): 2.4
Rotation time (in Earth days): 0.4131
Speed: 14,421.75km/h (8,961.26mph)

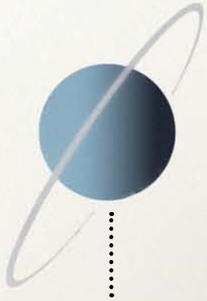
The Great Red Spot is a storm which has been raging for over 200 years.



Saturn

Average Distance from Sun:
1,433 million km (890,424,918 miles)
Diameter: 120,536km (74,898 miles)
Gravity (compared to Earth): 1.07
Rotation time (in Earth days): 0.4257
Speed: 11,797.82km/h (7,330.83mph)

One of Saturn's moons, Titan, is larger than Mercury.



Uranus

Average Distance from Sun: 2,872 million km (1,784,578,064 miles)
Diameter: 51,117km (31,761 miles)
Gravity (compared to Earth): 0.9
Rotation time (in Earth days): 0.7166
Speed: 2,972.2km/h (1,846.84mph)

Unlike all the other planets, Uranus spins on its side in relation to the Sun.



Neptune

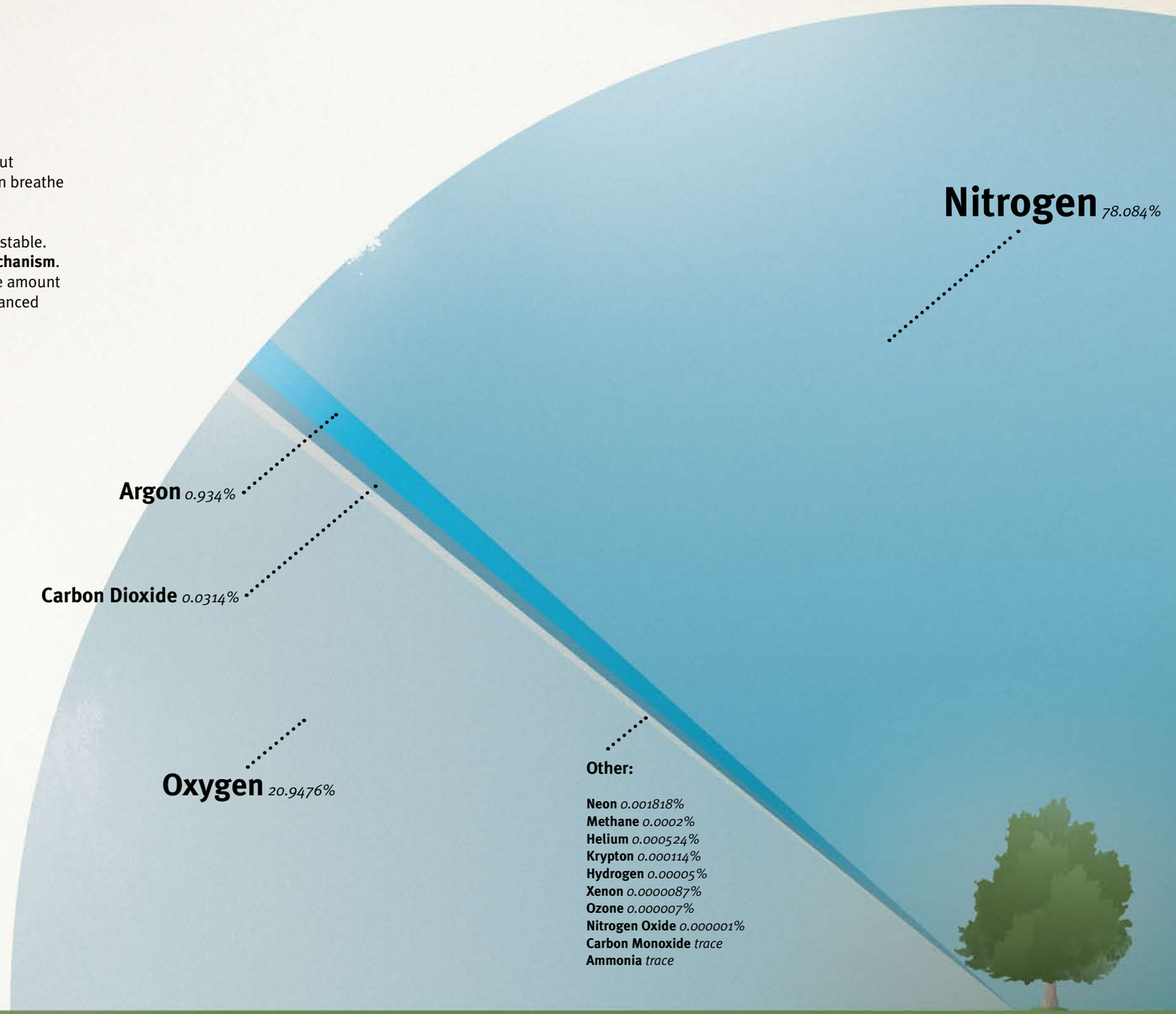
Average Distance from Sun:
4,495 million km (2,793,063,509 miles)
Diameter: 49,527km (30,775 miles)
Gravity (compared to Earth): 1.19
Rotation time (in Earth days): 0.6784
Speed: 3,041.9km/h (1,890.15mph)

Was discovered because of an irregularity in Uranus' orbit which was created by Neptune's gravitational pull.

02.4 The Air We Breathe_

In the simplest terms we are all able to live because we breathe out carbon dioxide, which trees and other plants breathe in. They then breathe out oxygen that we breathe in and so the cycle continues.

The astonishing thing is that the balance of the atmosphere is so stable. It goes to show that the Earth is an incredible **self-regulating mechanism**. While the number of living things on the planet has increased, the amount of oxygen in the air has not gone down, and it is still perfectly balanced to support life on Earth.



Something To Think About ...

We don't think about breathing, we do it automatically, and we take for granted the supply of clean air. The World Health Organisation estimates that two million deaths a year are attributable to air pollution.

04.1 The Evolution Of Man From Monkey_

Like monkeys, apes and even lemurs, human beings are classed as **Primates** – the first of which appeared around 65 million years ago (mya), after the dinosaurs had died out and Earth's climate had stabilised once again. Whilst we could trace our evolution further back in history, this particular moment in time was really the start of our own distinct branch of evolution.

Fifteen million years after primates first appeared, *Hominidae* (or Great Ape) evolved, but it was still another ten million years before the emergence of the earliest known primate that displayed distinct elements of Man. The proof of this is a fossil dating from around 4.5 mya that shows *Ardipithecus ramidus* to be predominantly bi-pedal (two-legged). He was followed (3–4 mya) by *Australopithecus anamensis* and *Australopithecus afarensis*, both showing signs of permanent bi-pedalism. The brain at this evolutionary step was still small, and facial features were still mainly ape-like, but the teeth were gradually becoming smaller.

Something To Think About ...

It is believed that toward the end of the late Pleistocene period, about 75,000 years ago, the number of *Homo sapiens sapiens* got as low as 1,000 breeding couples, and it is from this small group that we all come.

The Neanderthal was as strong, intelligent and resourceful as sapiens, but around 30,000 years ago they became extinct, while *Homo sapiens* flourished and eventually became *Homo sapiens sapiens* – that's us.

Homo erectus came next around 1.8 mya. His facial features are now closer to human than ape, body hair has greatly reduced and brain size is about three-quarters that of a modern human's.

Fossil remains have been found of *habilis* along with primitive tools. Standing around 1.5m (5ft tall), *habilis* had a brain cavity big enough to house an organ capable of primitive speech.

Over the next two million years evolution began to speed up with three further species of *Australopithecus*: *africanus*, *robustus* and, finally, *boisei* around one million years ago. These overlap with the appearance, at last, of *Homo*, about 2.5 mya, in the shape of *Homo habilis*.



65 mya *First primates* (survived 50 mya)

15 mya *Hominidae* (survived 10 mya)

4–5 mya *Ardipithecus ramidus* (survived 1 mya)

3–4 mya *Australopithecus anamensis* (survived 2 mya)

2.9 mya *Australopithecus afarensis* (survived ½ mya)

2.2 mya *Homo habilis* (survived ½ mya)

1.8 mya *Homo erectus* (survived 1½ mya)

300–400,000 years ago Neanderthal (survived 250,000 years)

30,000 years ago *Homo sapiens*

05.10 Pollution And The Planet_

In a recent list of the **world's top ten most polluted cities** seven of them had gained their notoriety due to an increased dependency on **driving cars**. Part of the problem is that many people cannot afford to live in the city where they work and so they have to drive in to get to their job. This is *the* major concern in cities such as **Beijing**, **Cairo**, **Dhaka** and **New Delhi** and most especially in **Buenos Aires** where the **population increases** four-fold during the daytime.

Tanzania's capital **Dar Es Salaam** contains 80% of the country's industry and the residents burn **waste and biomass** on the streets. **Moscow's** recent **forest fires** have added to its pollution, whilst **Mexico City** has a combination of industry and cars compounded by dry, hot spells that add to this pollution.

The last two cities in the hall of shame are **Dzerzhinsk** in Russia and China's **Linfen**. Dzerzhinsk is where the Soviet Union produced many of its biological and chemical weapons during the Cold War up until the 1990s.This 'secret' city is still suffering from the poor management of this **industrial output**. Linfen, officially the most polluted city in the world, has the simple combination of cars, high population and **coal-fired power stations** to blame.

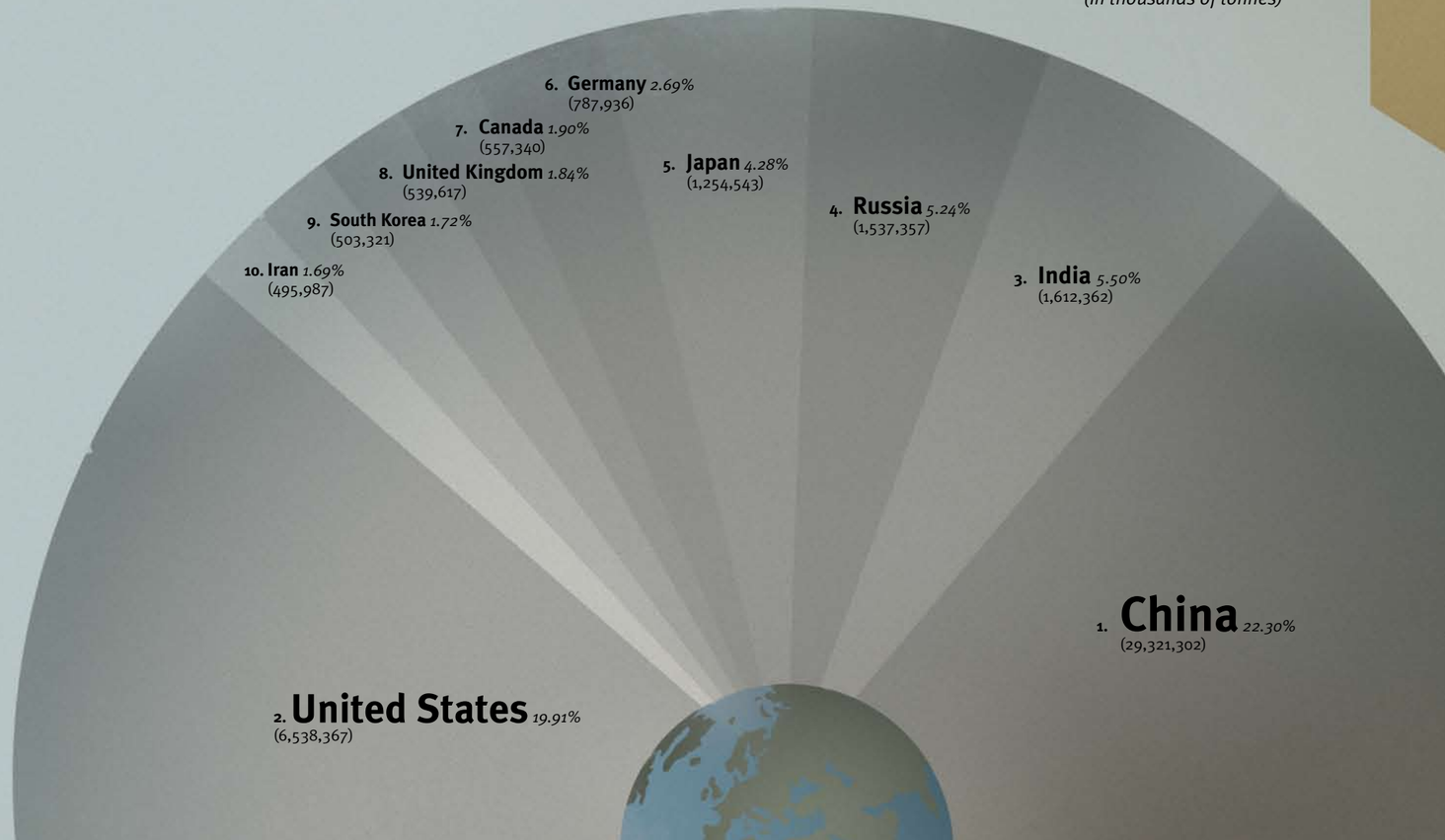
The Earth's Top Six Most Harmful Pollutants

	Caused by	Major problem
1. Carbon Dioxide	*Burning fossil fuels and deforestation*	*Increases global warming*
2. Nitrogen Dioxide	*Burning fossil fuels*	*Attacks the Earth's protective ozone layer*
3. Particulate Matter	*Roads, fires, construction*	*Gets into the lungs*
4. Sulphur Dioxide and Chlorofluorocarbons	*Burning fossil fuels*	*Constricts tubes in the lungs*
5. Lead	*Industry (used to be in petrol)*	*Affects the nervous system, kidney function, immune system amongst others*
6. Carbon Monoxide	*Mainly from automobile exhausts*	*Reduces oxygen intake*

Something To Think About ...

In December 1952 there was a build-up of smog in London. It is estimated that 4,000 people died as a direct result of this polluted air. It led to the 1956 Clean Air Act.

The world's top ten worst polluters
In global percentage and annual CO_2 emissions (in thousands of tonnes)

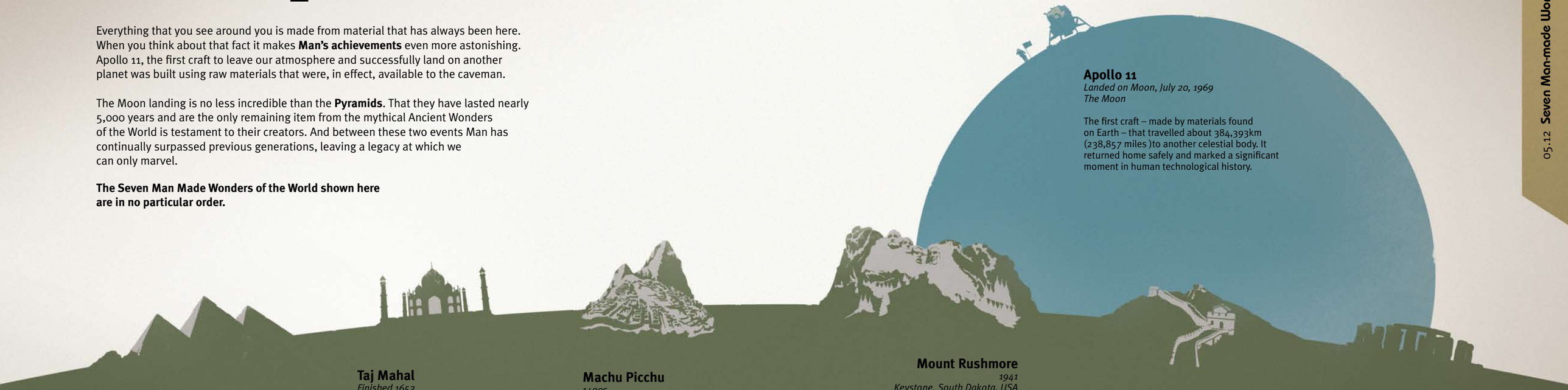


05.12 Seven Man-made Wonders Of The World_

Everything that you see around you is made from material that has always been here. When you think about that fact it makes **Man's achievements** even more astonishing. Apollo 11, the first craft to leave our atmosphere and successfully land on another planet was built using raw materials that were, in effect, available to the caveman.

The Moon landing is no less incredible than the **Pyramids**. That they have lasted nearly 5,000 years and are the only remaining item from the mythical Ancient Wonders of the World is testament to their creators. And between these two events Man has continually surpassed previous generations, leaving a legacy at which we can only marvel.

The Seven Man Made Wonders of the World shown here are in no particular order.



The Great Pyramids
Built around 2560 BC
Giza, Egypt

Series of pyramids built for the 4th Dynasty pharaoh Khufu. Notable for the astronomical link-up with Orion's Belt.

Taj Mahal
Finished 1653
Agra, India

A mausoleum built by Shah Jaham in memory of his wife Mumtaz Mahal. Considered by many as one of the most beautiful man-made buildings in the world, and a globally recognised symbol of eternal love.

Machu Picchu
1400s
Urubamba Valley, Peru

The Lost City of the Incas, as it is commonly referred to, had gone undiscovered by the rest of the world until 1911 and, even today, remains relatively intact.

Mount Rushmore
1941
Keystone, South Dakota, USA

The heads of four important US Presidents – George Washington, Thomas Jefferson, Theodore Roosevelt and Abraham Lincoln – carved into the granite rock of the Black Hills region of South Dakota. Each head is about 18m (60ft) high and were created as an attempt to improve tourism in the area. It worked.

Apollo 11
Landed on Moon, July 20, 1969
The Moon

The first craft – made by materials found on Earth – that travelled about 384,393km (238,857 miles)to another celestial body. It returned home safely and marked a significant moment in human technological history.

Great Wall of China
5thC BC–16thC^{h}
China

This ancient wall meanders around Northern China at about 8,851km (5,500 miles) in length and was built to defend the borders against nomadic invaders.

Stonehenge
c. 2700 BC
Wiltshire, United Kingdom

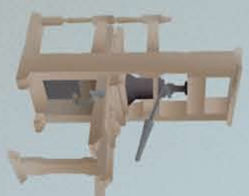
No one is exactly sure who made Stonehenge. Or how.

08.3 The History Of The Printed Word_

The earliest method of printing was produced by carving into wood and then transferring the image on to paper by inking the wood. This was very time-consuming and complicated as whatever was being printed had to be carved in reverse.

The major leap forward came with the production of individual blocks for each letter of the alphabet and construction of a frame into which these could be placed – this was called the **printing press**. Whilst there have been improvements since Johannes Gutenberg invented his printing press in the mid-15th Century, the processes now are essentially the same except everything is done by computer.

Advances in printing technology were vital in the **dissemination of information and ideas**. In dictatorial regimes where ideas printed in books go against the ideology of the current rulers (and where they do not encourage free speech), freedom of expression via the printed word can be a dangerous weapon. If it is true that the pen is mightier than the sword, it cannot be denied that **the printing press is mightier than the pen**.



Printed Word

868 AD
Diamond Sutra – *The world's first printed book or the earliest dated printed book found so far.*

Printing Press

1041
First printing, using **carved wooden blocks** *covered in ink, transferred text and image onto paper, Bi Sheng, China.*

1241
Koreans **use metal moveable type** *to print books.*

1309
Paper first made by Europeans.

1338
In France, the first paper-mill opens.

1430
Intaglio printing *first used.*

1476
In England, **William Caxton** *uses a Gutenberg printing press.*

1501
Italic type *is first used.*

1543
Copernicus publishes his **Heavenly Spheres**.

1570
Beware the Cat *by William Baldwin – the first novel in English.*

1605
Relation *– the first weekly newspaper printed in Strasbourg by Johan Carolus.*

1611
King James Bible *published.*

1623
William Shakespeare's First Folio – *a collected edition of all his plays. Without this, there would be no Shakespeare today.*

1755
Samuel Johnson publishes **the first dictionary**.

1785
The Times *(as the* Daily Universal Register*) first printed. Oldest national paper in the world.*

1796
Lithography *– a type of printing using a stone or metal plate – invented by Alois Senefelder.*

1824
French teenager Louise **Braille**, *aged 15, invents the six-dot system that now bears his name.*

1903
American Ira Washington Rubel accidentally invents **offset printing**, *when he forgets to put the paper into the press and the ink goes on to the rubber cylinder. When he then inserts the paper the resulting image on the paper is clearer.*

1920 *(US),* **1921** *(UK)*
The Mysterious Affair at Styles – *Agatha Christie's first book published.*

1925
Mein Kampf *– Adolf Hitler's autobiography.*

1927
The International Federation of Library Associations and Institutions is founded – they oversee the cataloguing of all published books.

1932
Albatross Books in Germany are credited with creating **the first mass-market paperback** *books.*

1960
To Kill a Mockingbird *by Harper Lee – regarded as one of the best novels of all time.*

1988
Professor Stephen Hawking publishes **A Brief History of Time** *– a vital, and popular, book on the history of the Universe.*

1995
Website Amazon begins selling books.

1997
Harry Potter and the Philosopher's Stone *by J.K. Rowling (only 500 printed in first print run).*

1998
Softbook release the first type of e-book reader.

2005
The Girl with the Dragon Tattoo *by Stieg Larsson – the must-read book of the decade.*

2007
Amazon release its first generation **digital e-book reader**, *the Kindle.*

2011
Where next for the book?

Something To Think About...

Louise Braille's six-dot writing system evolved from the tactile *Ecriture Nocturne* (night writing) code invented by Charles Barbier de la Serre. This code was used to send military messages that could be read on the battlefield at night without light.