

**SATURDAY 08 JULY 2017**

**SAT 19:00 Britain and the Sea (b03m3x1j)**  
Pleasure and Escape

Having examined the sea as a source of exploration, defence and trade, David Dimpleby explores how it emerged as a source of pleasure, Punch and Judy and sand sculpture.

Starting at Gorleston-on-Sea, David explores the creation of a seaside holiday culture that remains uniquely British to this day.

Sailing down the Suffolk and Essex coasts and into the Thames, David also shows how the sea became an irresistible subject for our most celebrated artists and architects, before finally docking in the very heart of British maritime power - Greenwich.

**SAT 20:00 Nature's Great Events (b00j8g9g)**  
The Great Feast

Every summer in the seas off Alaska humpback whales, sea lions and killer whales depend on an explosion of plant life - the plankton bloom. It transforms these seas into the richest on earth. But will these animals survive to enjoy the great feast?

The summer sun sparks the growth of phytoplankton, microscopic floating plants which can bloom in such vast numbers that they eclipse even the Amazon rainforest in sheer abundance of plant life. Remarkably, it is these minute plants that are the basis of all life here.

But both whales and sea lions have obstacles to overcome before they can enjoy the feast. Humpback whales migrate 3,000 miles from Hawaii, and during their three-month voyage, lose a third of their body weight. In a heartrending scene, a mother sea lion loses her pup in a violent summer storm, while another dramatic sequence shows a group of killer whales working together to kill a huge male sea lion.

In late summer, the plankton bloom is at its height. Vast shoals of herring gather to feed on it, diving birds round the fish up into a bait ball and then a humpback whale roars in to scoop up the entire ball of herring in one huge mouthful.

When a dozen whales work together, they employ the ultimate method of co-operative fishing - bubble net feeding. One whale blows a ring of bubbles to engulf the fish and then they charge in as one. Filmed from the surface, underwater and, for the first time, from the air, we reveal how these giant hunters can catch a tonne of fish every day.

In Swallowed By a Whale, cameramen Shane Moore and David Reichert were filming bait balls when a 30-tonne whale roared past, within feet of them, swallowing the entire bait ball.

**SAT 21:00 Mea Culpa (b04pnnxt)**

Cops Franck and Simon are partners in the French police force. Simon has been wracked with guilt since a fatal drunk-driving accident some years ago, his self-esteem and family life in tatters. But when his young son inadvertently becomes witness to a murder and finds himself hunted by the killers, Simon has a shot at redemption both as a cop and father.

In French with English subtitles.

**SAT 22:25 Titanic's Tragic Twin: The Britannic Disaster (b083dp3s)**

The Titanic sank in April 1912, and her sister ship, the Britannic, ultimately suffered the fate, sinking in 1916 due to an explosion caused by an underwater mine.

In the wake of the Titanic disaster, Britannic was re-engineered to be even stronger. And yet she sank in just 55 minutes - three times faster than Titanic. It's one of Britain's greatest untold disaster stories. Now on the 100th anniversary, presenters Kate Humble and Andy Torbet piece together exactly what happened in those 55 minutes.

While Andy makes a dangerous dive to the wreck, Kate speaks to descendants of the survivors. The characters she uncovers include Violet 'Miss Unsinkable' Jessops, who survived both Titanic and Britannic, Captain 'Iceberg Charlie' Bartlett and lookout Archie Jewell, who miraculously survived while those around him died.

**SAT 23:25 Top of the Pops (b08wzynn)**

Mike Read and Janice Long present the pop chart programme, first broadcast on 23 February 1984. Includes appearances from Hot Chocolate, Rockwell, Marilyn, Nik Kershaw, Carmel and Howard Jones.

**SAT 00:00 Top of the Pops (b08wzpp9)**

John Peel and David Jensen present the pop chart programme,

first broadcast on 1 March 1984. Featuring Matt Bianco, Van Halen, Alexei Sayle, Break Machine, Wang Chung, Slade, Nena and Julia & Company.

**SAT 00:35 Synth Britannia at the BBC (b00n93c6)**

A journey through the BBC's synthpop archives from Roxy Music and Tubeway Army to New Order and Sparks. Turn your Moogs up to 11 as we take a trip back into the 70s and 80s!

**SAT 01:35 Synth Britannia (b00n93c4)**

Documentary following a generation of post-punk musicians who took the synthesiser from the experimental fringes to the centre of the pop stage.

In the late 1970s, small pockets of electronic artists including The Human League, Daniel Miller and Cabaret Voltaire were inspired by Kraftwerk and JG Ballard, and they dreamt of the sound of the future against the backdrop of bleak, high-rise Britain.

The crossover moment came in 1979 when Gary Numan's appearance on Top of the Pops with Tubeway Army's Are 'Friends' Electric? heralded the arrival of synthpop. Four lads from Basildon known as Depeche Mode would come to own the new sound, whilst post-punk bands like Ultravox, Soft Cell, OMD and Yazoo took the synth out of the pages of NME and onto the front page of Smash Hits.

By 1983, acts like Pet Shop Boys and New Order were showing that the future of electronic music would lie in dance music.

Contributors include Philip Oakey, Vince Clarke, Martin Gore, Bernard Sumner, Gary Numan and Neil Tennant.

**SUNDAY 09 JULY 2017**

**SUN 19:00 The Royal Ballet: Woolf Works (b08xypdv)**

The Royal Ballet presents Wayne McGregor's triptych, inspired by the writings of Virginia Woolf, with an original score by Max Richter. Met with outstanding critical acclaim on its premiere in 2015, it went on to win McGregor the Critics' Circle Award for Best Classical Choreography and the Olivier Award for Best New Dance Production.

Each of the three acts draws from one of Woolf's iconic novels - Mrs Dalloway, Orlando and The Waves - combined with elements from her letters, essays and diaries.

Presented from The Royal Opera House by Darcey Bussell and Clemency Burton-Hill.

**SUN 21:00 Horizon (b08ry919)**  
2018

Volcanoes of the Solar System

Volcanoes have long helped shape the Earth. But what is less well known is that there are volcanoes on other planets and moons that are even more extraordinary than those on our own home planet. Horizon follows an international team of volcanologists in Iceland as they draw fascinating parallels between the volcanoes on Earth and those elsewhere in the solar system. Through the team's research, we discover that the largest volcano in the solar system - Olympus Mons on Mars - has been formed in a similar way to those of Iceland, how a small moon of Jupiter - Io - has the most violent eruptions anywhere, and that a moon of Saturn called Enceladus erupts icy geysers from a hidden ocean. Computer graphics combined with original Nasa material reveal the spectacular sights of these amazing volcanoes.

Along the way, we learn that volcanoes are not just a destructive force, but have been essential to the formation of atmospheres and even life. And through these volcanoes of the solar system, scientists have discovered far more about our own planet - what it was like when Earth first formed, and even what will happen to our planet in the future.

**SUN 22:00 The Sky at Night (b08xyplm)**  
Into the Dark Zone

Scientists have spent hundreds of years observing the planets with telescopes and over fifty exploring the solar system through space travel, so you might have thought they knew our cosmic neighbourhood pretty well.

But actually, they've hardly scratched the surface. The reality is that most of the solar system is still almost a complete mystery. Beyond the orbit of Neptune lies a vast number of strange, dark, icy worlds - the trans-Neptunian objects. And it's only over the last few years that we've even started to see and understand them, and have begun to realise they play a crucial role in the evolution of our solar system.

Maggie Aderin-Pocock and Chris Lintott discover how we've found hundreds of thousands of these strange new objects, some with multiple moons, others with strange orbits, and some spinning way faster than any planet in the solar system.

Marcus du Sautoy explores how studying the mathematics governing the behaviours of these objects has changed our understanding of how the solar system evolved, and how it might eventually end.

**SUN 22:30 Destination Titan (b0109ccd)**

It's a voyage of exploration like no other - to Titan, Saturn's largest moon and thought to resemble our own early Earth. For a small team of British scientists this would be the culmination of a lifetime's endeavour - the flight alone, some two billion miles, would take a full seven years.

This is the story of the space probe they built, the sacrifices they made and their hopes for the landing. Would their ambitions survive the descent into the unknown on Titan's surface?

**SUN 23:30 The Search for Life: The Drake Equation (b00wltbk)**

For many years our place in the universe was the subject of theologians and philosophers, not scientists, but in 1960 one man changed all that.

Dr Frank Drake was one of the leading lights in the new science of radio astronomy when he did something that was not only revolutionary, but could have cost him his career. Working at the National Radio Astronomy Observatory in Greenback in Virginia, he pointed one of their new 25-metre radio telescopes at a star called Tau Ceti twelve light years from earth, hoping for signs of extraterrestrial intelligence.

Although project Ozma resulted in silence, it did result in one of the most seminal equations in the history of science - the Drake Equation - which examined seven key elements necessary for extraterrestrial intelligence to exist, from the formation of stars to the likely length a given intelligent civilisation may survive. When Frank and his colleagues entered the figures, the equation suggested there were a staggering 50,000 civilisations capable of communicating across the galaxy.

However, in the 50 years of listening that has followed, not one single beep has been heard from extraterrestrials. So were Drake and his followers wrong and is there no life form out there capable of communicating? Drake's own calculations suggest that we would have to scan the entire radio spectrum of ten million stars to be sure of contact.

The answers to those questions suggest that, far from being a one-off, life may not only be common in the universe but once started will lead inevitably towards intelligent life.

To find out about the equation's influence, Dallas Campbell goes on a worldwide journey to meet the scientists who have dedicated their lives to focusing on its different aspects.

**SUN 00:30 Nature's Great Events (b00j8g9g)**  
[Repeat of broadcast at 20:00 on Saturday]

**SUN 01:30 The Royal Ballet: Woolf Works (b08xypdv)**  
[Repeat of broadcast at 19:00 today]

**MONDAY 10 JULY 2017**

**MON 19:00 100 Days+ (b08xq999)**  
Series 1

10/07/2017

Katty Kay in Washington and Christian Fraser in London report on the events that are shaping our world.

**MON 19:30 Great British Railway Journeys (b0517vrl)**  
Series 6

Oakham to Cambridge

On the final leg of his journey from west Wales to East Anglia, Michael Portillo begins in Oakham, where he learns of a noble tradition dating back to the Middle Ages. Following in the footsteps of peers over the centuries, he determines to take part. Heading east to Stamford, Michael discovers why the town is such an attractive location for period dramas and takes part in a Victorian melodrama.

A ghoulish scene awaits in Peterborough as Michael visits a Victorian operating theatre where railwaymen were treated.

Michael's last stop on this final journey is Christ's College at Cambridge University, where he learns about the student days of the father of evolution, Charles Darwin.

**MON 20:00 Colour: The Spectrum of Science (b06nxwld)**  
Colours of Life

We live in a world ablaze with colour. Rainbows and rainforests, oceans and humanity, earth is the most colourful place we know of. But the colours we see are far more complex and fascinating than they appear. In this series, Dr Helen Czerski uncovers what colour is, how it works, and how it has written the story of our planet - from the colours that transformed a dull ball of rock into a vivid jewel to the colours that life has used to survive and thrive. But the story doesn't end there - there are also the colours that we can't see, the ones that lie beyond the rainbow. Each one has a fascinating story to tell.

The raw, early Earth had plenty of colour, but that was nothing compared with what was going to come next. That canvas was about to be painted with a vast new palette - and the source of those colours was life. Green is the colour of the natural world and yet it's the one colour that plants have evolved not to use.

The huge diversity of human skin tones tells the story of how humanity spread and ultimately conquered the planet. But the true masters of colour turn out to be some of the smallest and most elusive. Helen travels to the Great Smokey Mountains of Tennessee during the one week in the year when fireflies light up the night sky with their colourful mating display. And she reveals the marine animals that hide from the world by changing the colour of their skin.

**MON 21:00 Science and Islam (b00gq6h7)**  
The Empire of Reason

Physicist Jim Al-Khalili travels through Syria, Iran, Tunisia and Spain to tell the story of the great leap in scientific knowledge that took place in the Islamic world between the 8th and 14th centuries.

Al-Khalili travels to northern Syria to discover how, a thousand years ago, the great astronomer and mathematician Al-Biruni estimated the size of the earth to within a few hundred miles of the correct figure.

He discovers how medieval Islamic scholars helped turn the magical and occult practice of alchemy into modern chemistry.

In Cairo, he tells the story of the extraordinary physicist Ibn al-Haytham, who helped establish the modern science of optics and proved one of the most fundamental principles in physics - that light travels in straight lines.

Prof Al-Khalili argues that these scholars are among the first people to insist that all scientific theories are backed up by careful experimental observation, bringing a rigour to science that didn't really exist before.

**MON 22:00 Storyville (b08xyq06)**  
This Was My Dad – The Rise and Fall of Geoffrey Matthews

A profoundly intimate documentary filmed by Bafta-winning director Morgan Matthews over a period of more than ten years in the life of Morgan's father Geoff and his wonderfully eccentric partner Anna.

In an attempt to reconnect with his dad after becoming estranged, Morgan uses the camera as both a facilitator and a filter that enables him to stay close during challenging times. The film follows Geoff and Anna through a financial crisis that sees them losing their home, it captures the challenges of their relationship, and documents the decline in Geoff's health as a result of emphysema and cancer.

With the warmth, love and humour that is so often mixed up in family dramas, this is a documentary made from the inside by a film-maker who is used to turning his camera towards other people's families - but never his own. The result is deeply personal, but the themes of a challenging paternal dynamic, a relationship under pressure, and death in the family, are widespread and universal.

**MON 23:25 Ocean Giants (b013q50m)**  
Giant Lives

This episode explores the intimate details of the largest animals that have ever lived on our planet - the great whales. From the balmy waters of the Indian Ocean to the freezing seas of the Arctic, two daring underwater cameramen - Doug Allan, Planet Earth's polar specialist, and Didier Noirrot, Cousteau's front-line cameraman - come face to face with fighting humpback whales and 200-ton feeding blue whales.

Teaming up with top whale scientists, Giant Lives discovers

why southern right whales possess a pair of one-ton testicles, why the arctic bowhead can live to over 200 years old and why size truly matters in the world of whales.

**MON 00:25 Hidden Kingdoms (b03rmckl)**  
Secret Forests

This is the story of two tiny animals coming of age.

In the wild woods of North America, a young chipmunk is gathering a vital store of nuts ahead of his first winter - in his way are ruthless rivals and giant predators.

In the steaming rainforest, a young tree shrew is forced deep into the jungle to find food. She must draw on all her intelligence and agility if she is to escape the ultimate jungle predator - a reticulated python!

**MON 01:25 Science and Islam (b00gq6h7)**  
[Repeat of broadcast at 21:00 today]

**MON 02:25 Colour: The Spectrum of Science (b06nxwld)**  
[Repeat of broadcast at 20:00 today]

**TUESDAY 11 JULY 2017**

**TUE 19:00 100 Days+ (b08xq9jc)**  
Series 1

11/07/2017

As President Trump takes office, Katy Kay in Washington and Christian Fraser in London report on the events that are shaping our world.

**TUE 19:30 Handmade: By Royal Appointment (b07fky64)**  
Wedgwood

Film which follows the making of a Wedgwood vase. The culmination of over 250 years of expertise and heritage, the panther vase is handcrafted by artisan potters using the same techniques pioneered by Josiah Wedgwood in the 18th century. But the Wedgwood factory in Stoke is now a very different place. Under new, foreign ownership, it's a gleaming, modern operation, and as we follow the vase slowly taking shape, the film also takes a gentle look at how this quintessentially British company is reinventing itself for the 21st century.

**TUE 20:00 Britain Beneath Your Feet (b061v75n)**  
Series 1

On the Move

Dallas Campbell reveals a fascinating and secret world hidden below Britain. In this episode he explores how what goes on underground keeps our country on the move. He delves into the past to discover how a secret wartime pipeline is now delivering fuel to Heathrow Airport. Extraordinary computer graphics lay bare the underwater engineering genius that allowed the iconic Forth Rail Bridge to be built in the 19th century.

Along the way Dallas meets some of the hidden army of workers that keep Britain running from underground, from the drivers of the largest tunnelling machines in the world to the engineers running a vast power station under a mountain in Wales. In one memorable scene, he helps dislodge a 'fatberg' that's blocking one of London's sewers. And he does some secret filming of badgers that are threatening the foundations of a primary school and helps to relocate the whole sett.

**TUE 21:00 The British Garden: Life and Death on Your Lawn (b08xyqcs)**

The British back garden is a familiar setting, but underneath the peonies and petunias is a much wilder hidden world, a miniature Serengeti, with beauty and brutality in equal measure. In this documentary, Chris Packham and a team of wildlife experts spend an entire year exploring every inch of a series of interlinked back gardens in Welwyn Garden City. They want to answer a fundamental question: how much wildlife lives beyond our back doors? How good for wildlife is the great British garden?

Through all four seasons, Chris reveals a stranger side to some of our more familiar garden residents. In summer he meets a very modern family of foxes - with a single dad in charge - and finds that a single fox litter can have up to five different fathers. In winter he shows that a robin's red breast is actually war paint. And finally, in spring he finds a boiling ball of frisky frogs in a once-in-a-year mating frenzy.

The secret lives of the gardens' smallest residents are even

weirder. The team finds male crickets that bribe females with food during sex, spiders that change colour to help catch prey, and life-and-death battles going on under our noses in the compost heap.

So how many different species call our gardens home? How well do our gardens support wildlife? By the end of the year, with the help of a crack team from London's Natural History Museum and some of the country's top naturalists, Chris will find out. He'll also discover which type of garden attracts the most wildlife. The results are not what you might expect... You'll never look at your garden in quite the same way again.

**TUE 22:30 Deep Down & Dirty: The Science of Soil (b040y925)**

For billions of years our planet was devoid of life, but something transformed it into a vibrant, living planet. That something was soil.

It's a much-misunderstood substance, often dismissed as 'dirt', something to be avoided. Yet the crops we eat, the animals we rely on, the very oxygen we breathe, all depend on the existence of the plant life that bursts from the soil every year.

In this film, gardening expert Chris Beardshaw explores where soil comes from, what it's made of and what makes it so essential to life. Using specialist microphotography, he reveals it as we've never seen it before - an intricate microscopic landscape, teeming with strange and wonderful life forms.

It's a world where the chaos of life meets the permanence of rock, the two interacting with each other to make a living system of staggering complexity that sustains all life on Earth.

Chris explores how man is challenging this most precious resource on our planet and how new science is seeking to preserve it.

**TUE 23:30 The Brits Who Built the Modern World (b03vgz8d)**

The Power of the Past

How an exceptional generation of British architects, led by Norman Foster and Richard Rogers, conquered the globe with their high-tech vision.

This episode focuses on the 1980s, when modern architecture was deeply unpopular and under attack from the Prince of Wales. The architects reveal the dramatic stories behind some of their most famous creations, including Rogers's Lloyd's of London building and Foster's Stansted Airport.

Terry Farrell reveals how he was kept in the dark when he was designing the M16 Headquarters, Michael Hopkins recalls the challenges of bringing ultra-modern architecture into the traditional world of Lord's Cricket Ground, and Nicholas Grimshaw follows in the footsteps of the great Victorian engineers with his Waterloo International station.

**TUE 00:30 Medieval Lives: Birth, Marriage, Death (b03d6c64)**

A Good Marriage

Unlike birth and death, which are inescapable facts of life, marriage is rite of passage made by choice and in the Middle Ages it wasn't just a choice made by bride and groom - they were often the last pieces in a puzzle, put together by their parents, with help from their family and friends, according to rules laid down by the church.

Helen Castor reveals how in the Middle Ages marriage was actually much easier to get into than today - you could get married in a pub or even a hedgerow simply by exchanging words of consent - but from the 12th century onwards the Catholic church tried to control this conjugal free-for-all. For the church, marriage was a way to contain the troubling issue of sex, but, as the film reveals, it was not easy to impose rules on the most unpredictable human emotions of love and lust.

**TUE 01:30 Britain and the Sea (b03m3x1j)**  
[Repeat of broadcast at 19:00 on Saturday]

**TUE 02:30 The British Garden: Life and Death on Your Lawn (b08xyqcs)**  
[Repeat of broadcast at 21:00 today]

**WEDNESDAY 12 JULY 2017**

**WED 19:00 100 Days+ (b08xq9xv)**  
Series 1

12/07/2017

As President Trump takes office, Katty Kay in Washington and Christian Fraser in London report on the events that are shaping our world.

**WED 19:30 Handmade: By Royal Appointment (b07g9q28)**  
John Lobb Shoes

In the shadow of St James's Palace is the workshop of shoemakers John Lobb. Since the mid-19th century, they have handcrafted shoes for gentlemen and boast royal warrants from both the Duke of Edinburgh and the Prince of Wales. It's a rare heritage company still run by the original family and this film follows a day in the life of the shoemakers, who use methods that have barely changed since the company was founded. From pencilled outlines on brown paper to the cutting and stitching of leather, heels hammered on soles to the final polishing, the film follows the meticulous craft process and hears from the shoemakers themselves, many of whom have spent decades working for the company.

**WED 20:00 Hunting the Nazi Gold Train (b07yc9zf)**

In August 2015, two amateur researchers declared they had found a lost Nazi train buried in a railway cutting near Walbrzych, southern Poland. Better still, they believed the train might be loaded with gold, armaments or precious treasure, all left behind by the Nazis at the end of World War II. The claim sparked a global media frenzy. Locals have long believed that at least one train, loaded with looted Nazi gold, left the provincial capital Wroclaw in early 1945. But until now, no one has discovered what happened to it.

Dan Snow follows the treasure hunters as they look for the gold train, while also carrying out his own investigation into this story, one that leads all the way to Adolf Hitler himself and his secret plans for this remote corner of the Third Reich during the last months of World War II.

Dan explores the astonishing underground tunnel complex called Riese, built on the fuhrer's orders almost certainly as an underground city to house armaments production beyond the reach of Allied bombing. Nearby, Dan visits the Ksiaz Castle, which at the end of the war was converted into a possible bolt-hole for Hitler and his high command. A door from the fuhrer's bedroom leads down to tunnels that could have linked the palace with the underground Riese complex.

Dan considers the evidence that Hitler was planning to retreat to this near impregnable complex and fight on. As Dan uncovers Hitler's possible plans for this region, it also lends weight to the theories and stories that there is a hidden tunnel here, a tunnel that could even contain the legendary train full of gold.

Finally, Dan joins the treasure hunters as they begin the excavation itself, and reveals the outcome of the hunt for the Nazi gold train.

**WED 21:00 Sound Waves: The Symphony of Physics (b08h061q)**  
Series 1

Making Sound

Dr Helen Czerski investigates the extraordinary science behind the sounds we're familiar with and the sounds that we normally can't hear.

She begins by exploring the simplest of ideas: what is a sound? At the Palace of Westminster, Helen teams up with scientists from the University of Leicester to carry out state-of-the-art measurements using lasers to reveal how the most famous bell in the world - Big Ben - vibrates to create pressure waves in the air at particular frequencies. This is how Big Ben produces its distinct sound. It's the first time that these laser measurements have been done on Big Ben.

With soprano singer Lesley Garrett CBE, Helen explores the science of the singing voice - revealing in intimate detail its inner workings and how it produces sound. Lesley undergoes a laryngoscopy to show the vocal folds of her larynx. At University College London, Lesley sings I Dreamed a Dream inside an MRI scanner to reveal how her vocal tract acts as a 'resonator', amplifying and shaping the sound from her larynx.

Having explored the world of sounds with which we are familiar, Helen discovers the hidden world of sounds that lie beyond the range of human hearing. At the summit of Stromboli, one of Europe's most active volcanoes, Helen and volcanologist Dr Jeffrey Johnson use a special microphone to record the extraordinary deep tone produced by the volcano as it explodes - a frequency far too low for the human ear to detect. Helen reveals how the volcano produces sound in a similar way to a musical instrument - with the volcano vent acting as a 'sound resonator'.

Finally, at the University of Cambridge's Institute of Astronomy, Helen meets a scientist who has discovered

evidence of sound waves in space, created by a giant black hole. These sounds are one million billion times lower than the limit of human hearing and could be the key in figuring out how galaxy clusters, the largest structures in the universe, grow.

**WED 22:00 Railways: The Making of a Nation (b07x4fg9)**  
Time

Historian Liz McIvor explores how Britain's expanding rail network was the spark to a social revolution, starting in the 1800s and continuing through to modern times. A fast system of transportation shaped so many areas of our industrial nation - from what we eat to where we live, work and play. The railways generated economic activity but they also changed the nature of business itself. They even changed attitudes to time and how we set our clocks. Our railways may have reflected deep class divisions, but they also brought people together as never before, and helped forge a new sense of national identity.

This episode looks at how you organise a rail network in a country made up of separate local time zones and no recognised timetables. Before the railways, our country was divided and local time was proudly treasured. Clocks in the west of the country were several minutes behind those set in the east. The railways wanted the country to step to a new beat in a world of precise schedules and timetables that recognised Greenwich Mean Time. Not everyone was keen to step in line, and some complained about the new world of one single time zone and precise schedules.

**WED 22:30 Railways: The Making of a Nation (b07x4dyz)**  
Capitalism and Commerce

The railways stimulated great changes to the nation's economy. They also changed the way we do business, encouraging a new generation of mechanical engineers, skilled workers, managers and accountants. Originally, local railway entrepreneurs viewed trains as vehicles for shifting raw materials, stock and goods. But soon they discovered there was money to be made in transporting people.

Places such as Derby became 'railway towns'. Derby was central to the new network, and home to the engineers who made and maintained locomotives and carriages. But the railway 'boom' of the 1840s also came with a 'bust'. A new age of middle-class shareholders who invested in the railways soon discovered what goes up can also go down.

Alongside this were stories of railway rogues and dodgy dealing. However, railway companies recovered from the crash and continued to develop as complex national business organisations - capable of building great structures such as the Ribbleshead Viaduct in Yorkshire and St Pancras Station in London.

**WED 23:00 Patagonia with Huw Edwards (b05xd52f)**

Huw Edwards fulfils a lifelong dream to explore Patagonia, and the unique attempt to preserve Welsh culture by isolating a Welsh community in one of the most remote and inhospitable places on earth. A hundred and fifty years after the pioneers arrived, Huw meets their descendants and asks what remains of the culture the forefathers wanted to safeguard.

**WED 00:00 The Renaissance Unchained (b071gsdv)**  
Whips, Deaths and Madonnas

Waldemar Januszczak returns to Italy to trace the Italian Renaissance from its perceived origins with Giotto and takes a look at the importance of religious narrative in Italian art. While there were certainly a few aesthetic influences from classical art, the majority of Italian painting and sculpture in the 14th and 15th centuries was created to inspire devotion, especially in the work of Piero della Francesca, Michelangelo, Leonardo, Raphael and Fra Angelico.

**WED 01:00 Horizon (b01d99vb)**  
2011-2012

Solar Storms - The Threat to Planet Earth

There is a new kind of weather to worry about and it comes from our nearest star.

Scientists are expecting a fit of violent activity on the sun, which will propel billions of tonnes of superheated gas and pulses of energy towards our planet. They have the power to close down our modern technological civilisation - in 1989, a solar storm cut off the power to the Canadian city of Quebec.

Horizon meets the space weathermen who are trying to predict what is coming our way, and organisations like the National Grid, who are preparing for the impending solar storms.

**WED 02:00 Voyages of Discovery (b0074t3q)**  
The Making of Captain Cook

Explorer Paul Rose tells the story of one of the greatest ever sea adventures, which transformed Captain James Cook into a national hero and dramatically changed the course of history. Two and a half centuries later, Captain Cook is still a household name, but his achievements are often misunderstood, contrary to popular perception, he did not discover New Zealand and Australia. Intrepid Rose follows his journey down under and uncovers the real story of Captain Cook.

**WED 03:00 Hunting the Nazi Gold Train (b07yc9zf)**  
[Repeat of broadcast at 20:00 today]

**THURSDAY 13 JULY 2017**

**THU 19:00 100 Days+ (b08xqb5t)**  
Series 1

13/07/2017

As President Trump takes office, Katty Kay in Washington and Christian Fraser in London report on the events that are shaping our world.

**THU 19:30 The Sky at Night (b08xyplm)**  
[Repeat of broadcast at 22:00 on Sunday]

**THU 20:00 Castles: Britain's Fortified History (b04v85sy)**  
Defence of the Realm

Sam Willis explores how, by the Wars of the Roses, castles were under attack from a new threat - the cannon - but survived into the Tudor era only to find their whole purpose challenged. What had once been strategic seats of power now had to keep up with the fickle fashions of the court and become palaces to impress monarchs such as Elizabeth I.

Just as castles seemed to have lost their defensive function, the English Civil War erupted. The legacy of that tumultuous period resulted in castles no longer being associated with protection. Rather, their ruins took on a unique appeal, embodying a nostalgia for an age of chivalry that became a powerful part of the national psyche.

**THU 21:00 A Timewatch Guide (b08xxsw5)**  
Series 4

Decoding Disaster

From earthquakes to tsunamis to volcanic eruptions, natural disasters are both terrifying and fascinating - providing endless fresh material for documentary makers. But how well do disaster documentaries keep pace with the scientific theories that advance every day?

To try and answer that question, Professor Danielle George is plunging into five decades of BBC archive. What she uncovers provides an extraordinary insight into one of the fastest moving branches of knowledge. From the legendary loss of Atlantis to the eruption that destroyed Pompeii, Danielle reveals how film-makers have changed their approach again and again in the light of new scientific theories.

While we rarely associate Britain with major natural disaster, at the end of the programme Danielle brings us close to home, exploring programmes which suggest that 400 years ago Britain was hit by a tidal wave that killed hundreds of people, and that an even bigger tsunami could threaten us again.

**THU 22:00 Timewatch (b00s129f)**  
Atlantis: The Evidence

Historian Bettany Hughes unravels one of the most intriguing mysteries of all time. She presents a series of geological, archaeological and historical clues to show that the legend of Atlantis was inspired by a real historical event, the greatest natural disaster of the ancient world.

**THU 23:00 The Bermuda Triangle: Beneath the Waves (b007c68n)**

Professor Bruce Denardo attempts to prove whether there is any truth behind the legend of the Bermuda Triangle, where many ships and planes have disappeared in mysterious circumstances. New investigation techniques reveal the truth behind the infamous disappearance of Flight 19. Graham Hawkes is also able to reveal, by using a state-of-the-art submarine, how five wrecks mysteriously wound up 730 feet down in the heart of the Bermuda Triangle.

**THU 00:00 Infested! Living with Parasites (b03vrwj8)**

Dr Michael Mosley explores the bizarre and fascinating world of parasites by turning his body into a living laboratory and deliberately infesting himself with them. He travels to Kenya to give himself a tapeworm - a parasite that can grow to many metres inside the human gut. He also encounters lice, leeches and the deadly malaria parasite, before swallowing a pill-camera to reveal what is growing within him. By the end of his infestation Michael learns a new-found respect for these extraordinary creatures, which can live off and even take control of their hosts for their own survival.

**THU 01:00 Everyday Eden: A Potted History of the Suburban Garden (p0118n4q)**

Because it's not grand, the story of the suburban garden has barely been told - and yet eight out of ten people in England live in the suburbs. In this documentary, writer and historian Michael Collins delivers a riposte to the urban intelligentsia which has spent a century sneering at the suburbs. His south London pilgrimage takes him to Bexley and Bromley, Surbiton and the new promised land of Bluewater in Kent to explore what the suburban garden has meant to the UK and to celebrate what one contributor calls 'their little piece of heaven'.

George Orwell famously laid out the icons of English culture as 'solid breakfasts and gloomy Sundays, smoky towns and... red pillarboxes' and Collins shows that the suburban garden very much deserves a place in that canon. South Londoner Collins previously charted the history of the white working class in his controversial book *The Likes of Us* and explored the rise and fall of the council house in BBC Four's *The Great Estate*. He tends to admire what critics of suburbia have loathed - its lack of history, the mock and ersatz style of its homes and gardens, and the suggestion that it is a 'nowhere place', neither town nor country but stranded in between.

Collins's journey starts a century ago in Hampstead Garden Suburb, a planned utopia that transformed the lives of its residents fleeing urban squalor, but one that came with off-putting regulations - maximum hedge size, a designated wash-day, and no pub. Suburban sprawl between the wars, when three million new homes were built, couldn't have been more different. 'You could', recalls one contributor from Welling, 'buy a house for 12/6 down and pay 7/6 a week on the mortgage, and suddenly you had a two-up/two-down, front garden/back garden. Those were the days!'

In the 1930s, Wills cashed in on the suburban gardening craze with 50 cigarette cards offering handy tips. But this was also the era that identified a new condition - suburban neurosis. When war broke out, Rita Withers's dad, a veteran of the Somme, was so traumatised he dug a trench right across their lawn, thinking it the only way to protect his family. Wartime 'Dig for Victory', launched by the BBC's first horticultural expert, Mr Middleton, saw flowers sacrificed for vegetables and the war effort.

The Peace Rose ushered in the post-war garden, and contributors fondly remember the ubiquitous swing of the 1950s and 60s, the equally ubiquitous tortoise and the shock of the new as suburbia's new mecca, the garden centre, transformed the 70s garden. This was the era of *The Good Life*, but a Surbiton couple, the Howes, whose immaculate garden would have impressed Margot and Jerry, are keen to point out the series was actually shot in north London 'because Surbiton was not sufficiently like Surbiton to be worth filming... a kind of oblique compliment.'

Collins's suburban odyssey ends in the spanking new 21st-century purpose-built suburb of Ingress Park in Kent, a dormitory for Europe's biggest mall, Bluewater. Karen Roberts may have bought her astroturf lawn for £700 on the internet, but the appeal of the suburban garden is timeless. 'Ingress Park is dope', she explains. 'I live the dream. I haven't got a lot of money to spend, but I can go snip, snip, I'm doing my garden, I love it.'

**THU 02:00 Castles: Britain's Fortified History (b04v85sy)**  
[Repeat of broadcast at 20:00 today]

**THU 03:00 A Timewatch Guide (b08xxsw5)**  
[Repeat of broadcast at 21:00 today]

**FRIDAY 14 JULY 2017****FRI 19:00 World News Today (b08xkvm4)**

The latest national and international news, exploring the day's events from a global perspective.

**FRI 19:30 Top of the Pops (b08y3km0)**

Richard Skinner and Gary Davies present the pop chart programme, first broadcast on 8 March 1984. Including appearances from Galaxy, The Weather Girls, Sade, Bananarama, Howard Jones, Tracey Ullman and Nena.

**FRI 20:00 BBC Proms (b08xyvdw)**

2017

First Night of the Proms - Part 1

BBC Proms 2017 kicks off in style tonight at the Royal Albert Hall. Beethoven's dramatic Third Piano Concerto is performed by star soloist Igor Levit with the BBC Symphony Orchestra and conductor Edward Gardner. This opening concert of the world's biggest music festival also includes a raucous new work by Tom Coult, *St John's Dance*, the first of 13 world premieres at Proms 2017. Presented by Katie Derham.

**FRI 21:00 Tales from the Tour Bus: Rock 'n' Roll on the Road (b05rjc9c)**

Rock legend and tour bus aficionado Rick Wakeman takes us on a time-travelling trip through the decades in this first-hand account of rockers on the road from the late 1950s to the 80s and beyond.

It's an often bumpy and sometimes sleepless ride down the A roads and motorways of the UK during the golden age of rock 'n' roll touring - a secret history of transport cafes, transit vans, B&Bs, sleepless roadies and of loved ones left at home or, on one occasion, by the roadside. And it's also a secret history of audiences both good and bad, and the gigs themselves - from the early variety package to the head clubs, the stadiums and the pubs.

This is life in the British fast lane as told by Rick and the bands themselves, a film about the very lifeblood of the rock 'n' roll wagon train. With members of Dr Feelgood, Suzi Quatro, The Shadows, The Pretty Things, Fairport Convention, Happy Mondays, Aswad, Girlschool, The Damned and many more.

**FRI 22:00 Great Guitar Riffs at the BBC (b049mtxy)**

Compilation of BBC performances featuring some of the best axe men and women in rock 'n' roll, from Hendrix to The Kinks, Cream to AC/DC, The Smiths to Rage Against the Machine and Radiohead to Foo Fighters. Whether it is The Shadows playing FBI on Crackerjack, Jeff Beck with The Yardbirds, The Jimi Hendrix Experience, Cream's Sunshine of Your Love from their final gig, Pixies on the Late Show, AC/DC on Top of the Pops or Fools Gold from The Stone Roses, this compilation is a celebration of rock 'n' roll guitar complete with riffs, fingerstylin', wah-wah pedals and Marshall amps.

**FRI 23:00 The Joy of the Guitar Riff (b049mtxw)**

The guitar riff is the DNA of rock 'n' roll, a double helix of repetitive simplicity and fiendish complexity on which its history has been built. From Chuck Berry through to The White Stripes, this documentary traces the ebb and flow of the guitar riff over the last 60 years of popular music. With riffs and stories from an all-star cast including Brian May, Dave Davies, Hank Marvin, Joan Jett, Nile Rodgers, Tony Iommi, Robert Fripp, Johnny Marr, Nancy Wilson, Kevin Shields, Ryan Jarman, Tom Morello and many more. Narrated by Lauren Laverne.

**FRI 00:00 Top of the Pops (b08y3km0)**

[Repeat of broadcast at 19:30 today]

**FRI 00:35 Tales from the Tour Bus: Rock 'n' Roll on the Road (b05rjc9c)**

[Repeat of broadcast at 21:00 today]

**FRI 01:35 Great Guitar Riffs at the BBC (b049mtxy)**

[Repeat of broadcast at 22:00 today]

**FRI 02:35 The Joy of the Guitar Riff (b049mtxw)**

[Repeat of broadcast at 23:00 today]