

SATURDAY 22 JULY 2017

SAT 19:00 Forest, Field & Sky: Art out of Nature (b079ckkf)

Dr James Fox takes a journey through six different landscapes across Britain, meeting artists whose work explores our relationship to the natural world. From Andy Goldsworthy's beautiful stone sculptures to James Turrell's extraordinary sky spaces, this is a film about art made out of nature itself. Featuring spectacular images of landscape and art, James travels from the furthest reaches of the Scottish coast and the farmlands of Cumbria to woods of north Wales. In each location he marvels at how artists' interactions with the landscape have created a very different kind of modern art - and make us look again at the world around us.

SAT 20:00 The Last Seabird Summer? (b072wv9)
Trouble at Sea

Picking up the birds' progress in July, Adam finds the Shiant colonies to be healthy and the puffins, guillemots and razorbill bringing in great bill-fuls of gleaming silver fish for their chicks. But elsewhere, the sea is failing to provide the birds with the food they need to survive.

In Scotland alone, 40 per cent of the birds have been lost and, further afield in Iceland, Adam sees colonies where nearly all the birds have been wiped out. He discovers how puffin hunters respond to the crisis and talks to both local people and experts about what could lie behind the catastrophic seabird declines. With the help of leading ornithologists and marine scientists, he begins to reveal an unexpected picture of the global forces driving the crisis, and the possible future for our seabird world.

SAT 21:00 I Know Who You Are (b08yzsn)
Series 1

Episode 3

Juan Elias finds a phone number in his office and rings it. A prostitute answers and invites him to a hotel where he learns that they have met regularly for over two years. Giralt and Hess are shown a video of Elias at the eve-of-election party in which he appears to be under the influence of drugs. Alicia resigns from the bench temporarily until her niece has been found.

In Spanish with English subtitles.

SAT 22:05 I Know Who You Are (b08zb5f)
Series 1

Episode 4

Juan Elias continues to show the confusion associated with amnesia, but also continues to act suspiciously. A lead found at the scene of his accident takes him to a prison where he meets with his father-in-law Hector Castro who, as a price for his assistance in finding Ana, asks that Juan brings his grandson Pol to see him.

In Spanish with English subtitles.

SAT 23:25 Top of the Pops (b08yft4)
Peter Powell and Janice Long present the pop chart programme, first broadcast on 22 March 1984. Featuring Depeche Mode, Shakin' Stevens, Culture Club, UB40, Sade and Lionel Richie.

SAT 00:00 Top of the Pops (b08yfkxy)
Mike Read and Andy Peebles present the pop chart programme, first broadcast on 29 March 1984. Featuring The Special AKA, Captain Sensible, Siouxsie and the Banshees, Madonna, Thompson Twins and Lionel Richie.

SAT 00:35 How to Be a World Music Star: Buena Vista, Bhundu Boys and Beyond (b038rp8k)
Documentary telling the story of the British world music revolution from the early 1980s to the present. Through a variety of careers, starting with Zimbabwe's Bhundu Boys and culminating with Portugal's Mariza in the new millennium, the film explores what it takes to bring music from 'out there' over here.

Through the testimony of artists from all around the world alongside key British producers and broadcasters including Andy Kershaw, Joe Boyd and Nick Gold, it tracks the evolving story of what British audiences have wanted from what has come to be called 'world music' and what a range of artists, including Les Mystere des Voix Bulgares, Salif Keita, Youssou N'Dour, Baaba Maal, Nusrat Fateh Ali Khan, Buena Vista Social Club and Tinariwen, have made of us.

At the dawn of the 80s, in an age of spandex and synthesizers, many music fans were becoming bored with the pop charts and

hungered for a new music that could excite them once again. Where music from the rest of the world had once been regarded as mere exotica, there was increasingly a sense that world music could be the future of pop music.

The documentary traces the hopes and ambitions of a new music industry as cultures came together for the first time, producing much brilliant music and a degree of human comedy.

From the tribal warriors of Mali who fought in rebellions with guitars and guns strapped to their shoulders, all-female choirs from the other side of the Iron Curtain playing to rock fans, a band from Zimbabwe who supported Madonna to a group of old men from Cuba who took the world by storm with their music from another era, these tales from musicians from out there arriving over here trace an evolving market that has both offered a blueprint for the future and an escape into a romantic past.

SAT 02:05 A-Z of World Music (b038rp8n)
Journeying through the alphabet, a showcase of music from across the world - from Africa to Uzbekistan, Norway to South America, India to Louisiana and everywhere in between.

Featured instruments include Kimmo Pohjonen's accordion, the impressively large drums of the Yamato Drummers and the extraordinary vocals of Nusrat Fateh Ali Khan. The helter-skelter ride takes us from the 1970s, through to the explosion of acts in the 1980s, right up to the most sought-after musicians on the world music circuit today.

From Sevara Nazarkhan's pin-drop solo to a crowd-moving set from Orchestra Baobab, this is a compilation that presents a fun, vibrant snapshot of the range of traditional music that has captured audiences the world over.

SUNDAY 23 JULY 2017

SUN 19:00 BBC Proms (b08z2x5g)
2017

Haitink's Mozart

BBC Proms legend Bernard Haitink returns to the Royal Albert Hall to conduct his beloved Chamber Orchestra of Europe. Acclaimed German violinist Isabelle Faust plays Mozart's joyous Third Violin Concerto, which is paired tonight with his groundbreaking Prague Symphony. Schumann's Second Symphony closes the programme.

SUN 20:50 Operation Crossbow (b011cr8f)
The heroic tales of World War II are legendary, but Operation Crossbow is a little-known story that deserves to join the hall of fame: how the Allies used 3D photos to thwart the Nazis' weapons of mass destruction before they could obliterate Britain.

This film brings together the heroic Spitfire pilots who took the photographs and the brilliant minds of RAF Medmenham that made sense of the jigsaw of clues hidden in the photos. Hitler was pumping a fortune into his new-fangled V weapons in the hope they could win him the war. But Medmenham had a secret weapon of its own, a simple stereoscope which brought to life every contour of the enemy landscape in perfect 3D.

The devil was truly in the detail. Together with extraordinary personal testimonies, the film uses modern computer graphics on the original wartime photographs to show just how the photo interpreters were able to uncover Hitler's nastiest secrets.

SUN 21:50 Storyville (b08z007p)
Accidental Anarchist: Life Without Government

Carne Ross was a career diplomat who believed western democracy could save us all. But after the Iraq war he became disillusioned and resigned. This film traces Carne's worldwide quest to find a better way of doing things - from a farming collective in Spain, to Occupy Wall Street to Rojava in war-torn Syria - as he makes the epic journey from government insider to anarchist.

SUN 22:50 After Life: The Strange Science of Decay (b012w66t)

Ever wondered what would happen in your own home if you were taken away, and everything inside was left to rot? The answer is revealed in this fascinating programme, which explores the strange and surprising science of decay.

For two months in summer 2011, a glass box containing a typical kitchen and garden was left to rot in full public view within Edinburgh Zoo. In this resulting documentary, presenter Dr George McGavin and his team use time-lapse cameras and specialist photography to capture the extraordinary way in

which moulds, microbes and insects are able to break down our everyday things and allow new life to emerge from old.

Decay is something that many of us are repulsed by. But as the programme shows, it's a process that's vital in nature. And seen in close-up, it has an unexpected and sometimes mesmerising beauty.

SUN 00:20 Dissected (p01mv2rj)
The Incredible Human Foot

In a purpose-built dissection lab, Dr George McGavin is joined by leading anatomy experts to dissect a real foot, taking it apart layer by layer to reveal what makes it unique in the animal kingdom. We discover the incredible natural engineering that is key to our greatest physical achievements, from a baby's first steps to a ballerina on pointe.

SUN 01:20 Britain's Whale Hunters: The Untold Story (b046w23l)
The Fall

Writer Adam Nicolson continues to explore the forgotten role that British whalers played in Antarctic whaling as late as the 1960s. Granted rare access to the ruins of the whaling stations on the island of South Georgia, he charts the boom and bust of this once multimillion-pound industry. He hears first-hand about the battle between science, politics and profit that brought whales to the brink of extermination just 50 years ago and reveals the astounding role that Britain played in the international whaling industry.

A few hundred years ago, the oceans were home to millions of whales, but then we found that they were incredibly useful: by the 1920s they were even forming an essential part of Britain's fat supply to make soap and margarine. On the remote British Antarctic island of South Georgia, the centre of the industry in the 1920s, Adam explores the incredible ruins of the world's largest whaling station. Abandoned in the 1960s, Leith Harbour is a complete, but now deserted, whaling town. To fully understand how whale populations were so drastically reduced, Adam puts our modern environmental guilt to one side and, with the help of the last of the British whalers and dramatic archive film, sees the industry through the eyes of its own time.

In the mid-1920s, up to 8,000 whales a year were being processed on South Georgia to satisfy Europe's demand for fat. The whalers describe the dangers of using industrial machinery to process whales and Adam explores the hospital that treated the unlucky ones, still stocked with 1950s medicine. Meanwhile, some scientists in Britain were aware of the threat of the industry to whale populations, and a hugely ambitious piece of marine biology - the 'Discovery Investigations' - were launched. Adam visits a legacy of this program, the new ship Discovery, and learns how the original attempted to build an argument for sustainable whaling.

The industry soon found a way to become yet more effective at hunting and processing whales through a revolutionary piece of ship design, which also allowed them to dodge British attempts at regulation. Adam explores the incredible scale of the oil being sent home: by 1933, 37 per cent of the fat in British margarine was from whales. As World War Two approached, Germany and Japan joined the industry, and catches reached a staggering 46,000 whales caught in the Antarctic in one year.

While exploring an abandoned whale-catching ship and taking a peek behind the scenes at the Natural History Museum, Adam examines the tussle between the industry and science. War-ravaged Europe was desperate for fats, and new attempts to regulate the industry proved completely inadequate to protect whale populations. It wasn't until population dynamics experts were included in the 1960s that the industry began to take action to seriously reduce catches. And by then, whale stocks were in a disastrous state, with some species near extinction.

Having discovered so much about the forgotten story of British whaling, Adam attempts to find a balanced view of the industry as a whole - one that killed over 1.6 million whales in the Antarctic. He feels a deep admiration for the great skill and courage of the whalers, but, at the same time, concludes that he hates the whaling itself.

SUN 02:20 Electric Proms (b00vzsw)
2010

Neil Diamond

Neil Diamond in concert from London's Roundhouse with his six-piece band performing tracks from his 2010 album Dreams, which explores the 60s and 70s songs he loves, and reinventing his classics. This is Neil Diamond stripped down with strings in his most intimate performance for years.

MONDAY 24 JULY 2017**MON 19:00 World News Today (b08yzvjb)**

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

MON 19:30 Royal Welsh Show (b08z0kbv) 2017

Episode 1

Kate Humble brings the highlights from the opening day of the Royal Welsh Show. She takes a behind-the-scenes look at what it takes to put on a show that attracts 250,000 visitors. Gareth Wyn Jones gets up close with the cattle and the working dogs, they're just some of 8,000 animals that make the show their temporary home for the week. Rachel de Thame swaps tips with the vegetable and flower growers. Kate also presents special reports from animal lovers around Wales.

MON 20:00 Horizon (b08w61hc) 2017

Ten Things You Need to Know about the Future

This episode looks at the issues that will change the way we live our lives in the future. Rather than relying on the minds of science fiction writers, mathematician Hannah Fry delves into the data we have today to provide an evidence-based vision of tomorrow. With the help of the BBC's science experts - and a few surprise guests - Hannah investigates the questions the British public want answered about the future.

Hannah tries to discover whether we could ever live forever or if there will ever be a cure for cancer. She finds out how research into the human brain may one day help with mental health, and if it is possible to ever ditch fossil fuels. Hannah and her guests also discover the future of transport - and when, if ever, we really will see flying cars. She discovers whether a robot will take your job or if, as some believe, we will all one day actually become cyborgs. The programme predicts what the weather will be like and discovers if we are on the verge of another mass extinction. Hannah's tenth prediction is something she - and Horizon - are confident will definitely happen, and that is to expect the unexpected!

MON 21:00 The Joy of Stats (b00wgg0l)

Documentary which takes viewers on a rollercoaster ride through the wonderful world of statistics to explore the remarkable power they have to change our understanding of the world, presented by superstar boffin Professor Hans Rosling, whose eye-opening, mind-expanding and funny online lectures have made him an international internet legend.

Rosling is a man who revels in the glorious nerdiness of statistics, and here he entertainingly explores their history, how they work mathematically and how they can be used in today's computer age to see the world as it really is, not just as we imagine it to be.

Rosling's lectures use huge quantities of public data to reveal the story of the world's past, present and future development. Now he tells the story of the world in 200 countries over 200 years using 120,000 numbers - in just four minutes.

The film also explores cutting-edge examples of statistics in action today. In San Francisco, a new app mashes up police department data with the city's street map to show what crime is being reported street by street, house by house, in near real-time. Every citizen can use it and the hidden patterns of their city are starkly revealed. Meanwhile, at Google HQ the machine translation project tries to translate between 57 languages, using lots of statistics and no linguists.

Despite its light and witty touch, the film nonetheless has a serious message - without statistics we are cast adrift on an ocean of confusion, but armed with stats we can take control of our lives, hold our rulers to account and see the world as it really is. What's more, Hans concludes, we can now collect and analyse such huge quantities of data and at such speeds that scientific method itself seems to be changing.

MON 22:00 The Secret Science of Pop (b08gk664)

Evolutionary biologist Professor Armand Leroy believes data science can transform the pop world. He gathers a team of scientists and researchers to analyse over 50 years of UK chart music. Can algorithms find the secret to pop success?

When the results are in, Armand teams up with hit producer Trevor Horn. Using machine-learning techniques, Armand and Trevor try to take a song by unsigned artist Nike Jemiyo and turn it into a potential chart-topper.

Armand also takes a scientific look at pop evolution. He hunts for the major revolutions in his historic chart data, looking for

those artists who transformed the musical landscape. The outcomes are fascinating and surprising, though fans of the Fab Four may not be pleased with the results. As Armand puts it, the hallmark of The Beatles is 'average'.

Finally, by teaming up with BBC research and development, Armand finds out if his algorithms can discover the stars of the future. Can he predict which of thousands of demo tracks uploaded to BBC Introducing is most likely to be a hit without listening to a note?

This is a clash of science and culture and a unique experiment with no guarantee of success. How will the artists react to the scientist intruding on their turf? And will Armand succeed in finding a secret science of pop?

MON 23:00 Ocean Giants (b01452jz)

Voices of the Sea

Whales and dolphins are nature's supreme vocalists, with a repertoire to put an opera singer to shame. The mighty sperm whale produces deafening clicks in its blowhole which it uses to locate giant squid two miles down in the ocean abyss, while migrating narwhals use similar sounds to pinpoint vital breathing holes in Arctic ice floes.

The pink boto dolphin creates bat-like ultrasonic clicks to 'see with sound' and to catch fish in the murky waters of the Amazon River, and also uses whistles and chirps for social conversations.

Killer whales in the North Sea use wolf-like howls to round up the herring shoals which they feed on, and they and other dolphins also use percussive tail slaps and splashing leaps to signal to each other. One group of bottlenose dolphins in Brazil has even learned to communicate with fishermen in a unique partnership.

But the most famous and mysterious voice of all surely belongs to male humpback whales, whose haunting operatic performances may last several hours and seem to be about singing purely for the sheer pleasure of making music.

MON 00:00 Apples, Pears and Paint: How to Make a Still Life Painting (b03ny8wk)

A richly detailed journey through the epic history of still-life painting, featuring a range of delights from the earliest existing Xenia mural paintings discovered at Pompeii to the cubist masterpieces of Picasso.

Awash with rich imagery of fruit, flowers and humble domestic objects, this lively take on the story of still life encompasses the work of some of the genre's greatest artists from Caravaggio to Chardin and Cezanne. But it also captures the surprising contributions of the less well-known, including asparagus enthusiast Adriaen Coorte and female flower painter in the court of Louis XVI, Anne Vallayer-Coster.

With contributions from historians Bettany Hughes and Janina Ramirez, art historians Andrew Graham Dixon and Norman Bryson, and philosopher Alain de Botton amongst others, it opens up the huge social histories that lie behind the paintings and the fascinating lives of the people who made them.

MON 01:30 The Joy of Stats (b00wgg0l)

[Repeat of broadcast at 21:00 today]

MON 02:30 Horizon (b08w61hc)

[Repeat of broadcast at 20:00 today]

TUESDAY 25 JULY 2017**TUE 19:00 World News Today (b08yzvk1)**

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

TUE 19:30 Royal Welsh Show (b08z0lfw) 2017

Episode 2

The Royal Welsh Show is for everyone as Kate Humble finds out on day two. She meets exhibitors from the country, town and city. Cerys Matthews scales new heights as she meets up with the forestry team. Never afraid to get stuck in, she tries out the new 30-metre climbing poles. Gareth Wyn Jones meets his fellow sheep farmers and takes a tour of the poultry tent. Plus more of Kate's special reports from animal lovers around Wales.

TUE 20:00 10 Things You Didn't Know About... (b008vrwk)

Avalanches

Iain Stewart travels across mountain ranges and glaciers to reveal ten remarkable stories about avalanches.

Over a million avalanches happen throughout the world each year, and yet we know more about the surface of the moon than we do about the chaotic turbulence inside an avalanche. Scientists have had to put themselves right inside a raging avalanche to find out more.

Stewart shows how the deadliest avalanche in history killed 18,000 people in three minutes; how Hannibal's army was devastated by avalanches as he crossed the Alps to fight Rome; why an avalanche was key to one of the greatest aviation mysteries of all time; and how global warming may increase the rate of ice avalanches in the future.

TUE 21:00 A Timewatch Guide (b08z02nl)

Series 4

Dictators and Despots

In recent years the world has become an unsettling place, from the mass movements of refugees to political upheaval, both in this country and abroad.

Disturbingly, history shows that it's at unsettled times like these that dictators can rise - leaders who promise they can solve every problem, if only they're granted supreme power.

David Olusoga examines fifty years of BBC documentary archives to try and discover why dictators can have such a powerful appeal.

David uncovers the surprising optimism felt by the West towards men like Gaddafi and Mugabe early in their regimes, and examines the events that turned this optimism into horror. He questions why such men continue to fascinate us regardless of their actions, and asks whether, especially in an age of mass media, our fascination has fed their power.

TUE 22:00 Storyville (b03tj0m0)

Mad Dog: Gaddafi's Secret World

Colonel Gaddafi was called 'mad dog' by Ronald Reagan. His income from oil was a billion dollars a week. He washed his hands in deer's blood. No other dictator had such sex appeal and no other so cannily combined oil and the implied threat of terror to turn western powers into cowed appeasers.

When he went abroad - bedecked in fake medals from unfought wars - a bulletproof tent was flown ahead, along with camels that would be tethered outside. His sons lived a Dolce & Gabbana lifestyle - one kept white tigers, while another commissioned a \$500 million cruise liner with a shark pool.

Like other tyrants, Gaddafi used torture and murder to silence opposition, but what made his rule especially terrifying was that death came so casually. A man who complained that Gaddafi had an affair with his wife was allegedly tied between two cars and torn in half. On visits to schools and orphanages Gaddafi would tap underage girls on the head to show his henchmen which ones he wanted. They would be taken to his palace and abused. Young boys were held in tunnels under the palace.

Yet because of his vast oil lake there seemed no limit to western generosity. British intelligence trapped one of his enemies overseas and sent him to Libya as a gift. The same week, Tony Blair arrived in Libya and a huge energy deal was announced.

Filmed in Cuba, the Pacific, Brazil, the US, South Africa, Libya and Australia, the cast of this documentary consists of palace insiders and those who gave shape to Gaddafi's dark dreams. They include a fugitive from the FBI who helped kill his enemies worldwide; the widow of the Libyan foreign minister whose body Gaddafi kept in a freezer; and a female bodyguard who adored him until she saw teenagers executed.

Gaddafi was a dictator like no other; their stories are stranger than fiction.

TUE 23:25 World War II: 1945 and the Wheelchair President (b05vlzsn)

David Reynolds re-examines the war leadership of American president Franklin Roosevelt.

At the height of war, Roosevelt inspired millions with stirring visions of a new and better postwar world, but it was a world he probably knew he would never see. He was commander-in-chief of the greatest military power the world had known, and yet his paralysis from polio made him powerless to accomplish even the most minor physical tasks. Few Americans knew the extent of his disability.

In this intimate biography set against the epic of World War II,

Reynolds reveals how Roosevelt was burdened by secrets about his failing health and strained marriage that, if exposed, could have destroyed his presidency. Enigmatic, secretive and with a complicated love life, America's wheelchair president was racing to shape the future before the past caught up with him.

Weaving together the conduct of the war in Europe and the Pacific, the high politics of Roosevelt's diplomacy with Stalin and Churchill, and the entangled stories of the women who sustained the president in his last year, Reynolds explores the impact of Roosevelt's growing frailty on the war's endgame and the tainted peace that followed.

TUE 00:55 10 Things You Didn't Know About... (b008vrwk)
[Repeat of broadcast at 20:00 today]

TUE 01:55 The Secret Life of Rubbish (b01p48tt)
Episode 1

With tales from old binmen and film archive that has never been broadcast before, this two-part series offers an original view of the history of modern Britain - from the back end where the rubbish comes out.

The first programme deals with the decades immediately after the Second World War. Ninety-year-old Ernie Sharp started on the bins when he was demobbed from the army in 1947, and household rubbish in those days was mostly ash raked out of the fire-grate. That's why men like Ernie were called 'dust' men.

But the rubbish soon changed. The Clean Air Act got rid of coal fires so there was less ash. Then supermarkets arrived, with displays of packaged goods. And all that packaging went in the bin.

In the 1960s consumerism emerged. Shopping for new things became a national enthusiasm. It gave people the sense that their lives were improving and kept the economy going. And as the binmen recall, the waste stream became a flood.

As the programme sifts through the rubbish of the mid-20th century, we discover how the Britain of 'make do and mend' became a consumer society.

TUE 02:55 A Timewatch Guide (b08z02nl)
[Repeat of broadcast at 21:00 today]

WEDNESDAY 26 JULY 2017

WED 19:00 World News Today (b08zyvzx)
The latest national and international news, exploring the day's events from a global perspective.

WED 19:30 Royal Welsh Show (b08z0thy)
2017

Episode 3

Day three of the Royal Welsh Show and Kate Humble celebrates the mighty Welsh cob as the horses take to the main ring. She also looks at the future of farming, from the high-tech equipment to the next generation of farmers. Comedian Omar Hamdi takes the night shift to find out what happens when the public leaves the showground. Gareth Wyn Jones tries to stay impartial at the international sheep-shearing competition. Plus more of Kate's special reports from animal lovers around Wales.

WED 20:00 Norman Wisdom: His Story (b00vhnqq)
From street urchin to knight of the realm - the story of Norman Wisdom, who used to be one of the biggest film stars in the UK, portraying a man who rarely stepped out of character in public, and whose highly individual comic style hid the private tragedy of his early life.

The actor's life story is told through the people who knew him well - his son and daughter Nick and Jacqui Wisdom, his daughter-in-law Kim, film director Stephen Frears, actors Ricky Tomlinson, Leslie Phillips and Honor Blackman, and singer Dame Vera Lynn.

WED 21:00 Hyper Evolution: Rise of the Robots (b08zj4v5)
Series 1

Episode 1

Professor Danielle George MBE, an electronics engineer from Manchester University and a robot supporter, and Dr Ben Garrod, an evolutionary biologist from Anglia Ruskin University and robo-sceptic, uncover whether the rise of the robots will enhance the progress of humanity or ultimately

threaten the survival of the human race.

With extraordinary access to the world's leading robot-makers, they meet the trailblazing machines who pioneered key evolutionary leaps for robot-kind, and their most advanced descendants - to uncover just how far we've really come.

Ben is unashamedly unnerved by the tremendous rate that robots are evolving, whilst Danielle is welcoming them with open arms. To make sense of Ben's fears and Danielle's optimism, they set out to investigate the evolution of robots - treating them as if they are an emerging 'species'.

Ben meets one of the most humanlike robots in the world - the disarmingly charming Erica - who might be warm to the touch, but whose sense of humour falls decidedly flat. Their encounter seems weird enough until he meets her creator, who has made a robot twin of himself, and even has cosmetic enhancements to ensure they continue to look the same. He also finds out why it's so difficult for robots to walk like us.

This episode uncovers the roots with our obsession with robots in human form, with a visit to the fearsome Eric - the UK's first robot - to unpack the deep distrust of robots inherent in western culture.

Danielle meets an early pioneer of robotic movement, who led the way for robots to take over the workplace, and ends up in a sea of robot arms, working in beautiful robotic harmony at a car plant. She also meets the latest breed of robots at Boston Dynamics, who combine biology with technology. Videos of their extraordinary robots - inspired by humans, animals and machines in form - have spawned millions of hits on the internet.

The series explores questions over what happens when robots learn to think for themselves, and what that will mean for the future of humankind.

WED 22:00 Mechanical Marvels: Clockwork Dreams (b0229pbp)

Documentary presented by Professor Simon Schaffer which charts the amazing and untold story of automata - extraordinary clockwork machines designed hundreds of years ago to mimic and recreate life.

The film brings the past to life in vivid detail as we see how and why these masterpieces were built. Travelling around Europe, Simon uncovers the history of these machines and shows us some of the most spectacular examples, from an entire working automaton city to a small boy who can be programmed to write and even a device that can play chess. All the machines Simon visits show a level of technical sophistication and ambition that still amazes today.

As well as the automata, Simon explains in great detail the world in which they were made - the hardship of the workers who built them, their role in global trade and the industrial revolution and the eccentric designers who dreamt them up. Finally, Simon reveals that these long-forgotten marriages of art and engineering are actually the ancestors of many of our most-loved modern technologies, from recorded music to the cinema and much of the digital world.

WED 23:00 The Renaissance Unchained (b072wvy9)
Hell, Snakes and Giants

In the final episode Waldemar Januszczak looks at the surprising climax of the Renaissance as it spiralled into madness and distortion. This was a period full of war, confusion and darkness, which was captured perfectly in the art of Leonardo, Bosch, Arcimboldo, Palissy, the Italian Mannerists and El Greco.

WED 00:00 Tails You Win: The Science of Chance (p00yh2rc)

Smart and witty, jam-packed with augmented-reality graphics and fascinating history, this film, presented by professor David Spiegelhalter, tries to pin down what chance is and how it works in the real world. For once this really is 'risky' television.

The film follows in the footsteps of The Joy of Stats, which won the prestigious Grierson Award for Best Science/Natural History programme of 2011. Now the same blend of wit and wisdom, animation, graphics and gleeful nerdery is applied to the joys of chance and the mysteries of probability, the vital branch of mathematics that gives us a handle on what might happen in the future. Professor Spiegelhalter is ideally suited to that task, being Winton professor for the public understanding of risk at Cambridge University, as well as being a recent Winter Wipeout contestant on BBC TV.

How can you maximise your chances of living till you're 100? Why do many of us experience so many spooky coincidences? Should I take an umbrella? These are just some of the everyday questions the film tackles as it moves between Cambridge, Las

Vegas, San Francisco and... Reading.

Yet the film isn't shy of some rather loftier questions. After all, our lives are pulled about and pushed around by the mysterious workings of chance, fate, luck, call it what you will. But what actually is chance? Is it something fundamental to the fabric of the universe? Or rather, as the French 18th century scientist Pierre Laplace put it, 'merely a measure of our ignorance'.

Along the way Spiegelhalter is thrilled to discover One Million Random Digits, probably the most boring book in the world, but one full of hidden patterns and shapes. He introduces us to the cheery little unit called the micromort (a one-in-a-million chance of dying), taking the rational decision to go sky-diving because doing so only increases his risk of dying this year from 7000 to 7007 micromorts. And in one sequence he uses the latest infographics to demonstrate how life expectancy has increased in his lifetime and how it is affected by our lifestyle choices - drinking, obesity, smoking and exercise.

Did you know that by running regularly for half an hour a day you can expect to extend your life by half an hour a day? So all very well... if you like running.

Ultimately, Tails You Win: The Science of Chance tells the story of how we discovered how chance works, and even to work out the odds for the future; how we tried - but so often failed - to conquer it; and how we may finally be learning to love it, increasingly setting uncertainty itself to work to help crack some of science's more intractable problems.

Other contributors include former England cricketer Ed Smith, whose career was cut down in its prime through a freak, unlucky accident; Las Vegas gambling legend Mike Shackleford, the self-styled 'Wizard of Odds'; and chief economist of the Bank of England, Spencer Dale.

WED 01:00 Voyages of Discovery (b0074t5l)
The Figure of the Earth

Explorer Paul Rose tells the story of three Frenchmen who couldn't stand each other, yet set off on an eight-year scientific mission in one of the most hostile places on the planet. Their plan, to settle an international row by measuring the shape of the planet, took them to the disease-ridden rainforests and oxygen-starved peaks of the Ecuadorian Andes.

Rose follows in the footsteps of the 18th-century explorers who were complete innocents abroad and had no idea of the horrors they were letting themselves in for. Despite disease, death and some highly disastrous sexual liaisons, the men made discoveries that fundamentally changed all our lives.

WED 02:00 Mechanical Marvels: Clockwork Dreams (b0229pbp)

[Repeat of broadcast at 22:00 today]

WED 03:00 Hyper Evolution: Rise of the Robots (b08zj4v5)
[Repeat of broadcast at 21:00 today]

THURSDAY 27 JULY 2017

THU 19:00 World News Today (b08zyvzl)
The latest national and international news, exploring the day's events from a global perspective.

THU 19:30 Royal Welsh Show (b08z0vg2)
2017

Episode 4

Kate Humble tries not to get her fingers burned as she plays with fire on the final day of the Royal Welsh Show as she meets up with the blacksmiths. There's also the last of her special reports with animal lovers from around Wales. Gareth Wyn Jones gets to grips with fast-paced mounted games. He also takes a last look at some of his livestock favourites. Chef Andi Oliver meets local food producers while giving her own twist to a Welsh oggie, but will it be to Kate and Gareth's liking?

THU 20:00 Shipwrecks: Britain's Sunken History (b0317kj8)

A World Turned Upside Down

Shipwrecks are the nightmare we have forgotten - the price Britain paid for ruling the waves from an island surrounded by treacherous rocks. The result is a coastline that is home to the world's highest concentration of sunken ships. But shipwrecks also changed the course of British history, helped shape our national character and drove innovations in seafaring technology, as well as gripping our imagination.

Mutiny, murder and mayhem on the high seas as Sam Willis takes the story of shipwrecks into the Georgian age when Britain first began to rule the waves. But with maritime trade driving the whole enterprise, disasters at sea imperilled all this. As key colonies were established and new territories conquered, the great sailing ships became symbols of the power of the Georgian state - and the shipwreck was to be its Achilles' heel. By literally turning this world upside down, mutinous sailors, rebellious slaves and murderous wreckers threatened to undermine Britain's ambitions and jeopardise its imperial venture.

THU 21:00 Prejudice and Pride: The People's History of LGBTQ Britain (p0578x02)
Series 1

Episode 1

Every so often the world changes beyond your wildest dreams. In 1967, the Sexual Offences Act partially decriminalised homosexuality, offering lesbian, gay, bisexual, transgender and queer people the opportunity to start living openly for the first time.

Presented by Stephen K Amos and Susan Calman, this unique series features LGBTQ people from across the UK as they share the objects that have helped define their lives during 50 transformative years.

In episode one, these crowdsourced treasures range from a rare collection of the first openly gay magazine (featuring a virtually unknown young singer called David Bowie) to letters from worried parents trying to understand their newly 'out' daughters and sons.

Over 20 incredible years, 1967-1987, we meet the fearless revolutionaries of the Gay Liberation Front, a transgender pioneer who almost caused a strike and a woman who faced losing her children when she came out as a lesbian. By the early 1980s, LGBTQ people were starting to build a community, which would be tested to the limit when Aids loomed.

This is the story of ordinary people in extraordinary times - told through their cherished possessions - charting the joys and heartbreaks of just being true to yourself.

Prejudice and Pride: The People's History of LGBTQ Britain is part of Gay Britannia, a season of programming produced in 2017 to mark the 50th anniversary of the 1967 Sexual Offences Act.

THU 22:00 Railways: The Making of a Nation (b07x4f1y)
Food and Shopping

The railways changed what we eat and the culinary tastes of the population. Moving produce around at speed was suddenly possible - fresh meat, wet fish, dairy, fruit and veg were now widely available. And it was in London where arguably the nation's diet changed the most. With a new system of rapid transport it was now possible for the capital to enjoy food supplies from all corners of the nation. Diets improved in terms of the variety and quality of food available. Victorian men and women developed a taste for one particular dish that would be popular with the masses for generations to come - fish and chips.

THU 22:30 Railways: The Making of a Nation (b07x4fvm)
A Touch of Class

Trains reflected class divisions with separate carriages for first, second and third class passengers. Yet, seen at the time, they were also bringing people physically closer together. In the early 1800s, Britain was clearly divided between upper, middle and working classes. On the railways they shared the same stations and arrived at the destination at the same time!

The trains gradually acted as a great catalyst, mixing the country up as people were travelling to regions and places for the first time. Locations, accents, culture and fashions were all new. The nation's relationship with royalty also changed. Queen Victoria was now able to venture far and wide across her kingdom and visit more of her subjects. Over time, we developed a stronger sense of shared identity and culture.

THU 23:00 Oak Tree: Nature's Greatest Survivor (b06fq03t)

George McGavin investigates the highly varied and dramatic life of oak tree. Part science documentary, part historical investigation, this film is a celebration of one of the most iconic trees in the British countryside. It aims to give viewers a sense of what an extraordinary species the oak is and provide an insight into how this venerable tree experiences life.

Filmed over a year, George uncovers the extraordinary transformations the oak goes through to meet the challenges of

four very different seasons.

In autumn, George goes underground, digging below an oak tree to see how its roots extract precious resources from the soil. And he sees why the oak's superstrong wood made it the perfect material for building some of the most famous ships in naval history, including Nelson's flagship The Victory.

In winter, George discovers the sophisticated strategies the tree uses to survive gales and bitter frosts. He finds out about the oak's vital role in architecture, showing how some very familiar sights, such as the tower of Salisbury Cathedral, are in fact giant oak structures.

In spring, George investigates how the oak procreates, spreading its pollen through the countryside. He discovers the incredibly sophisticated strategies it uses to withstand savage onslaughts from predators hellbent on eating it alive.

In summer, George uses a high-powered microscope to see the hundreds of species that regard the oak as their home. Humans too rely on the oak for their own form of 'sustenance'. Whisky gets its unique flavours from the oak wood barrels in which it's matured.

THU 00:30 King Alfred and the Anglo Saxons (b038bd5)
The Lady of the Mercians

In this second episode, Alfred's children continue the family plan to create a kingdom of all the English.

The tale begins with a savage civil war in a bleak decade of snow and famine, culminating in an epic victory over the Vikings near Wolverhampton in 910. Filmed in the Fens and Winchester, Gloucester, Oxford and Rome, the key figure in this episode is Alfred's daughter Aethelflaed, the ruler of Mercia. Michael Wood recovers her story from a copy of a lost chronicle written in Mercia in her lifetime which, in the film, we hear read in Old English.

One of the great forgotten figures in British history, Aethelflaed led armies, built fortresses, campaigned against the Vikings and was a brilliant diplomat. Her fame spread across the British Isles, beloved by her warriors and her people she was known simply as 'the Lady of the Mercians'. Without her, concludes Wood, 'England might never have happened'.

THU 01:30 Shipwrecks: Britain's Sunken History (b0317kj8)
[Repeat of broadcast at 20:00 today]

THU 02:30 Prejudice and Pride: The People's History of LGBTQ Britain (p0578x02)
[Repeat of broadcast at 21:00 today]

FRIDAY 28 JULY 2017

FRI 19:00 World News Today (b08yzvm0)

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

FRI 19:30 BBC Proms (b08z2x60)
2017

Malcolm Sargent Revisited

Nicknamed 'Flash Harry', Sir Malcolm Sargent was the chief conductor of the Proms for two decades, bringing the concerts to TV audiences for the first time. Marking the 50th anniversary of his death, conductor Sir Andrew Davis, the BBC Symphony Orchestra and sensational young pianist Beatrice Rana recreate Sargent's 500th Prom from 1966. Alongside Schumann and Berlioz, there's a feast of English music, including works by Elgar and Holst, culminating in Britten's much-loved Young Person's Guide to the Orchestra.

FRI 21:45 The Chopin Etudes (b0074qm4)

Opus 10, No 11

Pianist Freddy Kempf plays Chopin's Etude in E flat, Op 10 No 11.

FRI 21:50 Sounds of the Sixties (b075f7r4)

Reversions

Swinging Sixties 1

Forget Madchester, forget Factory, forget Oasis. Manchester never sounded better than Herman's Hermits and the Hollies, who feature in this archive extravaganza.

FRI 22:00 BBC Proms (b08z2x62)
2017

Scott Walker Revisited

Jarvis Cocker leads an eclectic line-up in this late night tribute to the 60s cult icon Scott Walker. Conductor Jules Buckley has arranged tracks from Walker's four eponymous albums, performed with live orchestral backing for the very first time. Featuring Jules Buckley's Heritage Orchestra and London Contemporary Voices.

FRI 23:25 Reginald D Hunter's Songs of the South (p02j952b)
Alabama and Georgia

In the second of a three-part road trip, Georgia-born but London-based Reginald D Hunter heads home to explore the interplay between gospel, soul and hip-hop. Passing through Alabama, Reg witnesses a Lynyrd Skynyrd gig and discovers the soul riches of the town of Muscle Shoals.

Arriving in Georgia, Reg visits the Athens of the B52s and REM, as well as Martin Luther King's and Ludacris's Atlanta.

Featuring Arrested Development, St Paul and the Broken Bones, Clarence Carter and Sharon Jones.

FRI 00:25 Elvis: That's Alright Mama 60 Years On (b04c317g)

Actor and musician Sam Palladio hosts a musical tribute to Elvis Presley, 60 years to the day from when he recorded his first single, That's All Right, at Sun Studio in Memphis on 5 July 1954. Sam traces Elvis's story from childhood poverty in Mississippi, where he had to make do with a broom for a guitar, to the moment when, by accident, he ended up recording the song that changed the history of popular music. There are performances of the finest Elvis tracks from the likes of soul legend Candi Staton, LA duo The Pierces and country star Laura Bell Bundy.

FRI 01:25 Country Kings at the BBC (p028vxj4)

Classic male country singers from the BBC vaults, journeying from The Everly Brothers and Jerry Lee Lewis to Garth Brooks and Willie Nelson, and featuring classic songs and performances by Glen Campbell, Charley Pride, George Hamilton IV, Kenny Rogers, Clint Black, Johnny Cash, Eric Church and more. This 50 years-plus compilation is a chronological look at country kings as featured on BBC studio shows as varied as In Concert, Wogan, The Late Show and Later with Jools Holland, plus early variety shows presented by the likes of Lulu, Harry Secombe and Shirley Abicair.

FRI 02:25 Reginald D Hunter's Songs of the South (p02j952b)
[Repeat of broadcast at 23:25 today]