

A photograph of Boris Johnson and an older man sitting and talking to a group of children. Boris Johnson is on the left, wearing a dark suit and a purple tie. The older man is on the right, wearing a blue suit and a patterned tie. They are both looking down at their hands, which are clasped together. In the foreground, the backs of several children's heads are visible, looking up at the men. The background is dark and out of focus.

SCIENCE MUSEUM GROUP

RISING TO THE CHALLENGE

ANNUAL REVIEW 2019–20

WORLD-BEATING
NEW GALLERIES

ENVIRONMENT
MATTERS

REIMAGINING YORK
AND MANCHESTER

OUR COLLECTION
GOES DIGITAL

THE ART OF
INNOVATION

LOCOMOTIVE LEGEND

Mallard made a special appearance in front of a delighted audience to mark the start of a new passenger service along the east coast

Steam traction inspector Jim Smith stands proudly between LNER's Azuma, on the left platform, and railway legend Mallard, at York station

Railway history was made last summer when the world-famous locomotives *Mallard* and *Flying Scotsman* joined LNER's latest train *Azuma* to mark the start of passenger services on the East Coast Main Line. The special event began when No. 4468 *Mallard*, the world steam record holder and thoroughbred locomotive, left the National Railway Museum to go on display at York station for the first time

in 30 years. *Mallard* pulled up alongside *Azuma* in a historic line-up that captured the speed and style of high-speed rail travel through the ages.

After a short opening ceremony, the special *Azuma* service travelled north to Darlington where passengers were treated to a second rare glimpse of a renowned engine, when *Azuma* stood alongside No. 60103, *Flying Scotsman*.

The event delighted the crowds who had gathered to see these era-defining vehicles, and also secured widespread media coverage, enabling LNER to celebrate its history and announce a new era of high-speed travel.

'We worked very closely with the team at the National Railway Museum to give *Mallard* a very rare and memorable public appearance outside

the museum,' said David Horne, managing director of LNER. 'Having such a legendary locomotive from LNER's proud history alongside our new *Azuma* helped to create a truly momentous occasion as we look to the future of rail travel on the LNER route.'

Behind the successful event was a period of intense preparation that saw LNER and colleagues from the National Railway Museum working together. *Mallard*, one of

the museum's most-loved attractions, is a static exhibit in the Great Hall, surrounded by other rail vehicles. Moving it required a series of careful shunts to manoeuvre other engines aside. The success of the event hung in the balance, as specialist contractors were called upon to test the locomotive's fitness to run – a failure at any point would have called an immediate halt to proceedings. However, on the day, as a heavy rain shower cleared and the early

light broke through the clouds, *Mallard* was able to emerge from the museum – not under its own power, but with wheels and pistons in motion to delight the crowds.

The event allowed us to show our collection to a wider audience, and demonstrated the value of maintaining strong links with the rail industry. It also highlighted our ability to tell stories about rail engineering from the past, present and future.

‘Today, we stand on the cusp of the graphene age, with applications in everything from de-icing of aircraft wings to life-saving medicine. The story of those pioneers is told here at the Science and Industry Museum – and it is one of the countless tales of Mancunian pioneers’

Boris Johnson makes his maiden speech as prime minister at the Science and Industry Museum, Manchester

‘I look forward to seeing how the Manchester Science Festival and the Science Museum’s exhibition about carbon capture spark discussion about how to protect our fragile planet’

Sir David Attenborough at the launch of the United Nations Climate Change Conference at the Science Museum

‘Oh yes! Now this is it. This is my sort of place, this. Just look at the size of these engines. The National Railway Museum is a shrine to British engineering – from the golden age of steam to the modern day’

David Jason, actor and presenter

‘These galleries really testify to this city’s and the UK’s contribution to science, technology and industry’

Mark Carney, former Bank of England governor, at the Science and Industry Museum

‘We cannot underestimate the potential of Sound and Vision to impact our communities, both economically and emotionally’

Susan Hinchcliffe, leader of Bradford Council, on new galleries at the National Science and Media Museum

‘This unique collaboration between GCHQ and the Science Museum is a great way to mark our centenary’

Jeremy Fleming, director of GCHQ, at the launch of Top Secret at the Science Museum

OUR FIVE WORLD-BEATING MUSEUMS

Science Museum, London
National Railway Museum, York
Science and Industry Museum, Manchester
National Science and Media Museum, Bradford
Locomotion, Shildon

SUPPORT OUR MUSEUMS

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ANNUAL REVIEW ONLINE

sciencemuseumgroup.org.uk/about-us/annual-review

SCIENCE MUSEUM GROUP
ANNUAL REVIEW 2019–20

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Cover image Prime Minister Boris Johnson and Sir David Attenborough discuss climate change with children at the Science Museum. Photography by Jody Kingzett **Back image** A Quiet Afternoon in the Cloud Cuckoo Valley by Rowland Emmett, from the SMG Collection. Photography by Jennie Hills

WELCOME FROM OUR CHAIR

FORCE FOR CHANGE

In the midst of testing times, the Science Museum Group is even more committed to its global message and ambitious work, says our chair Dame Mary Archer

Below Dame Mary Archer, chair of the Science Museum Group, beside Waterloo Station (1967) by Terence Cuneo, in the National Railway Museum



The Science Museum Group’s focus on a global, rather than a national, perspective has never been more relevant as the world tackles a pandemic. We publish our latest Annual Review when there is greater awareness than ever of the vital role of science in helping us to understand, treat and protect against infectious diseases.

In that spirit, in February the Science Museum was delighted to host the launch of both the UK Year of Climate Action and the UN’s 26th Climate Change Conference.

The naturalist Sir David Attenborough and the UK and Italian prime ministers chose us because the Science Museum Group is a prominent scientific voice in engaging its audience of more than five million people with the biggest threat to our planet – global climate change. As Sir David told us: ‘The moment of climate crisis is with us and our planet needs us all to act now.’

At the launch, Sir David, Sir Ian Blatchford, director and chief executive of the Science Museum Group, and Darren Moorcroft, chief executive of the Woodland Trust,

joined a group of schoolchildren to plant native hazel, wild cherry, rowan and crabapple trees to mark the Group’s climate-focused public programme.

These are in addition to the 43,000 native trees that the Group has already planted over the past decade at our National Collections Centre in Wiltshire, where we also host an external solar farm, which feeds up to 50MW of electricity into the national grid at any one time.

We have committed to planting a further 1,000 native locally sourced trees every year until 2030.

But planting trees, even millions of them, is not enough to mitigate global climate change. That is why carbon capture and storage are the focus of a new temporary exhibition at the Science Museum, and why climate change will be the theme of our biggest event, the Manchester Science Festival.

As the birthplace of the Industrial Revolution, Manchester was the catalyst

for scientific innovation and unprecedented change all over the world. Now, with Greater Manchester’s vision of becoming carbon neutral by 2038, the city is uniquely placed to influence future progress across the globe once again.

At our National Railway Museum in York, the use of natural materials and sustainable architecture was emphasised in a competition to help transform the museum into the cultural anchor for York Central. This will be one of the largest city-centre brownfield regeneration projects in Europe (*see page 16*).

There is much talk of this being a year of climate action, but we need to think in the long term. The Group’s Sustainability Strategy (*see page 20*) means we are committed to act each and every year to further curb our carbon emissions. To help us in this vital work, I am delighted to welcome the Group’s new trustees Peter Hendy, Hannah Fry and Jo Foster (*see page 64*).

Dame Mary Archer is patron of the National Energy Foundation, president of the UK Solar Energy Society and a companion of the Energy Institute. She has written and contributed to various volumes of work concerning solar energy utilisation.

‘The Science Museum Group has found innovative ways of bringing its collections to us. It has also chronicled the UK’s response to the coronavirus crisis through thoughtful collection and scholarship’

Culture Secretary Oliver Dowden

‘Our history helps us understand who we are and where we came from and this exciting art project will further increase public engagement with the Science Museum Group’s world-class collection’

Michael Ellis, former arts minister, on our new commission for the National Collections Centre

‘As we plan for a new decade we continue to celebrate the collections and the expertise at the National Science and Media Museum with colleagues all around the world’

David Wilson, director, Bradford UNESCO City of Film

‘The National Railway Museum is a truly unique institution and a must-see for the curious. Here, the extraordinary human stories and iconic locomotives of the past rub shoulders with the cutting edge technologies of today’

Prue Leith, restaurateur, chef and broadcaster

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at the Manchester
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Gaia’s earthly powers

Back cover

Rowland Emmett’s mechanical marvel

TEN YEARS OF SPECTACULAR ACHIEVEMENT

The past decade has seen the Group pursue an ambitious programme of expansion and innovation. We are now the most significant science museum organisation in the world, with a global audience and a firm commitment to the cultural life of the country outside London, says Group director Sir Ian Blatchford

In a year when humanity is dealing with the Covid-19 crisis, the one thing we can be sure of is that science will ultimately show us how to bring this pandemic to an end. This fact has made all of us in the Science Museum Group even more committed to our role in bringing the subject and its greatest pioneers to life for our visitors, notably schoolchildren, some of whom will surely go on to play their own role in devising life-saving solutions. The opening of *Medicine: The Wellcome Galleries* – the greatest medical collection in the world – at the Science Museum last year could not have been more timely, reminding us of the extraordinary advances medicine has made, and will continue to make, from hospitals to drugs, vaccines and computer modelling.

On that note of optimism at this difficult time, I would like to take the liberty of reflecting on how much the Group has changed over the past decade. On my arrival in 2010, our prospects were hardly rosy, with galleries and collections suffering from long-term underinvestment and the organisation facing major reductions in government funding.

We might have responded with retrenchment, thereby risking a spiral of decline with reduced programming, shabbier galleries and alienated visitors. But I was struck by the staggering importance of our collections, the energy and intelligence of my colleagues, and the great affection and trust that our visitors still vested in us, so we chose a different path and took a punt on extreme ambition instead.

We have invested in challenging exhibitions; dynamic STEM (science, technology, engineering and mathematics) learning; collection scholarship; digital resources; access to our collections; and world-class galleries. We also decided to invite the Science and Industry Museum in Manchester to join us in 2012, and thus became the most significant group of science museums in the world.

We now have a consistent brand and values, a better understanding of our audiences and, as our chair described on page one, we are now the essential location to announce the UK presidency of the UN's 26th Climate Change Conference.

We have built long-term relationships with so many generous partners and supporters, who have helped us every step of the way to fulfil our ambitions to offer a wealth of experiences, exhibitions, galleries and learning opportunities to millions of visitors, both online and in person.

At the Science Museum, we saw the culmination of a decade of scholarship, audience insights, outreach and gallery transformation when we opened our

magnificent *Medicine* galleries. We commissioned spectacular works of art, displayed our collections with flair and inclusion, and installed new lifts and facilities for our growing audience.

The new galleries begin with Marc Quinn's commanding sculpture, *Self-Conscious Gene*, which stirs the heart and mind as one enters the space. The opening of *Medicine* means that we have transformed half of the museum over the past decade, and plan to beautify the rest in the decade to come.

Beyond the permanent galleries, the museum marked the centenary of GCHQ with the launch of *Top Secret* and revealed its work in securing our safety and prosperity. Other exhibitions included *Driverless*, which examined AI through the lens of autonomous vehicles, and *The Art of Innovation: From Enlightenment to Dark Matter*. This surveyed the fascinating relationship between scientists and artists over the past 250 years, and was accompanied by a book and a 20-part BBC series for Radio 4.

While we have great plans for London, our boldest ambitions centre on the National Railway Museum in York. It celebrates its 50th anniversary in 2025 and the same year marks the bicentenary of the Stockton and Darlington Railway, a moment of world heritage importance. Vision 2025 will see a £55 million investment in upgraded collection displays, STEM learning, and public engagement around the future of the railways in the country that invented them.

And at a time when there is a national consensus about the urgent need for economic and cultural investment beyond the capital, we were delighted that the Department for Digital, Culture, Media and Sport (DCMS) committed £18.6 million to this project. In 2019, the team at the National Railway Museum were not only planning their new vision, but also launched two wonderful touring exhibitions: *Brass, Steel and Fire* and *One Billion Journeys*.

Opposite Bloom, an aerial sculpture representing the spread of infectious disease, by Studio Roso, in the Medicine galleries at the Science Museum
Above right Jean Thomas, Nancy Rothwell, Julia Goodfellow, David Attenborough, Amanda Solloway and Ian Blatchford at the 10th Anniversary Gala of the Royal Society of Biology



Vision 2025 will also embrace Locomotion, our railway museum in Shildon, Co Durham. It occupies a site whose railway works are a landmark in the history of the industry. Since Locomotion opened to the public in 2004, its popularity has exceeded all expectations. We will be working with our wonderful joint partner, Durham County Council, to expand the collection displays as part of the wider vision for the National Railway Museum. One of my favourite encounters of the year was visiting Shildon to see our most joyful acquisition of 2019, an extraordinary kinetic sculpture entitled *A Quiet Afternoon in the Cloud Cuckoo Valley* by the cartoonist, inventor and artist Rowland Emmett (*see back cover*).

Staying with this transport theme, the Liverpool and Manchester Railway was, in 1830, the world's first inter-city line and its Manchester terminus at Liverpool Road station is today home to our Science and Industry Museum. It is a site of great cultural importance and architectural beauty, but it needs some serious love. So it was great to begin the restoration of its Power Hall, which houses a splendid collection of the steam and electrical engines that made this region an industrial powerhouse. All of this has been made possible thanks to special capital funding from the DCMS, for which we are very grateful. Among the many national events held in the museum last year, we were particularly delighted that the Bank of England chose it as the venue to announce that Alan Turing, the renowned code-breaker and computer pioneer who lived and worked in Manchester, would grace the new £50 note.

The past decade has seen a remarkable renewal for the National Science and Media Museum in Bradford, and we have spent the year developing radical

‘The opening of *Medicine: The Wellcome Galleries* could not have been more timely, reminding us of the extraordinary advances medicine has made, and will continue to make’

Sir Ian Blatchford, director,
Science Museum Group

proposals for its new *Sound and Vision* galleries, which will honour a world-class collection of photography, television, radio and film. And while the collections are of global importance, the museum has a deep relationship with local communities as was shown by its pioneering show *Above the Noise*.

Across the Group, we continue to welcome the scientists, engineers and technicians of today and the future. Last year, we celebrated the first anniversary of the Science Museum Group Academy, our dedicated centre for science engagement training. It has already become an essential resource for teachers, museum educators and STEM professionals.

And this leads me to my final word on what extreme ambition can achieve. In October last year, the Science Museum was delighted to welcome Peter Tabichi, the Kenyan teacher who won the 2019 Varkey Foundation Global Teacher Prize. He remarked on the museum's power to enchant, entertain and inspire and in doing so encapsulated the Group's powerful ability to reach out to curious young minds: 'I was overcome by wonder at the scale and scope of the exhibits. I could see the look of wonder in the eyes of so many children.'

THE WORLD'S GREATEST ALLIANCE OF SCIENCE

‘Enhanced public access
is at the heart of our
vision for the National
Collections Centre’

Jonathan Newby, Group managing director



Above Atmospheric
Memory, an art
installation at the
Science and Industry
Museum, Manchester

Right Locomotion, in
Shildon, Co Durham
Far right Stephenson's
Rocket in the National
Railway Museum, York



Above The Science
Museum in London
is the most visited
museum in the UK by
school groups

Right The National
Science and Media
Museum in Bradford
explores the history of
the moving image



Above Building One,
our new collections
management facility, at
the National Collections
Centre in Wiltshire

SCIENCE MUSEUM

The Science Museum has pioneered interactive science for more than eight decades. We welcome 3.2 million visitors a year and remain the most visited museum in the UK by schools. The Group's world-class collection forms an enduring record of scientific, technological and medical advancement from across the globe. Key objects on display include Tim Peake's Soyuz capsule (2015) and a copy of Isaac Newton's seminal text *Principia Mathematica* (1687). The museum's Library and Archives care for more than half a million items. In 2019, six new permanent galleries opened: *Science City 1550–1800*: *The Linbury Gallery* plus the five that make up *Medicine: The Wellcome Galleries*.

SCIENCE AND INDUSTRY MUSEUM

The Science and Industry Museum in Manchester tells the stories of ideas that have changed the world, from the Industrial Revolution to today and beyond. Located on the site of the oldest surviving passenger railway station, in the world's first industrial city, the museum explores the greatest innovations of the past 200 years, from light bulbs and locomotives to textiles and computers. Our programme of exhibitions, experiences and events, including the Manchester Science Festival, bring science to life for people of all ages.



‘The development of Building Two and the homecoming
of Locomotion No. 1 will give Locomotion even more
opportunities to put the heritage of Shildon and
the North East on the map’

Peter Hendy, trustee, Science Museum Group



NATIONAL SCIENCE AND MEDIA MUSEUM

The National Science and Media Museum in Bradford explores the science and culture of image and sound technologies and their impact on our lives. We hold world-famous collections in photography, film and television, while our three-screen cinema, Pictureville, including an IMAX theatre, allows us to showcase films from around the world. The *Sound and Vision* galleries, due to open in 2023, will bring together star objects from our collection for the first time to present a comprehensive history of the still and moving image.

NATIONAL RAILWAY MUSEUM

The National Railway Museum in York is home to the world's greatest collection of railway objects from the past 250 years. Set in former railway buildings near York station, the museum attracts visitors from around the world and tells inspiring stories of railway history and engineering. It has an unrivalled collection of famous locomotives and royal carriages and a busy programme of exhibitions and events. Vision 2025 is a £55 million transformation of the site that will reimagine the story of the railways and provide an interactive and engineering-focused experience for visitors.

LOCOMOTION

Locomotion displays highlights of the national collection of rail vehicles in Shildon – the world's first railway town – in Co Durham. The building is home to more than 70 heritage vehicles, including the prototype Deltic, British Rail's experimental Advanced Passenger Train, North Eastern Railway No. 1, one of the country's first electric locomotives, and the High Speed Train prototype power car. Locomotion's workshop carries out a range of restoration projects on our vehicles which visitors can watch from a purpose-built viewing platform.

NATIONAL COLLECTIONS CENTRE

The National Collections Centre in Wiltshire is home to some of the Science Museum Group's largest and most dramatic objects, from the Blue Steel standoff bomb to the Sno-Cat vehicle for Antarctic exploration. The centre is undergoing a major transformation with the construction of a vast new collections management facility. This will house more than 300,000 small and large objects from the Group's collection, including buses, cars, telescopes and computers. Researchers, school groups and the public will be welcome to visit from 2023. The site is home to native woodlands and one of the UK's largest solar farms.

SCIENCE MUSEUM GROUP

WE ARE
THE
PLACE
TO BE



7 Sir David Attenborough, naturalist and broadcaster, Sir Ian Blatchford, SMG director, and Darren Moorcroft, chief executive of the Woodland Trust, join schoolchildren to plant a tree outside the Science Museum's Dana Centre



8 Greater Manchester's civic mayors join Sally MacDonald in front of Stephenson's Rocket for the Mayoral Civic Visit at the Science and Industry Museum



9 Sir Ian Blatchford, SMG director, and the artist Marc Quinn beside Self-Conscious Gene

1 Karina Vold of Cambridge University, Michael Ellis MP, SMG chair Dame Mary Archer, Chris Hayhurst of MathWorks, and SMG director Sir Ian Blatchford at the launch of Driverless
2 Danielle Bisutti and Chris Judge at Power UP in London
4 Actor Matthew Broderick enjoys his day off with a visit to Top Secret

3 Jeremy Fleming, director of GCHQ, at Top Secret

5 Gordon Corera, BBC security correspondent, with Sir Ian Blatchford, SMG director, at the launch of Top Secret

6 Prime Minister Boris Johnson with Sally MacDonald, director of the Science and Industry Museum, and Dame Mary Archer, SMG chair

SCIENCE MUSEUM GROUP



10 Actors Sheila Hancock and Maureen Lipman with director Trevor Nunn at the Arts and Media Lunch in the Science Museum's Smith Centre
12 Samira Ahmed, Derek Bardowell, Angela Saini and Gavin Evans at a Science Museum discussion on so-called 'race science'



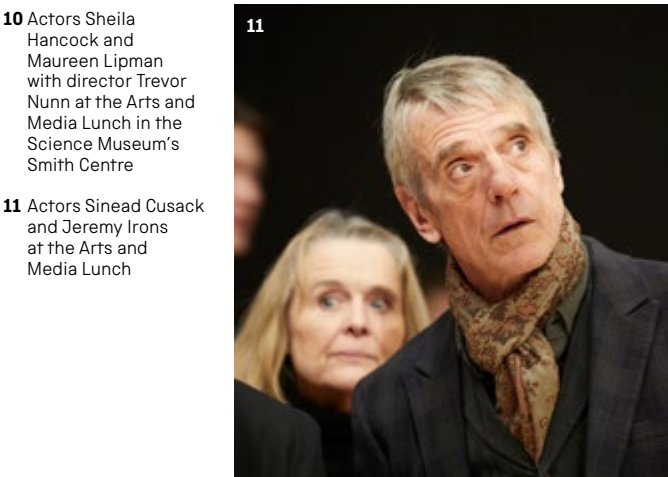
13 Aleyne Johnson of Samsung, former science minister Chris Skidmore, SMG chair Dame Mary Archer, former Samsung CMO Sam Grant, and astronaut Tim Peake at the unveiling of Soyuz in the Science Museum



14 Tim Peake receives the 2019 Rooke Award from Hayaatun Sillem, CEO, the Royal Academy of Engineering



16 Actor David Jason visits the National Railway Museum during filming for a new documentary series



15 Prue Leith, restaurateur and broadcaster, was a guest speaker at the National Railway Museum's Director's Dinner



17 Games journalist and presenter Alysia Judge hosts a panel discussion at the Yorkshire Games Festival



NATIONAL TREASURES

It has been a busy year for the teams who manage the Group's objects, as they prepare more than 300,000 items for the historic move to our National Collections Centre in Wiltshire

89,000

Number of collection objects illustrated online. The collection website has been visited two million times

'Our £150 million Blythe House operation will help provide superb new storage facilities for our national collections. I am delighted that the Science Museum Group is putting public access at the heart of its plans for the National Collections Centre'

Michael Ellis, former arts minister



Main image
Construction of Building One at the National Collections Centre began in February 2019

Above Jonathan Newby, Group managing director, and Michael Ellis MP, launch the start of construction work

Rising to the challenge

One of the grandest scientific instruments in King George III's observatory in Richmond was a monumental mural arc. Standing three metres tall, its brass silhouette is one of the highlights of *Science City 1550-1800: The Linbury Gallery*, our new permanent gallery at the Science Museum.

To prepare for display, the arc underwent extensive conservation. Discoloured lacquering was removed to make the finely engraved details visible. The biggest challenge, however, was moving the arc to the gallery. The arc's weight and size – 450 kilogrammes – made this a logistical challenge, particularly as it had to be hoisted up to the second floor. Fortunately, our museum staff have long and extensive experience of transporting enormous and extremely heavy items.

One such heavy item, of course, is Stephenson's *Rocket*, which in September crossed the Pennines, travelling from the Science and Industry Museum in Manchester to the National Railway Museum in York. Following *Rocket's* journey from London to Newcastle and Manchester, the conservation team are now experts at handling, moving and reassembling the chimney of this 190-year-old locomotive.

The opening of *Medicine: The Wellcome Galleries* has also kept the Science Museum's conservation team busy, with the cleaning and preparation of significant historical items for display and the installation of 3,000 delicate objects, including 200-year-old wax anatomical figures.

'Thrillingly, we are in the midst of revolutionising public access to one of the most significant scientific collections in the world'

Jonathan Newby, Group managing director

Reviewing what we have

In 2018 our curators embarked on a review of the collection, studying it in detail to gain a greater understanding of the items we care for. This important work is already bearing fruit. For example, a review of our aeronautical collection led to the gifting of the Sandringham 'flying boat' to the Solent Sky Museum in Southampton (building on an existing long-term loan). Reviews are also under way at the National Collections Centre to assess the significance of other areas of the collection, ranging in subject from civil engineering to firefighting.

December 2016. They even helped a staff member return the missing part of an object to its rightful place.

Indeed, giving the public easier and greater access to our enormous collection is the focus of the Group's ambitions over the next few years. As Newby says: 'Enhanced public access is at the heart of our vision for the National Collections Centre and I am delighted construction is under way for the collection's new home. Soon Wiltshire residents and audiences across the globe will be able to explore more of our incredible collection than ever before.'

The Science Museum Group's ambitious project to transport 320,000 of its items to a new, purpose-built collections centre in Wiltshire is well under way, with the new facility nearing completion. It will, as Jonathan Newby, Group managing director, says, 'transform how we care for and share our internationally significant collection with the world'.

Construction of Building One at the National Collections Centre began in February 2019, and by May the facility's steel structure had taken shape. Since then progress has been rapid. Almost 1,000 people have been involved in the construction and, by November, 212,612 nuts, bolts and fixings had been used to complete the building's shell.

With construction nearly finished, project managers are discussing the internal layout and planning for public access to the new facility, in preparation for its opening to researchers and public tours in 2023. The team are also studying, digitising and preparing up to 20,000 large objects already housed at the site for their move into the building.

In 2019 we also began the monumental task of packing all 300,000 objects at Blythe House in west London, where the bulk of our collection is currently stored. By March 2020, more than 50 staff had conserved 137 objects, packed 50,072, photographed 132,602 and recorded, barcoded and hazard-checked 218,538 items.

We also launched the first of our annual online themes, exploring the impact of chemistry through artefacts in the collection related to food, fashion, plastics, pollution and more. We shared engaging stories and videos, created 360-degree views of objects and highlighted lesser-known ones.

There are now 89,000 images of the collection online (more than double what was available in April 2019). Support from Google Arts & Culture helped to digitise a further 11,000 coins and paper artworks. Global audiences have explored rarely seen items and star objects from the Science Museum Group Collection through the collection website, which recently received its two millionth visit since launching in

‘Staggering both in breadth and volume’

The Londonist

MEDICAL MARVEL

The Science Museum has transformed its first floor into a magnificent gallery exploring the history of medicine, with bespoke works of art, ground-breaking technology and moving testimonies

After nine years of planning, the Science Museum was delighted to open a spectacular new permanent space, *Medicine: The Wellcome Galleries*, in November last year. Spread across the first floor of the museum, the five galleries allow our visitors to explore the most significant medical collection in the world, interwoven with the stories and experiences of patients and doctors.

Award-winning architects WilkinsonEyre have designed a stylish series of galleries that seamlessly links the 3,000sq-metre space. The project has transformed not only the first floor but also opened up the entire museum, making use of areas that had been closed to the public for several years and uniting the *Making the Modern World* gallery on the ground floor with those above. Solid-oak flooring and an emphasis on sight-lines make the space easy to navigate. With two new lifts and new toilets, it is also fully accessible to our visitors. Red highlight markers alert viewers to star objects, while audio, subtitles and British Sign Language ensure the experience is open to all.

Medicine includes Sir Henry Wellcome’s vast collection – on long-term loan from Wellcome – as well as the museum’s own extensive medical archive. Each of the

five galleries is arranged by theme. In *Medicine and Bodies*, we explore what we have learned about the human body over the centuries, including the history of anatomy, different ways of imaging and measuring the body, and the body on a microscopic level.

In *Medicine and Treatments: The GSK Gallery*, we examine how we manage the health of the individual, using surgery, different therapies and drugs. Here, our visitors can enter a Victorian pharmacy and experiment with mixing their own medicines through an interactive digital exhibit. And in *Medicine and Communities*, a gallery dedicated to public health, visitors can learn about infectious disease, sanitation and the history of the hospital.

Exploring Medicine is a vast cabinet of curiosities, crammed from floor to ceiling with more than 1,000 objects. Resembling a museum storeroom, it houses objects from the ancient to modern that jostle together on the shelves. This gallery also showcases some of the museum’s recent acquisitions. The final gallery, *Faith, Hope and Fear*, examines the cultural side of medicine, and how faith in our treatment and in our doctors, and the support of loved ones, have a direct effect on our health.

One notable feature of *Medicine* has been the use of contemporary art to bring together the history of science and medicine with contemporary culture. The monumental sculpture *Self-Conscious Gene* was created especially for the *Medicine and Bodies* gallery by the celebrated artist Marc Quinn. Illuminating the ceiling of *Medicine and Communities* is *Bloom*, a kinetic sculpture inspired by the spread of infectious disease, by the Danish designers Studio Roso. The elaborate bronze *Santa Medicina* by Eleanor Crook keeps watch over the thought-provoking gallery *Faith, Hope and Fear*. And across two galleries are the beautiful, life-size photographic portraits created for us by Siân Davey.

Alongside these striking artworks, *Medicine* contains many digital, interactive exhibits. Visitors can play games, some of which have proved to be extremely topical. They can experience the challenges of stopping an epidemic from spreading, or being in an intensive care unit, or learn what is involved in ensuring a new drug is safely tested. Clever animations explain what cells and proteins are, and how magnetic resonance imaging (MRI) works.

Right *Self-Conscious Gene*, a 3.5-metre bronze sculpture of Rick ‘Zombie Boy’ Genest, by Marc Quinn, towers above visitors as they enter the space

‘The Wellcome Galleries provide an enthralling historical context for how we experience health and medicine in the modern world’

Adam Kay, The Daily Telegraph

3,000

Number of square metres that the first floor gallery covers – the equivalent of 1,500 hospital beds



‘We are incredibly proud to see our Batman radiotherapy mask taking pride of place in the new Medicine galleries. The painted masks help children who are undergoing radiotherapy at our hospital by transforming them into the character of their choice’

Leeds Children’s Hospital

The Science Museum’s Learning team has also created impressive 3D-scanned models of some of the objects as online resources for teachers.

Medicine gave the museum an opportunity to update our collection of contemporary medical technology. As well as showcasing the existing collection, the curatorial team identified and acquired new objects for the permanent collection. These include the first robotic surgery equipment used on a live patient, a tiny MRI scanner used for premature babies and a 3D-printed kidney.

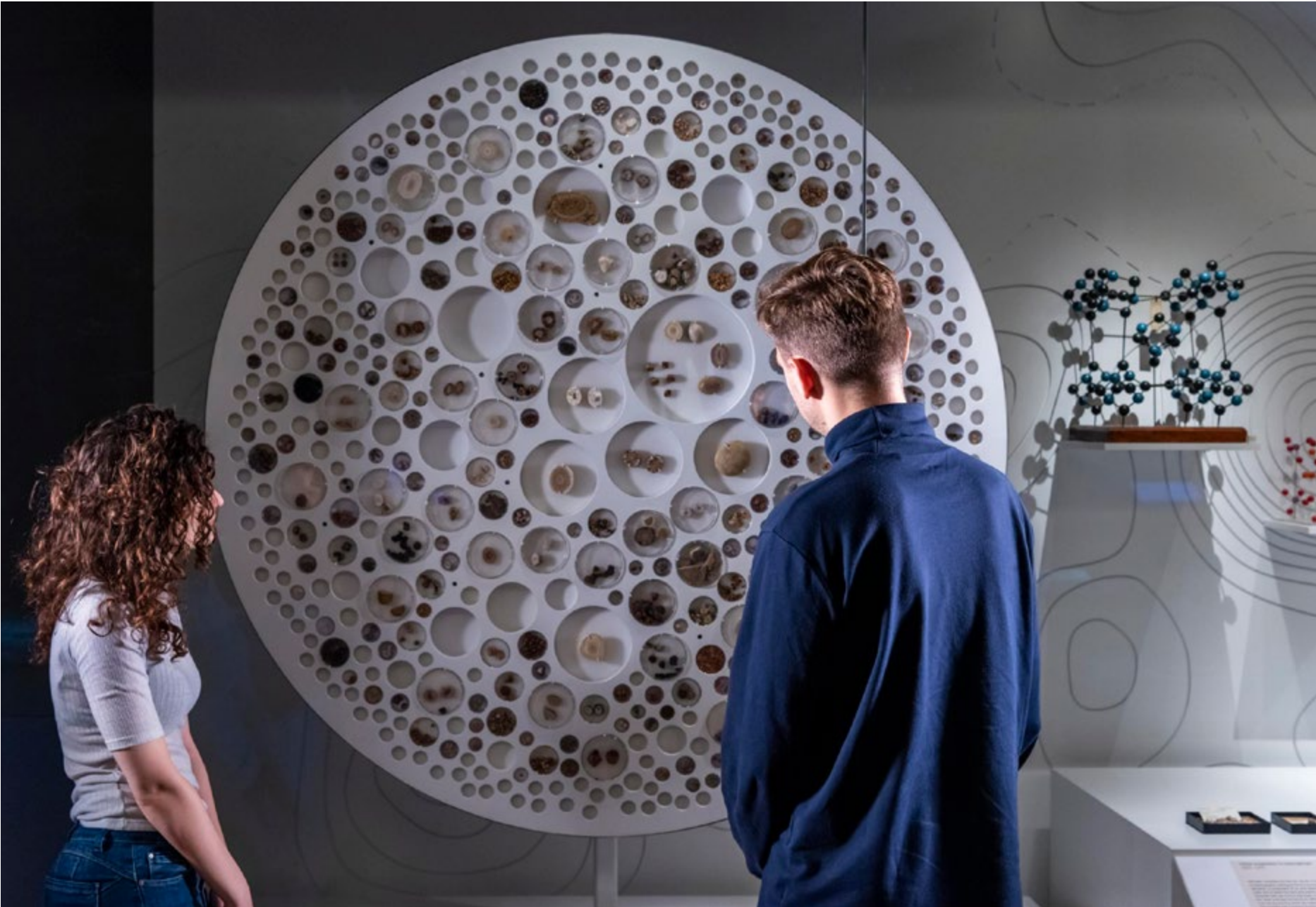
The new galleries also allowed us to develop an oral history project, led by our dedicated team of volunteers. The team recorded and transcribed 32 new oral histories. These testimonies were given by medical practitioners and patients – extracts of them are used in the gallery and will be available online and at our National Collections Centre. They include the voices of pioneers of ultrasound and robotic surgery, doctors working in cancer research, and those using diagnostic tools or complex drug treatments for conditions such as cystic fibrosis.

But perhaps the most important element of *Medicine* are the voices of ordinary people, which appear throughout the galleries in audio and visual presentations. These form a rich and moving tapestry of our relationship with our own health and mortality, those we care for and those who look after us. We hear from people with mental health issues, those recovering from serious brain injuries, an eye surgeon working in Uganda, and a person explaining what it is like to live with terminal cancer. It is this personal element that brings the human touch to medicine – and to our wonderful new permanent galleries.

300+

Number of new acquisitions in the Medicine galleries

Right A circular display of human gall bladder stones
Below The Medicine and Bodies gallery explores what we know about the human body and, right, Faith, Hope and Fear examines the cultural aspects of health and medicine



Below Santa Medicina, an allegorical bronze figure by Eleanor Crook, in Faith, Hope and Fear



‘Santa Medicina is a magnificent fusion of all that the new galleries seek to portray... the kindness that matters as much as technology, and the faith, hope and love that is as crucial a part of the treatment as the medicine, the surgery, the chemotherapy or the incubator’

Joanna Moorhead, The Tablet



Far right A cabinet of curiosities (the Wunderkammer), displays 1,000 objects from Sir Henry Wellcome’s collection

Funders Medicine: The Wellcome Galleries has been generously supported by Wellcome, National Lottery Heritage Fund, GSK, The Wolfson Foundation, Vitabiotics, Art Fund, Stavros Niarchos Foundation, Britford Bridge Trust, Dr Martin Schoernig, Medical Sciences Historical Society and an anonymous donor



Vision 2025, our plan to transform the National Railway Museum in York and expand Locomotion in Shildon, is on its way to becoming a reality

1.2m

Number of annual visitors the National Railway Museum's new Central Hall will be able to welcome

RIGHT ON TRACK



£18.6m

The amount the government has agreed to invest in Vision 2025

'The brief combined three of our passions – museum architecture, great railway architecture of the 19th century and working in Yorkshire. Central Hall is both a tremendous challenge and a unique opportunity to create a new face and connected experience for the museum. We can't wait to start work with such a fantastic client'

Fergus Feilden, director, Feilden Fowles architects

One of the most significant and famous objects in the history of locomotion – and in modern civilisation – arrived at the National Railway Museum in York in September 2019. *Rocket*, a superstar of the Group's collection, is now at home alongside other titans of railway history.

The arrival of *Rocket* was a powerful statement of our ambition and a symbolic moment in our journey towards Vision 2025, a plan that will see us become the 'World's Railway Museum'. The £55 million project to transform our museums at York and Shildon will reimagine the inspirational story of the railways for future generations. It is fitting that this will be achieved in the same year the National Railway Museum celebrates its 50th birthday and the Stockton and Darlington Railway is 200 years old.

In the past year, the dream of Vision 2025 began to become a reality. In March 2019, York Central received outline planning permission, a milestone in a regeneration project that will profoundly affect our museum and the city of York. The National Railway Museum's Vision 2025 development is poised to become the cultural anchor of the wider York Central scheme, a 45-hectare development created in partnership with Network Rail, Homes England, City of York Council and the museum.

It is a once-in-a-lifetime opportunity to transform the Leeman Road area of the city; the redevelopment of former railway land will create 2,500 homes, 20% of which will be affordable, and a commercial quarter creating up to 6,500 jobs.

Just a month after *Rocket* arrived in York, the government strengthened that growing sense of confidence when it announced an £18.6 million investment in the museum. It was a milestone in realising a £55 million fundraising target for Vision 2025, a vote of confidence in our plans and it will be a springboard for the next phase of development.

From extensive landscaping of South Yard, to the creation of an interactive *Wonderlab* gallery and redisplaying the famous Great Hall, the Vision 2025 masterplan comprises projects that will transform the National Railway Museum into a world-class visitor attraction.

But the goal of Vision 2025 is to create two world-class railway museums, and in January we announced the most significant redevelopment at Locomotion, in Shildon, since it opened in 2004.

A £4.5 million plan will see the construction of the new 4,000sq-metre Building Two, close to the existing visitor centre, which will almost double the amount of covered space available to the public. The building will house up to 40 vehicles from the national collection, bringing the total number of rail vehicles at Locomotion to more than 100.

Back in York, it is hard to overstate the importance of the Central Hall to the museum's future. It will unify the site, connect historic railway buildings and provide a beautiful new welcome area for our visitors. In March, a jury convened by Dame Mary Archer, Group chair, selected the UK-based architects Feilden Fowles

from 76 international teams to create the £16.5 million building. Feilden Fowles's most recent project, The Weston visitor centre at the Yorkshire Sculpture Park, was shortlisted for the RIBA Stirling Prize.

The firm was chosen by the jury for the elegance of its designs, which draw sympathetically on the history of our site. Inspired by working railway buildings, the concept features locomotive 'roundhouses' with a central two-storey rotunda. Clad in recycled copper and featuring high glazed ceilings, the design will allow us to reduce our carbon footprint by 80%. The Group is working with a world-class team, who will help us to create a new landmark building for York.

On a practical level, the 4,500sq-metre Central Hall will connect the existing Great Hall and Station Hall buildings and provide additional capacity to welcome up to 1.2 million visitors annually. But just as important as these functional aspects is the Central Hall's role in showcasing the future of rail engineering.

The National Railway Museum has always been adept at bringing the past to life – preserving, conserving and celebrating what has been. But that role is changing. To remain relevant, Central Hall and Vision 2025 must link that past to what is happening today, and inspire our visitors with what will be possible tomorrow.

Opposite British architects Feilden Fowles beat stiff competition from 76 international firms to create the elegant new £16.5 million Central Hall. The design is inspired by a locomotive 'roundhouse'

RAILWAY RENAISSANCE

A new building at Locomotion will transform the museum for visitors, and build on Shildon’s reputation as the ‘cradle of the railways’

‘This town, and the railway that runs through it, changed the world forever. For here was the genesis of the modern railway and to now have Locomotion at its heart is a privilege’

Tim Dunn, railway historian and broadcaster

Ambitious plans to expand the site at Locomotion, our beautiful railway museum in Co Durham, are in development that will transform the experience for visitors and inspire a new generation to learn more about the transport technology that changed the world.

Locomotion takes inspiration from its location in Shildon, which has a special place in railway history. Near to the far end of the site is the place from where, in September 1825, Locomotion No. 1 hauled the first steam-powered passenger train on the Stockton and Darlington Railway.

Shildon is also the place where some of the earliest train tickets were sold and where some of the earliest locomotives were constructed. The town was home to the world’s first railway company works and at one point it also accommodated the largest sidings in the world. Often called ‘the cradle of the railways’, Shildon can justly claim to be the world’s first railway town.

Built on a brownfield site adjacent to the existing site, the new 4,000sq-metre Building Two will allow us to double the amount of collection items on display and give us the opportunity to show more non-vehicle objects. Together with the existing collection building, and better displays across the whole site, it will enable us to tell a more involved and coherent story of the railway industry from its earliest days in Shildon to the present, and highlight both its national and international impact.

The new building will cement Shildon’s standing as the world’s first railway town and Locomotion as an essential museum to visit for anyone who is interested in the history of the railways and how they changed the world.

Funder Durham County Council



THE REVOLUTION STARTS HERE

18,500

Number of hours it has taken to erect scaffolding in the Power Hall in order to install 1,220 metres of specialist alloy beams for the roof

The restoration of our Manchester museum, which occupies a historic railway site, comes to fruition over the coming year, and includes a beautiful new exhibition space in our Grade II-listed warehouse

The Science and Industry Museum stands on one of the most important industrial heritage sites in Europe. Indeed, many would claim that it started a technology revolution which led to the birth of the modern world. Our visitors can walk through the oldest surviving passenger railway station and railway warehouse, a place that was crucial to the emergence of Manchester as the first industrial city.

A multimillion-pound restoration project is under way to carry out crucial conservation and restoration work to the site. We will open up new spaces and create a more sustainable museum to provide inspiring science, heritage and cultural experiences for everyone. The renovated museum will reveal how Manchester’s know-how shaped the globe and our lives today, and remind visitors that they too can have ideas that change the path of history.

Special Exhibition Gallery
Our new £5 million Special Exhibition Gallery will create and host some of the world’s most exciting science exhibitions. Designed by the award-winning architects Carmody Groarke, this beautiful new space is in our Grade II-listed New Warehouse, built in 1882. In the coming year we will reveal the grandeur and scale of this historic gallery for the first time, where visitors will be able to enjoy innovative exhibition experiences. The gallery will help to shift the centre of gravity of the Science Museum Group north, and Manchester will be able to launch major exhibitions that will also tour the Group.

The Power Hall
The £7.5 million Power Hall project includes major roof repairs and a renovation and rethink of the gallery space. Built in 1855 as the shipping shed for Liverpool Road station, the hall houses Europe’s largest collection of working steam engines. When it reopens in two years’ time, visitors will be able to experience the sounds and smells of the great age of steam and explore the personal stories of the people who lived through it. We will show how Manchester provided the power that changed not only the city but also the world around us today.

Forty years ago, the museum was a catalyst for the regeneration of Castlefield, the world’s first urban heritage park. Now, alongside our partners at Manchester International Festival and The Factory, a new events space in the heart of the city, we are helping to create an exciting city destination with culture at its heart. Revolution, after all, is in our DNA.

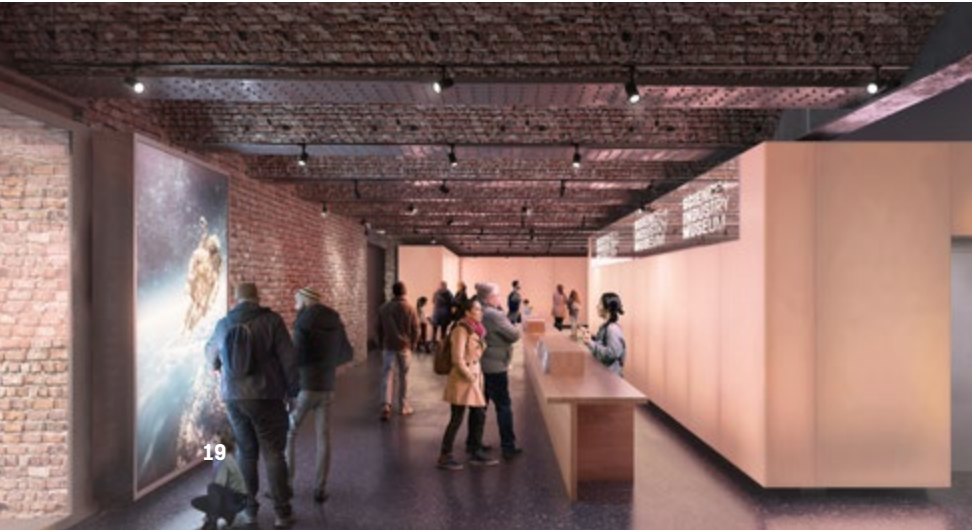
Above The Power Hall, which celebrates the golden age of steam, is undergoing a £7.5 million renovation

Below Impression of the new £5 million Special Exhibition Gallery, designed by Carmody Groarke

‘Everyone who visits will understand how what happened here changed the world. We can’t wait to see where this journey takes us’

Sally MacDonald, director, Science and Industry Museum

Funders Power Hall: Department for Digital, Culture, Media and Sport, Atmos International, Zochonis Charitable Trust, Sally MacDonald, Special Exhibition Gallery: Department for Digital, Culture, Media and Sport, Wellcome, Garfield Weston Foundation, Kirby Laing Foundation, Zochonis Charitable Trust



SUSTAINABILITY

‘The five museums in the SMG are uniquely placed to engage a huge audience around the science of climate change’

Sir Ian Blatchford, Group director

GREENER AND CLEANER

The Group’s first new Sustainability Strategy will ensure all our museums and sites are on a journey towards significantly cutting our carbon emissions

When it comes to the most pressing challenge facing the planet, we have an obligation to both set an example and lead the way as a group of world-class science museums. We aim to engage our five million-plus visitors and 11 million digital audience with the science of climate change, mitigation and adaptation, along with the technologies to manage the global transition to a low carbon future, from energy storage to carbon capture.

The science of climate change is clear. Radical decarbonisation is needed to limit the global temperature rise to no more than 1.5C above pre-industrial levels by the end of the century, a target set out two years ago in a special report from the UN’s Intergovernmental Panel on Climate Change.

To meet this challenge, and embed sustainability across our sites, the Science Museum Group set up an external Sustainability Advisory Board this year, chaired by the Science Museum’s deputy director, Julia Knights. Knights, a soil and climate scientist, is also our Group executive lead for our Sustainability Strategy, and says: ‘The Science Museum Group aims to be a leader in public

engagement around climate change and sustainability within the cultural heritage sector and so it is right that by the end of 2020 we will set an ambitious science-based target by the end of the year.’

A Sustainability Strategy will be launched around the end of 2020 by which time independent consultants will have verified the carbon emissions that we have already calculated and also provided us with clarity on carbon emissions from all we procure. We can then explore where we can make further greenhouse gas emissions savings in line with our new target. While all our electricity is already purchased from renewable sources, there is still much more we want to do, including: decarbonising our heating; reducing our energy consumption and cutting our carbon emissions from travel by introducing high-quality video-conferencing across our sites, which has already been accelerated as a result of the Covid-19 pandemic; and implementing a cycle-to-work scheme.

We also aim to cut our reliance on single-use plastics and disposable cups in our cafés and shops, and install more water fountains to encourage colleagues and visitors to use reusable water bottles.

Above Environmental initiatives at our National Collections Centre site in Wroughton include barn owl boxes
Right Aerial view of the National Collections Centre, which has one of the largest solar farms in the UK



Above left and right Beehives and a bat box support local wildlife
Left Our bees enjoy an orchard in Kent before they arrive at the Science Museum
Below right Beehave, by Marlène Huissoud, is a beehive shaped like a log that will feature in a permanent gallery on agriculture in the Science Museum. It was commissioned by our director, Sir Ian Blatchford

The Group has also committed to planting 1,000 native trees annually at our National Collections Centre at Wroughton alongside the 43,000 trees we have already planted. In 2020, our partner for our tree planting will be the Woodland Trust.

Within the Group, we have introduced carbon literacy training to support our colleagues as they move to a more sustainable future, from explanations of the science behind climate change to ‘action training’ for managers to identify practical ways to cut emissions.

At each of our sites, we will be creating local sustainability action plans by the end of 2020 to build on the work of our local Sustainability Guiding Teams who have focused on specific and practical actions to make our organisation more sustainable. Through the South Kensington Group, for example, we have rolled out waste management training and introduced recycling for gloves.

Finally, the Science Museum is thrilled to be providing hives for our very own honey bees in 2020. Furthermore, across the Group, we will increase areas of wild flowers for bees and other foraging insects.

Sir Ian Blatchford, Group director, says: ‘There is no more pressing issue facing the world, and the five museums in the Science Museum Group are uniquely placed to engage a huge audience around the science of climate change, and the technological challenges and solutions around the crucial energy and food transitions we need to achieve. Our visitors are the engaged citizens and scientists of now and tomorrow.’



TOP SECRET

BRAIN OF BRITAIN

The intriguing world of British intelligence and cyber security was revealed in the Science Museum’s thrilling exhibition *Top Secret*, timed to celebrate the 100th anniversary of GCHQ

Last spring, the Science Museum welcomed Her Majesty The Queen to announce the opening of a blockbuster exhibition exploring 100 years of communications intelligence and security: *Top Secret: From Ciphers to Cyber Security*.

The exhibition ran from July to February and was a great success, receiving enthusiastic press reviews and achieving record-breaking ticket bookings. *Top Secret* will open at the Science and Industry Museum in Manchester in the next year, where it is sure to prove just as popular.

Coinciding with the centenary of the UK’s intelligence, security and cyber agency, GCHQ, *Top Secret* explores the challenges of maintaining digital security in the 21st century and the ground-breaking technologies that have been used by GCHQ throughout its history.

Through more than 100 objects, including items from GCHQ’s collections that have never been seen in public, interactive puzzles and first-person interviews, the free exhibition reveals fascinating stories of communications intelligence and cyber security from the past century.

Top Secret tracks the evolution of technologies used to keep messages

secret. On display are Fullerphone sets used in the trenches during the First World War, a Soviet agent radio set abandoned in a field in Wales in the 1960s, and an encryption key used by HM The Queen to keep her telephone calls secure in the 1990s.

The exhibition also includes three different German Enigma cipher machines, famously decrypted by Alan Turing and other code-breakers at Bletchley Park, alongside cipher machines never exhibited in public before, such as 5-UCO. Previously believed to have been destroyed, this is one of the first electronic and fully unbreakable cipher machines, developed to handle secret messages during the Second World War, including the transmission of Bletchley Park’s decrypted Enigma messages to the British military in the field.

Visitors can also discover the Lorenz cipher machine, a German example that was more complex and secure than Enigma, and which was used to keep the German military command’s communications secure. Mistakes made by a German radio operator while using this machine enabled staff at Bletchley Park to break into the cipher using Colossus, the first semi-programmable digital electronic computer, introduced

Right The exhibition featured more than 100 objects from GCHQ’s collections, including items that had never been seen by the public before

in 1944. This helped to bring the Allies one step closer to winning the war.

Top Secret also tells the story of the spycraft technology used by Peter and Helen Kroger, such as one-time pads, powerful spy radio sets and microdots, where secret documents were shrunk down to the size of a full stop. Until their arrest in 1961, the Krogers were part of the Portland Spy Ring, one of the most successful Soviet espionage operations in Britain during the Cold War.

The Cold War saw the invention of technologies that proved crucial to the UK, including the Pickwick telephone – at the cutting edge of innovation at the time – which was developed to keep transatlantic

206,450

Number of people who booked to see the exhibition at the Science Museum

TOP SECRET

THREAT FROM ABOVE

‘Most cipher machines are destroyed when they come out of use. We have opened up more here at the Science Museum than we have ever opened up to anybody before’

Tony Comer, GCHQ historian

voice communications secure between President John F Kennedy and Prime Minister Harold Macmillan during the Cuban Missile Crisis in 1962.

By the 1980s, secure telephone systems were portable. The show includes Margaret Thatcher’s famous ‘briefcase telephone’ which was used to communicate the course of action to the Ministry of Defence during the Falklands War in 1982.

Contemporary artefacts in the exhibition highlight current security threats, such as those posed by cyber attacks, and the role

of GCHQ’s National Cyber Security Centre (NCSC) in combatting them. Visitors can hear from the individuals carrying out top-secret work to defend the UK from terror attacks and serious crime.

Displays include the remains of the crushed hard drive – alleged to have contained confidential US security information – used by *The Guardian* to store information stolen and leaked by Edward Snowden in 2013, and a computer infected with the WannaCry ransomware that, in 2017, affected thousands of organisations, including the NHS.

Top Secret also contains an interactive puzzle zone, giving visitors of all ages the opportunity to test their own code-breaking ability and discover first-hand the skills required to succeed in the world of GCHQ.

The Science Museum hosted a series of events inspired by the topics in the exhibition. These included the London premiere of *The Great Hack*, a documentary about Cambridge Analytica, a panel discussion about the future of quantum computing, and a special *Lates*, our adult evenings, inspired by *Top Secret*.

Funders Department for Digital, Culture, Media and Sport, Raytheon, Avast, DXC Technology, QinetiQ, The Hintze Family Charitable Foundation, Keith Thrower, Sir Ian Blatchford and Jeremy Rosenblatt, with special thanks to Michael Spencer and NEX Group. Department for Digital, Culture, Media and Sport and Raytheon will continue to support the exhibition when it opens at the Science and Industry Museum in Manchester **Media partner** The Telegraph

LEARNING

LEARNING

LEADER OF THE PACK

The Group's wide-ranging educational initiatives across all its museums are helping to improve scientific literacy and promote careers in science

96%

Over our STEM/industry professionals target

Since we opened our *Children's Gallery* in 1931, we have believed in the power of informal learning to inspire future generations. Today, the five museums in our Group are visited by more than 600,000 children each year in booked educational groups; we also visit schools and communities, and organise festivals, training and events. In 2019, we honed our learning strategy so we can do even more to nurture the diverse talents of young people to solve the challenges that society faces, from Covid-19 to climate change.

SCIENCE MUSEUM GROUP ACADEMY
Since its launch in 2018, the Science Museum Group Academy has provided more than 2,000 teachers, museum educators, scientists and industry professionals with science engagement training. It is the UK's first dedicated centre of excellence for informal science, technology, engineering and mathematics (STEM) education, and aims to help individuals, schools and institutions communicate their subjects to their pupils and audiences more effectively.

In 2019, the Academy announced its Science Capital in Practice programme, in partnership with the Association of Science and Discovery Centres.

'Science capital' is a measure of a person's knowledge of science and their attitude towards it, and the goal of the initiative is to establish a 'community of good practice' to help increase diversity and inclusion in STEM subjects. Fifteen science centres, including Glasgow Science Centre, the Eden Project and

Catalyst Science Discovery Centre, joined the programme. Organisations received a small grant, training, mentoring support and resources to help incorporate this learning more broadly into their STEM engagement activities.

In another promising collaboration, which began in January 2020, MathWorks, the mathematical computing software company, began a partnership with the Academy to establish a maths-focused engagement training course, with learning

resources, which will support and inspire maths communication and enjoyment of the subject among schools and educators.

These developments are just a few ways in which the Academy has already exceeded our expectations, and is showing that informal learning has the power to build a scientifically literate society.

Funders bp and MathWorks

Meanwhile, at the Science and Industry Museum, the May Bank Holiday saw the return of the popular family making-and-tinkering weekend, *MakeFest*. Nearly 100 makers delivered hands-on activities designed to encourage innovation to more than 6,000 visitors, from building a giant geodome and engineering a 15-metre bridge to coding miniature robots and laser-engraving key rings.

Funders MakeFest was supported by the Royal Academy of Engineering

'I was delighted to spend quality time with the Science Museum Group Academy. I enjoyed a great conversation and a truly constructive exchange of ideas with teachers and I think we all learned a lot from one another'

Peter Tabichi, winner of the 2019 Global Teacher Prize

40,000

Instances of audience participation at Hello Universe

1,462

Number of teachers and museum educators the SMG Academy has trained



Left The Group's displays have always placed a very high priority on engaging young minds

Above Young people at the We Make London workshop, part of Science City at the Science Museum

FAMILY-CENTRED ACTIVITIES
The National Science and Media Museum's *Hello Universe* exhibition invited visitors to look up and fuel their curiosity, imagine remote galaxies and wonder who – or what – is out there. A family programme ensured the exhibition was relevant to all ages. The star attraction was a Lego-building activity where visitors could design and build a different space vehicle each day. The best entries went on display in the museum.

LEARNING



Left A child takes part in an activity at the Bradford Science Festival

14,300

Number of people who engaged with Future Engineers

BRADFORD SCIENCE FESTIVAL

In July, the National Science and Media Museum hosted the third Bradford Science Festival. Celebrating both the 50th anniversary of the Moon landing and the 150th year of the periodic table, it was a hugely popular event that saw a 17% boost in visitor numbers. Highlights included the Nova 2 rocket displayed in Centenary Square, two displays of 360-degree journeys to Mars in the Broadway Shopping Centre, It's A Chem-Mystery! workshops, a Slime Bar presented by the University of Bradford, a periodic table family trail and STEM City, the interactive careers element of the festival. Organised by the Transpennine STEM Ambassador Hub, STEM City hosted science demonstrations and offered career advice to young people.

Funders Players of People's Postcode Lottery, The Broadway Shopping Centre, Surfachem, University of Bradford and Royal Society of Chemistry



40,000

Number of visitors the Bradford Science Festival welcomed over four days

TRAINS AND BRAINS IN YORK

Future Engineers, a problem-solving event to inspire budding young scientists, entered its fourth year at the National Railway Museum with an October half-term programme on the topic of forces. This explored concepts such as gravity, air resistance and pressure in the context of the railways. It offered a range of activities, including our signature Engineer Like Me gameshow, the Pressure Zone, where participants discovered how engineers build tracks over different terrain, and the Living Room, where visitors could relax in a familiar space and discover the scientific principles of everyday items.

The National Railway Museum also worked with rail companies and STEM Ambassadors (*see opposite page*) to deliver the Engineering Hub, cultivating relationships with industry contacts, including Network Rail as a new funder of the programme. In addition, the museum began a new schools workshop called Robot Railways. Its aim is to inspire students with the real-life applications of computing in a workshop. Students program their own robot railway using block code, test and improve their coding designs and discover how computers are used on modern railways. Eight hundred students have participated so far.

Funders Future Engineers was funded by Angel Trains, Network Rail, Eversholt UK Rails Group, and Porterbrook

Left A child in light glasses at the Science and Industry Museum's MakeFest event

LEARNING RESOURCES

The Group's Learning team unveiled an exciting range of resources and programming aligned with the Science Museum's beautiful new *Medicine* galleries. Schools and families visiting the space can use the gallery guide and activity trails to support the experience. Additionally, 17 objects from the collection were 3D-scanned to create digital interactive models. These are featured in an online resource that allows students to explore each object in detail, even if they are not able to visit the galleries in person. Meanwhile, the outreach team is offering a Medical Marvels session to help young people engage with objects from the medical handling collection in their own classroom or community space.

At the end of November, an evening event for teachers was held in the gallery to promote the resources and programming created to support educational visits. Teachers explored the galleries over drinks and medicine-themed nibbles and enjoyed interactive activities.

Funders Wellcome, National Lottery Heritage Fund and GSK

‘It was wonderful to see these stories brought to life in such a vivid way. You made me think afresh about the ones I thought I knew’

Ali Boyle, keeper of collections, Science Museum, after seeing the youth theatre performance inspired by Science City



STEM AMBASSADORS

STEM Ambassadors are volunteers who study or work in STEM and help bring the subjects to life for young people. A northern network of these volunteers, the Transpennine STEM Ambassador Hub, which the Group delivers on behalf of STEM Learning, has been developing two projects with primary schools. The first, in collaboration with All About STEM in Merseyside and Cheshire, launched a STEM and literacy initiative that lends books to schools. The hub is also working with more than 90 primary schools to deliver an engineering project funded by the Royal Academy of Engineering. Fifty ambassador engineers are being recruited for this project, which aims to raise aspirations around engineering in Category 5 and 6 local authority education districts. STEM Ambassadors also engaged young people with engineering opportunities available to them through a series of Everyday Engineers activities at the Science and Industry Museum over October half term. Activities included meeting engineers, skills development and the role of engineering in our everyday lives. It attracted a total of 2,690 participants.

Funders The engineering project is supported by the Royal Academy of Engineering. The Everyday Engineers education programme is supported by The Granada Foundation

Below Children explore the history of the railways through fun group activities

Top right The Robot Railways activity at the National Railway Museum
Below right A UNESCO Lates event at the Science Museum

LEARNING

HIGHLIGHTING RESEARCH

The Platform for Investigation, a programme of monthly events showcasing STEM research, hands-on activities and demonstrations, engaged 22,000 visitors at the Science and Industry Museum and off site at the Festival of Manchester and Big Bang North West, allowing families to discover together today's cutting-edge research and how it affects our lives. Supported by Siemens, the Platform for Investigation partnered with the European Southern Observatory, the Royal Northern College of Music and the Institution of Civil Engineers.

Funder Siemens



‘Terrific evening of art, science, performance, talks and crafts all creatively blended together, all designed to ease the mind and improve well-being’

Darren Henley, chief executive, Arts Council England, on the Lates event at the Science and Industry Museum in Manchester

CREATIVE COLLABORATIONS

The Science Museum worked with young people aged between 15 and 25 from local boroughs to codevelop creative responses to *Science City 1550–1800: The Linbury Gallery (see page 45)*. Creative collaborations between artists, performers, museum staff and young people, which began in September 2018, resulted in several exciting creative achievements: a film, a fanzine, a theatre performance and ceramic artworks – all exploring themes of place, craft and entrepreneurship.

A film screening of the young people's work, *North Kensington: A World in Itself*, took place during the 2019 Exhibition Road Festival. Young people also took part in craft workshops with the artist Janetka Platun, while youth actors from the Lyric Hammersmith summer school researched and developed a performance inspired by the gallery. Focusing on the Royal Society and key scientists of the era, it enjoyed three sold-out shows, and later performed at the museum's September opening of *Science City*.

Funders The Linbury Trust, supported by the National Lottery Heritage Fund, with additional support from the DCMS/Wolfson Museums and Galleries Improvement Fund, with special thanks to the John S Cohen Foundation and Iain and Jane Bratchie

LATES

The Science Museum has had a strong season of *Lates*, our adult evenings, throughout the year. In July, we celebrated the 50th anniversary of the Moon landings with more than 20 events, including a discussion on conspiracy theories and the future of space travel to Mars. In August, we focused on the *Driverless* exhibition, including a collaboration between the Centre for Connected and Autonomous Vehicles, the Royal Academy of Engineering's National Engineering Policy Centre and the Queen Elizabeth Prize for Engineering looking at public perceptions of driverless cars. In March 2019, we worked with UNESCO UK to showcase its projects in the fields of science and technology. More than 3,400 visitors found out how ancient manuscripts were written and how to track floods, map the deep sea floor and chart the Earth.

Manchester's popular *Lates* programme included *Culture Cure*, in which visitors explored the connections between arts and health with a packed schedule of laughter workshops, performances, wearable sculptures and more.



CRISIS RESPONSE

Although our museums were obliged to close during the Covid-19 pandemic, our online collection, learning resources, fun activities and weekly blogs were more popular than ever, keeping the public well informed, engaged and entertained during lockdown

With visitor numbers ahead of target, the Science Museum Group was into the final month of another successful year when activity across our six sites was stopped in its tracks by the novel coronavirus. While shutting the doors of our museums was a necessary part of an international effort to contain the pandemic, our collection remained open and audiences took digital delight in our informal learning resources and the online games we have developed, exploring science from their kitchens and living rooms. March saw the highest ever number of visitors to our collection website.

As we ignited the curiosity of tomorrow's scientists and engineers at home, the pandemic illustrated the critical value of scientific endeavour today: a story brought to life for our audiences through a weekly blog by our science director, Roger Highfield, that reached more than 50,000 people in a month.

Just as our exhibitions and wider public programme have been a central part of public engagement around global threats such as climate change and antibiotic resistance, so we will play a key role in helping future generations to explore the impact and innovations of the coronavirus pandemic. Our curatorial response has been swift but sensitive. Colleagues from across the Group are researching the stories and identifying the objects that will help us to explore the medical and scientific responses to the outbreak and to chronicle its wider impacts on our society and culture. This ranges from innovations in respiratory equipment and research into a Covid-19 vaccine to ephemera such as public health posters.

Culture Secretary Oliver Dowden said: 'With all of us spending more time at home, our museums have been adept at finding new ways to inspire and inform. Although it hasn't been possible to explore them

'March saw the highest ever number of visitors to our collection website'

50,000

Number of readers per month of science director Roger Highfield's weekly blog

in person, the Science Museum Group has found innovative ways of bringing its collections to us. It has also chronicled the UK's response to the coronavirus crisis through thoughtful collection and scholarship.'

As our curators began the collecting project with seriousness and within strict ethical guidelines, our organisation sought out other small ways to support the monumental work of care workers. Personal protective equipment was sent to the London Ambulance Service, York Hospital and Salford Royal Hospital. Glycerol and hydrogen peroxide, usually used in experiments by the Science Museum's Learning team, were dispatched to Imperial Hospitals Trust to make hand sanitiser for key workers and patients. And in Bradford, the National Science and Media Museum's Learning team distributed activity sheets to primary schoolchildren, some of whom do not have access to the internet.



Above The Group is acquiring the 'Stay Home, Protect the NHS, Save Lives' lectern message

'One who stands in comparison to Newton and Darwin. Alan Turing had a profound impact on science, computing and on the history of this country. A powerful symbol of the long overdue recognition he deserves'

Demis Hassabis, founder of DeepMind



Above Mark Carney at the Science and Industry Museum, where he announced the winning nominee

Right Alan Turing, the renowned code-breaker and computer pioneer, was chosen as the new face on the £50 note

All eyes were on Manchester's Science and Industry Museum last July to witness Mark Carney, then governor of the Bank of England, reveal which scientist would be celebrated on the new £50 note.

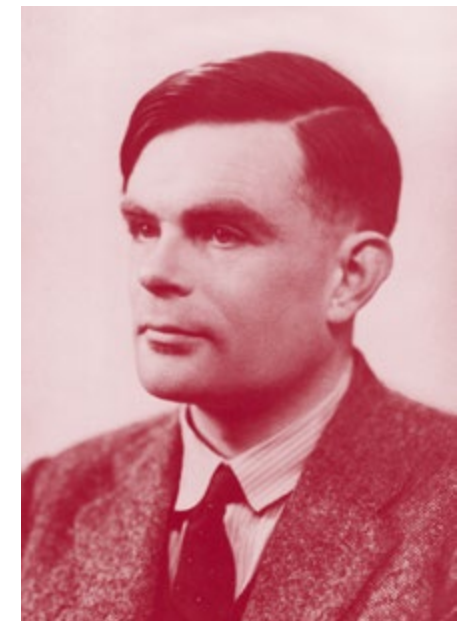
Following a six-week period, in which the public made over a quarter of a million nominations, covering almost 1,000 scientists whose work has shaped how we think about the world, a shortlist of 12 candidates was decided by a committee. Carney then whittled that list down to one extraordinary individual: Alan Turing (1912-54), the mathematical genius and computing pioneer.

The news was reported all over the world within minutes of the announcement. Turing dominated the trending tables on Twitter, and thousands tweeted using the hashtag #Turing50.

The public celebration of his nomination was particularly poignant because Turing's work was overshadowed during his lifetime by a prosecution for homosexuality that saw him professionally sidelined – he was

227,299

Number of nominations the Bank of England received; 989 eligible names were put forward



A NOTABLE GENIUS

stripped of his security clearance and lost his post-war consultancy to GCHQ – and cruelly punished.

Turing was a mathematician, logician, cryptanalyst and philosopher, best known for his work as the code-breaker whose work was crucial in enabling the Allies to defeat the Nazis; it is widely thought that he helped to shorten the Second World War, thereby saving millions of lives.

Turing is also renowned for his efforts to lay the mathematical foundations of the modern computer. Some of his most important work was conducted in Manchester, where the campaign began to clear his conviction, in 1952, for homosexual acts. The verdict ultimately led to his death aged 41.

Turing, along with 11 other shortlisted names for the new banknote, were also celebrated in *Notables*, a special exhibition at our Manchester museum. Sally MacDonald, director of the Science and Industry Museum, said: 'We were thrilled to be the venue for the £50 note character

reveal. It's especially appropriate that the announcement took place in Manchester, as Alan Turing worked here from 1948 as deputy director of Manchester University's Computing Machine Laboratory.

'He did most of his creative thinking during those years – grappling with the question of whether machines can think (the early foundations of AI) and exploring the mysteries of patterns in nature – all ideas that continue to inspire discovery today.'

NOTABLES: THE SHORTLIST

William and Caroline Herschel, astronomers; Charles Babbage and Ada Lovelace, computer pioneers; Mary Anning, fossil hunter; James Clerk Maxwell, unifier of science; Stephen Hawking, cosmologist; Ernest Rutherford, founder of nuclear physics; Paul Dirac, theoretical physicist; Srinivasa Ramanujan, mathematician; Dorothy Hodgkin, first British female Nobel prizewinner; Frederick Sanger, double Nobel prizewinner; Rosalind Franklin, DNA pioneer; Alan Turing, mathematician and cryptanalyst.

THE REEL THING

Widescreen Weekend returned to our Bradford museum to revive the golden era of cinema on the super-big screen and look at the past, present and future of immersive technologies



‘Every year I am always stunned by the immersive theatrical experience of the big screens and formats. One of the biggest joys for me about Widescreen Weekend is the audience’

Samira Ahmed, journalist and broadcaster

Above Audiences enjoyed classic films such as *The Sound of Music*
Right Director Clio Barnard received a ‘Brafta’ from Bradford UNESCO City of Film

The world’s greatest celebration of large-format cinema proved more successful than ever in 2019, breaking attendance records for the second year in a row. *Widescreen Weekend*, at the National Science and Media Museum, drew a total audience of 5,000 people – an impressive rise of 15% on the previous year.

The festival celebrates the past, present and future of film with a showcase of glorious widescreen formats and cinema technologies – our Bradford museum is uniquely well equipped to show these to their best effect.

Audiences can see an unrivalled selection of movies, from the latest releases to classics from Hollywood’s golden era across our three cinema screens: Cubby Broccoli, IMAX (the first in Europe) and Pictureville. The festival also shows super-wide formats developed in the 1950s and

1960s, such as Cinerama, in which three 35mm films are combined to produce one sweeping vista across a curved screen, and CinemaScope. These systems ushered in a thrilling new era in film, and kick-started a battle among the Hollywood studios for supremacy in widescreen cinema.

To give audiences a flavour of the experience, *Widescreen Weekend* showed an advert for a 1959 Renault Dauphine on the Cinerama screen – one of only two short films made using this process. And, for the first time, the festival introduced the Immersive Encounters Dome Cinema, a 360-degree screen that welcomed 650 visitors over four days.

At a time when women’s contributions to cinema are being re-evaluated and celebrated, last year saw the return of *Women in Widescreen*, a celebration of female-driven narratives and the work of

‘Isn’t it great to see movies projected as they were supposed to be? I love... the bigness of it and the boldness of it and the collective cinema experience – it is wonderful’

Christopher Frayling, writer and broadcaster



women in front of and behind the camera. Notable protagonists who featured in the event ranged from Okoye, the Marvel Comics character, and Shuri, the *Black Panther* super-heroine, to Rita Moreno, the first Hispanic actress to win an Oscar (for Best Supporting Actress in *West Side Story*), and the late, great Doris Day.

Finally, to celebrate the future of film-making, a special ‘Brafta’ was presented to Clio Barnard, director of *The Selfish Giant*, on the last day of the festival by Bradford UNESCO City of Film.

Funders Film Hub North (part of BFI Film Audience Network), City of Bradford Metropolitan District Council, BFI Major Programmes



CINEMA COMES HOME

‘I love this museum – it is actually the first place where I ever saw an IMAX film, when I was 10. I love the history of film so it is always great to get an excuse to come back here’

Stephen Slater, archive producer for the documentary *Apollo 11*

Pictureville is the only venue in Europe where Cinerama, IMAX, 70mm, 35mm and digital 4K formats can be seen under one roof

Above 3D is just one of many viewing experiences available at the Pictureville cinema in our Bradford museum

The National Science and Media Museum has relaunched its pioneering cinemas as a fully independent operation. Rebranded as Pictureville, collectively named after the museum’s celebrated 300-seat theatre, its three screens continue to deliver an eclectic programme for fans of the biggest blockbuster and arthouse releases, as well as having a greater focus on museum audiences and local communities.

Film exhibition has a long history at the museum: when the venue opened in 1983 it gave Europe its first permanent IMAX screen. At 60ft high, it was the largest cinema screen in the UK at the time, and it remains one of the biggest in the country. In 1992 the Pictureville screen opened, home to the only public Cinerama screen

outside the USA (see opposite page for details of the *Widescreen Weekend* festival). It was followed by the opening of the 100-seat Cubby Broccoli screen in 1996 and, together, these three screens have not only offered a programme unrivalled by any other venue in the UK, but have also welcomed world-famous actors, directors and other prominent guests to give talks and Q&As about their work in the industry.

As a five-year partnership with Picturehouse Cinemas came to an end in 2019, the museum took the opportunity to take full control of these exceptional theatres and open the city’s only truly independent cinema. It is aligning its programme more closely with the

museum’s activities, continuing its work with partners such as Bradford UNESCO City of Film as a venue for high-profile and community-led events, and wowing audiences with the latest IMAX hits.

Mark Cutmore, head of commercial experiences at the Group, says: ‘Relaunching as Pictureville means cinema is not only fully integrated into the museum’s offer, it is catering for an expanded range of audiences and has huge potential for driving revenue. The unique facilities we offer, a new membership scheme, and our championing of regionally sourced food and drink make this a very exciting venture.’

Funder Film Hub North

52

Number of shipping containers used to create a custom-built structure for the immersive installation

THE SOUND OF SCIENCE

The Science and Industry Museum and the Manchester International Festival joined forces to stage an extraordinary art installation last year that set a benchmark for imaginative art-science programming

Atmospheric Memory, a breathtaking, immersive art environment created by the Mexican-Canadian artist Rafael Lozano-Hemmer, was one of the highlights of the Manchester International Festival, the biennial arts event that ran in July 2019. Inspired by the ideas of Charles Babbage, who suggested that the air might be a ‘library’ of every word ever spoken, and combining daring artwork and sensory performance, Lozano-Hemmer’s spectacular installation scoured the atmosphere for voices, transforming them into things people could see and touch. Twenty of his artworks were shown within a custom-built shipping-container structure at the Science and Industry Museum, in what *The New York Times* called ‘the most ambitious art project’ at the festival.

The installation was a major artistic co-commission between the Science and Industry Museum, Manchester International Festival, FutureEverything, Elektra/Arsenal Contemporary Art, and

Montreal and Carolina Performing Arts (the University of North Carolina at Chapel Hill). It welcomed more than 11,000 visitors over 16 days. The project was funded by the festival, with the Science and Industry Museum’s contribution of £150,000 funded entirely by a Wellcome Trust grant.

The installation was accompanied by the *Atmospheric Memory* education programme, which engaged more than 600 KS2 primary schoolchildren from 10 schools across Greater Manchester. The Young Guides initiative was also hugely successful and encouraged secondary schoolchildren to develop presentation and conversation skills and lead public-engagement sessions. *Atmospheric Memory* also proved popular with the museum’s volunteers, with 369 (74% of our total volunteers) helping the project to run smoothly.

As well as showcasing the Science and Industry Museum’s external spaces in a fresh way, *Atmospheric Memory* allowed

‘Inventive and provocative’

The Sunday Times

us to highlight an iconic object from our collection. Henry Babbage’s Analytical Engine Mill, an early computer, was displayed during a ‘prelude’ exhibition in the 1830 Warehouse. This was a valuable opportunity to present our collection through a different lens while opening up spaces previously closed to the public.

Of the audience who came to see *Atmospheric Memory*, 86% had already visited the Science and Industry Museum – an indication that there is a strong appetite for art-science programming of this type.

As a result of our involvement with *Atmospheric Memory*, we established a strong, productive working relationship with the Manchester International Festival, a collaboration that is particularly important in the run-up to the opening of The Factory, the festival’s permanent world-class cultural space that will open next door to the Science and Industry Museum in the coming years.

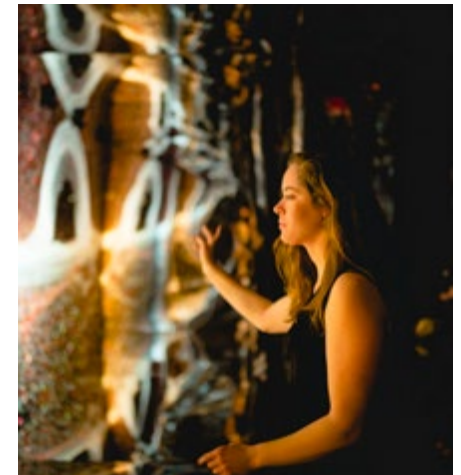
Funders Commissioned by Manchester International Festival, Science and Industry Museum, FutureEverything, ELEKTRA/Arsenal Contemporary Art, Montreal and Carolina Performing Arts – University of North Carolina at Chapel Hill. Supported by Wellcome. Education programme supported by The Granada Foundation

‘Manchester Science Festival is one of the boldest, most creative and thought-provoking festivals in the country’

Richard Leese, leader, Manchester City Council



Left and right Distortions in Spacetime, by Marshmallow Laser Feast
Below Mat Allen, 2018 Josh Award winner, talking with a family at his Touch the Stars event



1m

Number of people the Manchester Science Festival has engaged over the past decade



IDEAS FOR A BETTER WORLD

The Manchester Science Festival returns to focus on climate change, part of the Group’s commitment to engage audiences in one of the most pressing issues of our time

The Manchester Science Festival, which is produced by the Science and Industry Museum, has created a place for innovative, surprising and meaningful experiences over the past 12 years where people of all ages can ignite their curiosity in science. And its next edition will be no different, as the festival centres on one of the most urgent issues of our time: climate change.

The theme of the next Manchester Science Festival was announced as part of the Group’s major public programme focused on climate and solutions to the challenges facing the world. The programme is in support of the government’s Year of

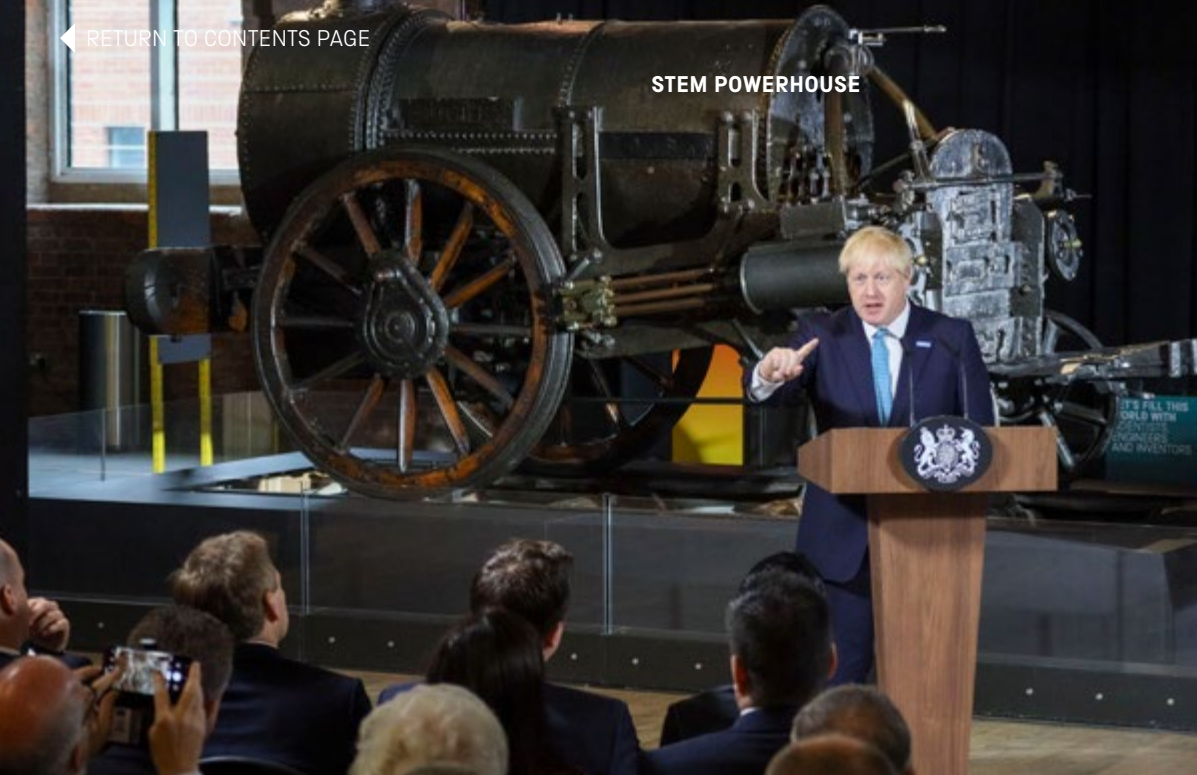
Climate Action, which was launched by Prime Minister Boris Johnson at the Science Museum in London in February. Guests included Sir David Attenborough and the Italian Prime Minister Giuseppe Conte.

The Group is delighted that Manchester Science Festival, the largest science festival in the country, is set to return after a pause in 2019. It is now officially running as a biennial event, with the majority of activity concentrated at the museum’s seven-acre city-centre site to enable audiences to enjoy more experiences in one visit. It will also be themed around one issue or subject. The festival will be a cornerstone of the Group’s programme

this year. From art commissions to immersive and participatory experiences, outdoor one-off events to live debates, the festival will inform, engage and ignite curiosity about climate change, one of the defining issues of the 21st century.

Manchester Science Festival will open ahead of the 26th United Nations Convention on Climate Change (COP26) in Glasgow in 2021, when world leaders and 30,000 delegates will convene to develop an international response to the climate emergency.

As the birthplace of the Industrial Revolution, Manchester was the catalyst for scientific innovation and unprecedented change worldwide. Now, with the city’s ambition to become carbon neutral by 2038, and our commitment to engaging audiences in the role of science in tackling urgent global problems, Manchester is primed to play its part in influencing future progress once more.



STEM POWERHOUSE

Many significant announcements have been made at the Science and Industry Museum. In 2015, Chancellor George Osborne coined the term 'Northern Powerhouse' in a speech he gave here

Left Boris Johnson speaks in front of Stephenson's Rocket

THE CITY LEADING THE WAY

In his first speech as prime minister, Boris Johnson came to our historic Manchester museum to praise the city and its scientific pioneers and outline his vision to drive growth across Britain's regions

In his first week of office, the prime minister chose the Science and Industry Museum to outline his ambitions to rebalance growth, productivity and power across the UK. He was accompanied by Robert Jenrick, Secretary of State for Housing, Communities and Local Government; Grant Shapps, Secretary of State for Transport; and Rishi Sunak, former Treasury secretary, now Chancellor of the Exchequer.

Speaking in the *Revolution Manchester* gallery against the dramatic backdrop of Stephenson's *Rocket*, Boris Johnson paid tribute not just to our museum but to the

vibrancy and importance of Manchester itself: 'We need to help places everywhere shape their cultural structure... time and time again Manchester has shown the world what's possible.'

It was a fitting spot for the prime minister to make his important announcement, because Stephenson's *Rocket* is an iconic symbol of the city, and recently returned here for the first time in over 180 years. Built to run on the Manchester to Liverpool railway, *Rocket's* technology paved the way for the first rail network, shaping the course of history and the world we live in today.

'I just want you to imagine, if we were to reconvene here 30, 40, 50 or more years hence, what treasures this museum might hold then'

Prime Minister Boris Johnson

Johnson also described culture as one of the four ingredients of success for the UK. Manchester is the UK's most visited city after London, and the Science and Industry Museum is proud to play a critical part in its cultural life. We produce the country's largest and most popular science festival, a changing schedule of exhibitions, and are now also devising programmes with Manchester International Festival (*see page 32*), our future neighbours, to bring world class arts and science attractions to the city.

The Science and Industry Museum is also proud to be the home of the TransPennine STEM Ambassador Hub – a network of volunteers studying or working in STEM (science, technology, engineering and mathematics) who work with young people – which operates across Greater Manchester, West and North Yorkshire. In Manchester we have more than 1,500 ambassadors working in our schools and communities to support teachers and act as inspirational role models. Manchester's digital, construction and health sectors are booming, so recruiting young people with STEM skills is vital to the future of the city's economy and growth.



CUTTING CARBON

'I welcome the prime minister's announcement of the UK Year of Climate Action and I hope it will galvanise real change'

Sir David Attenborough, naturalist

first country to industrialise. He added: 'It is up to us to organise the nations of the world to do something about it.'

The Group's museums are firmly committed to their role in this. Earlier that morning, Sir Ian Blatchford, Group director, announced our own ambitious year of related events and activities. Climate will be the theme for the next Manchester Science Festival, led by the Science and Industry Museum. The Science Museum will also present the UK's first significant exhibition on carbon capture and storage. This will explore the latest techniques being developed for removing carbon dioxide from the atmosphere to mitigate climate change.

To mark the occasion, Sir David and Sir Ian planted a native cherry tree in our courtyard garden between the Wellcome Wolfson Building and our main museum. Joining them were local schoolchildren, Darren Moorcroft, chief executive of the Woodland Trust, and Julia Knights, deputy director of the Science Museum. The result will be a beautiful grove of native wild cherry, crabapple, hazel and rowan trees to provide food for birds and nectar for bees.

The ceremony was a symbolic nod to the 100 million trees that need to be planted every year if the UK is to meet commitments to cut emissions to zero by 2050. These trees are in addition to the 43,000 native trees that the Science Museum Group has already planted over the past decade at our National Collections Centre in Wiltshire.

After the tree planting, the prime minister joined Sir David and Sir Ian for a climate workshop with local schoolchildren in the *Exploring Space* gallery.

Above Julia Knights, Group executive sustainability lead and Science Museum deputy director, Sir David Attenborough, naturalist and broadcaster, Darren Moorcroft, chief executive of the Woodland Trust, and Sir Ian Blatchford, Group director, plant a tree in the Science Museum's courtyard garden

CLIMATE ACTION

The Science Museum was delighted to host Prime Minister Boris Johnson in February to celebrate the UK's Year of Climate Action and upcoming presidency of COP26 – the international climate summit to be held at a date to be confirmed next year. Prime Minister Giuseppe Conte of Italy also attended as co-host of this event, alongside more than 150 guests.

Speaking at the launch, Sir David Attenborough stressed that there is no time to waste on this issue. 'The UN's 26th Climate Change Conference in Glasgow is a critically important opportunity for governments to act decisively – we know what has to be done to cut carbon emissions, and we can't afford to put off a

decision again because each delay makes it so much harder to avert more damaging climate change. It is also important that we all do our bit. That is why I welcome the prime minister's announcement of the UK Year of Climate Action and I hope it will galvanise real change.

'I also look forward to seeing how the Manchester Science Festival and the Science Museum's exhibition about carbon capture spark discussion about how to protect our fragile planet.'

Sir David highlighted the UK's goal to achieve net-zero emissions, which was legislated last June, and said the UK must 'lead the way' globally given that it was the

CONTEMPORARY COLLECTING

A star piece in Jon Savage's archive is the original cassette tape from Arrow Sounds Studio, which contains the recording of Joy Division's first unreleased album



Clockwise from top Jon Savage and Jan Hicks, archives manager at our Manchester museum; Hacienda club membership card; original posters promoting the Hacienda; an early copy of Joy Division's Unknown Pleasures



'For me, it's always been essential that the materials I've collected go to institutions rather than individuals. That way they can be enjoyed by everyone, particularly young people, who can use them to understand the unique personality of Manchester for themselves'

Jon Savage

RECORD BREAKER

Manchester was the world's first industrial city, and its pre-eminence as a place of invention, design and manufacture is firmly rooted in its 19th-century growth. However, in the following century, with the decline of industry, the city took on a new character. Its altered economic landscape prompted a culture of regeneration and reclamation, from which contemporary technologies, digital innovation and a thriving arts scene emerged, as former industrial sites were repurposed for new creative activities.

To reflect this important part of the city's history, the Science and Industry Museum is developing its creative industries collections, focusing in particular on Manchester's independent music scene, spearheaded by the revolutionary label Factory Records.

Factory Records will be celebrated with an exhibition opening in the coming year

at the museum. *Use Hearing Protection: The Early Years of Factory Records* will explore the label's origins and influence on Manchester's emerging industries. It will also reveal the surprising ways in which science, technology, engineering and mathematics are interwoven into our lives and culture.

The exhibition will give visitors exclusive access to previously unseen items from the Factory archives. Through a series of engaging and interactive displays, it will amplify the stories of Manchester's culture that gave rise to a new wave of creative industries in the North West.

Through the exhibition, we are realising our ambition to think big – and establishing ourselves as the home for the Factory Records Archives and the creative industries more generally. We will strengthen our existing collections to inspire future talent and ignite curiosity

about science and technology's place in popular culture. The collections will also ensure the museum is a leading resource for academics researching these subjects.

To help us achieve these goals, we recently acquired Jon Savage's archive of Joy Division material. Collected during his career as a music journalist and cultural commentator, the archive tracks the band's progression from pioneering punk outfit to international icon, and its impact on Manchester's global music profile.

We are working to acquire other significant archives that document Factory's story and wider technological advancements, such as the change from analogue recording to digital, the advance of digital instruments, and the changing process of design.

Funder Players of People's Postcode Lottery

SOUND AND VISION

'For our collection to be celebrated in the rich context of Sound and Vision, and in a UNESCO City of Film, is especially meaningful'

Tony Hall, director-general, BBC

TUNING IN TO OUR FUTURE

Two new permanent galleries at the National Science and Media Museum will examine how sound and image technologies have revolutionised our lives

The dawn of technologies such as photography, film and sound recording in the 19th century changed the world. Now, an exciting project is under way at the National Science and Media Museum in Bradford that will tell the story of how sound and image technologies have transformed our lives and the way we experience the world.

Sound and Vision, which will occupy two new galleries at the museum, is underpinned by three foundational 'pillars': collections, participation and STEM (science, technology, engineering and mathematics). The project will explore the history of these technologies through our collections; show our audiences how they were made and used; and collaborate with advisers and local communities – young people, deaf people, and those living in areas of complex deprivation – to ensure the galleries are relevant, communicate well, and have a lasting impact.

Because the museum's collections are all about the changing ways in which we hear and see the world, *Sound and Vision* has the opportunity to engage and inspire one of the UK's youngest, most diverse and fastest-growing cities. Our world-class collection of photography, radio, film, TV, sound and digital technologies ranges from the earliest photography and the camera that captured the world's first moving images to the explosion in internet streaming.

In reaching out to new communities, *Sound and Vision* hopes to increase museum visits and participation, and share our stories in novel and inclusive ways. It will encourage different generations to explore aspects of our national history, from how the city of Bradford was photographed using tintype and other early photographic methods, to the rise of grime and drill music.

Sound and Vision has been in development since we opened our ground-breaking *Wonderlab* gallery in 2017. We plan to open the new galleries in 2023.

1880

Year in which Shelford Bidwell's Telephotographic Transmitter, which could send and receive images, was developed – 110 years before the invention of the internet



SUMMER OF SPACE

1.3 million

Number of people who saw astronaut Tim Peake's Spacecraft during its 20-month tour of the UK

'Budding astronauts will be fascinated by the Science Museum's Summer of Space festival, which coincides with the 50th anniversary of the Apollo 11 Moon landing'

The Evening Standard

Above Children try on space suits in the Science Museum
Below The Soyuz and its parachute on display in the museum

Far right Tim Peake chats to young people after welcoming Soyuz back to the Science Museum after its successful UK tour

The summer of 2019 marked a giant leap in the space calendar. Not only did it mark 50 years since humans first stepped on the Moon, but also the return of astronaut Tim Peake's Soyuz capsule to the Science Museum after its stellar nationwide tour.

In celebration of this anniversary and the achievements of space exploration in the past half century, the Science Museum opened the *Summer of Space*, a hugely popular festival that celebrated space technologies from the Science Museum Group Collection.

The festival began with the official presentation of the Soyuz capsule in the museum's *Exploring Space* gallery after a 20-month nationwide tour. Peake unveiled the capsule and shared the news that 1.3 million people had seen the spaceship during the *Tim Peake's Spacecraft* tour presented by Samsung and the Science Museum Group.

The Soyuz was joined on display by the original Apollo 10 command module simulator console, a key object in NASA's contribution to the space race, and one which had never been seen in the UK before. It is on long-term loan from the Smithsonian.

The control panel was shown alongside the Apollo 10 command module *Charlie Brown*, which still holds the record for the fastest crewed vehicle in history, having reached 39,897km/h during its return to Earth on 26 May 1969. The Apollo 10 mission took astronauts Gene Cernan, Tom Stafford and John Young on two successful orbits of the Moon in a dress rehearsal for the historic Apollo 11 Moon landing which followed two months later in July 1969.

The festival also featured the museum's biggest ever *Astronights*, with 500 children and parents sleeping over in the museum 50 years to the day since the launch of the Apollo 11 mission to the Moon. Our IMAX Theatre screened the inspiring documentary *Apollo 11* and visitors heard from Brian May, the rock musician, and Martin Rees, astronomer royal, in a talk about space travel.

The museum also hosted: a preview of BBC Two's docu-drama *8 Days: To the Moon and Back*; a screening of the Smithsonian Channel's *Apollo's Moon Shot*, with a live score by Teeth of the Sea, introduced by former NASA astronaut Wally Funk; a space-themed *Lates* (adult evening events); and an outdoor *Space Zone* of workshops and activities as part of the Great Exhibition Road Festival.

'It's wonderful how the Science Museum Group and Samsung have come together through this tour to extend the Principia Mission's impact in inspiring the next generation of scientists and engineers'

Tim Peake, ESA astronaut

In June 2016, after six months orbiting the Earth on the International Space Station conducting experiments, walking in space and even running a marathon, Tim Peake returned to Earth in the Soyuz TMA-19M descent module. The module is the first flown human-rated spacecraft in the Science Museum Group Collection. It went on display in London after touring venues in Bradford, Shildon, York, Manchester, Edinburgh, Peterborough, Cardiff and Belfast.

The Sokol KV-2 emergency space suit worn by Peake also joined the national

SUMMER OF SPACE

'You'll probably never get to sleep on the Moon – only 12 people have – but you can have fun pretending at this family sleepover event at the Science Museum'

The Londonist

OUT OF THIS WORLD

The Science Museum celebrated all things extra-terrestrial last year, as it welcomed Tim Peake's Soyuz capsule back to the museum after its tour of the UK and opened a festival celebrating half a century of space exploration



collection and is now on long-term display at the National Space Centre, Leicester. *Space Descent VR with Tim Peake*, the stunning virtual-reality journey narrated by Peake, accompanied the tour, enabling nearly 50,000 people to experience the high-speed descent to Earth from the International Space Station. The VR experience was produced especially for the Science Museum Group and was powered by Samsung Gear VR technology.

A three-strand education outreach programme, developed by the Science Museum Group and Samsung, reached

more than 20,000 students through a combination of school sessions with the Science Museum Group's Explainer team, special visits to see the Soyuz, and a double-decker bus which was designed to replicate the interior of the International Space Station, with headsets showing *Space Descent VR*. In addition to the education outreach programme, the bus visited communities across the UK and welcomed more than 21,000 onboard.

Funders Samsung UK, European Space Agency, Russia-UK Year of Science and Education 2017, Players of People's Postcode Lottery

CHEMFEST 2019



‘I have always been fascinated by the periodic table – it first got me excited about chemistry – so I was delighted to be part of this initiative presenting chemistry to a wider audience’

Carol Robinson, president of the Royal Society of Chemistry

Left Children enjoy a chemistry activity **Below** Dame Mary Archer, Group chair, at the launch of ChemFest. A child is looking at a chemical element symbol on Dame Mary’s blouse, which depicts the periodic table



IN OUR ELEMENTS

ChemFest 2019, which celebrated the International Year of the Periodic Table, attracted thousands of visitors to a packed diary of events, talks and activities that brought the wonders of chemistry to life

Tens of thousands of people took part in ChemFest 2019 to celebrate the International Year of the Periodic Table – the grid of the chemical elements that is arranged by atomic number, electron configuration and recurring chemical properties.

During the year-long collaboration between leading scientific and cultural organisations in London – the brainchild of our chair, Dame Mary Archer – the Science Museum featured workshops, specially commissioned music and family shows that reached an audience of 12,565 adults and children.

From April to mid-July, professional chemists joined our Explainers at the Chemistry Bar in the museum’s spectacular *Wonderlab* interactive gallery to tell stories about chemistry to more than 100,000 visitors, mostly children.

ChemFest events continued over the summer with tours of the Royal Institution archives, a periodic table exhibition at the Royal Society of Chemistry, a tour of Natural History Museum laboratories, and a Royal Institution event exploring the life of William Crookes, who discovered the element thallium.

In September, the UK’s leading body advancing the central role of chemistry in life, the Royal Society of Chemistry, threw open the doors of its home at Burlington House, Piccadilly, as part of Open House London, and invited Science Museum curators to bring the subject to life for visitors. In all, about 2,000 people came along.

Rupert Cole, associate curator of chemistry, wrote the Science Museum’s chemistry-themed blogs for our millions of readers online and collected items from the worldwide ‘periodic table ballyhoo’, in

which people are invited to send in items of interest relating to the periodic table. This has so far resulted in various additions to the permanent collection, from bilingual Chinese-English chemical element samples to a periodic table blanket.

Additionally, Tom Lehrer, the famous mathematician-songwriter, donated some archival material relating to his song *The Elements*, including early, alternative versions and fan translations into other languages. Last year also marked the 60th anniversary of his machine-honed, rapid-fire enunciation of 102 elements – without doubt the smartest attempt to persuade a general audience to bask in the elemental joys of chemistry.

Partners Science Museum, V&A, Imperial College London, The Royal College of Art, The Royal Commission for the Exhibition of 1851, The Royal Society of Chemistry

POWER UP



20,000

Number of hours of games played last summer at Power UP in Manchester

‘A unique curation of gaming history currently delighting young and old’

Northern Soul

Power UP returned to the Science and Industry Museum in July 2019 for its most successful edition in Manchester to date. The retro-gaming extravaganza was extended from two to six weeks, giving more people the chance to experience the popular event. More than 10,400 people visited during the summer holiday period, which included three sold-out adult-only *Lates* sessions. Last year’s *Power UP* also generated greater profits than ever before.

The event moved to a new location inside the museum’s historic 1830 Warehouse. This beautiful building, with its exposed brickwork and wooden beams, provided a striking contrast to the interactive experience taking place inside it, and underlined the history of gaming, with the *Power UP* timeline displayed in the heart of the space.

Visitors particularly enjoy *Power UP* because they can play all the games they used to love and introduce these classics to the younger generation. The range of older games and consoles, such as *Pong* on the Binatone or *Pac-Man* on the Atari 2600, delighted families and adults alike, who played them alongside contemporary favourites, such as *Minecraft* and *Wii Sports*, as well as cutting-edge immersive games.

THE GAMES WE USED TO PLAY

Power UP, our celebration of the history of gaming, returned to Manchester last year, attracting more than 10,000 visitors of all ages

Retro hand-held consoles also featured in *Power UP* for the first time last year. These additions, which included the Game Boy, Atari Lynx and Sega Game Gear, gave regular *Power UP* visitors the chance to try a new kind of gaming experience.

As ever, there was a dedicated and enthusiastic team behind the event, who worked hard to make it a resounding success. Two members of the Visitor

Experience team were given the opportunity to develop their skills and experience by supervising the day-to-day running of *Power UP*. They were supported by 44 volunteers, who gave more than 500 hours of their time to help visitors play the most popular games from the past 40 years.

Above A father and son play Mario Kart 64 on the Nintendo 64, which dates from the late 1990s

ONE BILLION JOURNEYS

‘I describe myself as a professional thief; what I steal is not passengers’ possessions but their images’

Wang Fuchun

An exhibition of travel images by the acclaimed photographer Wang Fuchun at the National Railway Museum highlighted the startling pace of change in China over the past 40 years

Beautiful photographs that vividly document the rapid pace of social and technological change in China were displayed in a special exhibition that launched at the National Railway Museum in 2019. *One Billion Journeys: Wang Fuchun’s Chinese on the Train* is a collection of work by the prolific Chinese railway photographer Wang Fuchun.

The show comprises 43 of Wang’s most famous black-and-white photographs taken over a 40-year period. Together, they offer a fascinating insight into the lives of ordinary Chinese.

Earlier images in the exhibition show crowded steam or diesel-hauled passenger trains, used by rural workers to commute to work in China’s emerging big cities. Later photographs demonstrate the proliferation of smartphones and high-speed trains as China ‘opened up’ to the outside world. The exhibition title reflects the number



4,000

Number of railway journeys Wang Fuchun has taken in China, during which he has taken an estimated 200,000 photographs

Left Passengers travelling by steam hauled train between Tongliao and Jining, 1998, by Wang Fuchun
Below left Wang at the exhibition opening

of rail journeys said to be taken each year in China, which is now home to the world’s longest high-speed rail network. Throughout the exhibition, Wang’s images capture the candid expressions and experiences of his fellow travellers.

One Billion Journeys opened in York with a special preview attended by Wang and his wife Liu Weirong, and representatives from York’s Chinese community and the Chinese embassy in London. Wang entertained the audience with stories of his efforts to capture the perfect shot and revealed the secret to his success: ‘I describe myself as a professional thief; what I steal is not passengers’ possessions but their images.’

A freelance photographer living in Beijing, Wang has a lifelong passion for the railways. He began taking photographs as a railway employee and now has an international reputation, exhibiting in the United States, Russia and Europe.

The exhibition was popular with visitors eager to see these beautiful and poignant snapshots of life on China’s railways. *One Billion Journeys* was later on display at Locomotion in Shildon from October 2019 until March 2020.

Funder One Billion Journeys was made possible with the support of Michael and Jane Wilson



MINIATURE PIONEERS

A fascinating exhibition at the National Railway Museum pays tribute to the early model locomotives that heralded the rail revolution

In the early days of the railways, engineers and apprentices would make small but mechanically accurate models to test their locomotive designs. *Brass, Steel and Fire*, which opened at the National Railway Museum in York in September 2019, tells the story of the first 100 years of these fascinating and beautiful railway models.

Before manufactured kits, model-makers often had to make every piece by hand, and our exhibition collection contains 21 of these extraordinary, painstakingly detailed miniature steam engines. The star of the exhibition, however, is the original, full-size *Rocket*, which will be based at the National Railway Museum for the next 10 years.

Rocket is placed as the grand finale at the end of the exhibition to demonstrate how those early years of model-making, experimentation and design came together in 1829 with the creation of Robert and George Stephenson’s revolutionary locomotive.

Alongside *Rocket*, highlights of *Brass, Steel and Fire* include the world’s oldest working model steam engine, made in 1836 by Thomas Greener, aged just 16. The model is based on a full-size stationary winding engine that would have been used on the Stockton and Darlington Railway. The exhibition also features an example of toy engines, nicknamed ‘dribblers’ because they left trails of hot water and flammable spirits in their wake.

Appealing to a range of age groups and audiences, the exhibition is designed to feel like a modelling workshop and features tools, magnifying glasses and work benches.

Brass, Steel and Fire received an enthusiastic reception from the press and public and, according to our research, nine out of 10 people said they would recommend it. David Jason, the actor, even dropped by as part of a TV documentary on great British inventions.

As a further honour, *Brass, Steel and Fire* received the Best Interpretation prize at the prestigious Heritage Railway Association Awards.

Top Lead conservator Wendy Somerville-Woodiwis with Stephenson’s *Rocket* and a model locomotive
Left Middleton Railway wheel, 1877



‘The ingenious exhibition features some of the country’s oldest model locomotives which have been brought together for the first time’

Robin Jones, editor, Heritage Railway Magazine

2,000

Number of specialist tools that make up the hanging sculpture at the entrance to the exhibition

Funders Hornbeam Park Developments, Players of the People’s Postcode Lottery



ART AND SCIENCE

‘A radio series that, for once, deserves the term “landmark”’

The Spectator

THE ART OF INNOVATION

An acclaimed Science Museum exhibition and accompanying BBC Radio 4 show explored how artists have responded to scientific ideas over the past 250 years

In a first for the Science Museum Group, this year we embarked on an exciting partnership with BBC Radio 4, inviting audiences to explore the fascinating relationship between art and science over the past 250 years through a major free exhibition, a landmark 20-part radio series and an accompanying book.

The Art of Innovation: From Enlightenment to Dark Matter opened in September, examining how artists have been inspired by scientific ideas and why art is crucial to understanding our scientific legacy. Sir Ian Blatchford, Group director, and Tilly Blyth, principal curator at the Science Museum, were the driving force behind the project, expertly presenting the acclaimed Radio 4 series and authoring the accompanying book, published by Bantam Press.

Our ambitious exhibition – co-curated by Katy Barrett, the Science Museum’s curator of art, and Rachel Boon, its curator of technology and engineering – showcased the Group’s unrivalled collection, displaying objects of scientific discovery alongside great works of art by many legendary names in the



Top A visitor admires David Hockney’s *Sun on the Pool*, Los Angeles 1982
Above right JMW Turner’s *Rain, Steam and Speed* was paired with a model of the steam locomotive the artist painted
Left The accompanying book by Sir Ian Blatchford and Tilly Blyth



‘There’s a lot of fun, as well as science, in this show... that sense of excitement defines the exhibition’

The New York Review of Books

visual arts, including John Constable, Barbara Hepworth, David Hockney and contemporary artists Cornelia Parker and Conrad Shawcross. Providing a fresh perspective on technological and scientific change through the lens of culture, the exhibition placed objects of scientific discovery next to the artworks they inspired or provoked.

A treasured painting that encapsulates the scientific Enlightenment, *A Philosopher Giving that Lecture on the Orrery*, by Joseph Wright of Derby, was seen next to

an 18th-century orrery which Wright may himself have seen.

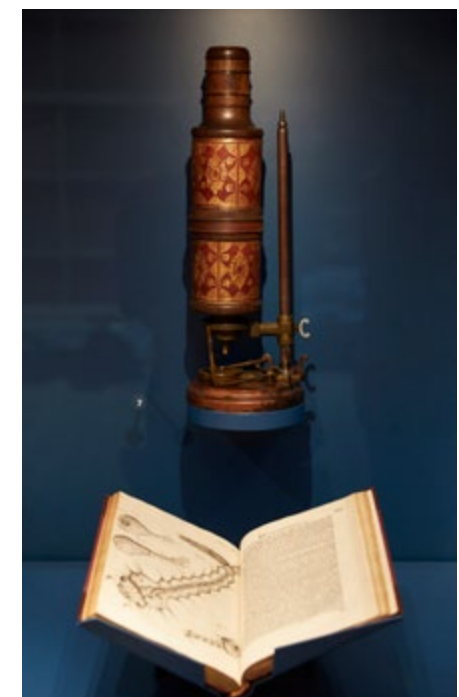
Rain, Steam and Speed – the Great Western Railway by J M W Turner was paired with a beautiful model of the steam locomotive Turner featured in the painting. In a show of support from across the culture sector, significant artworks were loaned by Tate, the V&A, the National Gallery, Derby Museums and many others for this thought-provoking exhibition.

Partner BBC Radio 4

SCIENCE CITY

‘A treasure trove of scientific paraphernalia’

Metro



Far left and above The Science City gallery draws on several renowned scientific collections, including the King George III Collection and the Royal Society collection
Left The microscope designed by the 17th-century scientist Robert Hooke and a copy of his *Micrographia*

TIME TRAVEL

A new permanent gallery at the Science Museum takes visitors on an immersive journey through the capital as it grew into a world leader in scientific inquiry

The transformation of London into a world city over the course of 250 years is the subject of the Science Museum’s new gallery *Science City 1550-1800: The Linbury Gallery*, which opened in September 2019. The permanent space focuses on how London began to lead the world in science, innovation and discovery.

The design of the space echoes the theme of a city changing over time. Artist Gitta Gschwendtner has created an intriguing cityscape that immerses visitors in historic London as they meet the innovative artisans and thinkers of the time.

Science City draws on three iconic scientific collections: the Science Museum Group Collection; the King

George III Collection owned by King’s College London; and the collection of the Royal Society. Together they represent the evolution of London as a centre for scientific endeavour, when artisans and scientists worked together to reveal the hidden workings of their world.

Highlights from the gallery include the seminal text *Principia Mathematica* by Isaac Newton, which lays out the laws of universal motion; a microscope designed by Robert Hooke, the Royal Society’s curator of experiments in the 17th century; a copy of Hooke’s ground-breaking *Micrographia*, the first scientific bestseller; and a range of spectacular scientific instruments commissioned by King George III upon his coronation in 1761.

This free gallery spans 650sq-metres and was built as part of the Science Museum’s Masterplan Phase One.

Supported by a National Lottery Heritage Grant and made possible by funding raised by National Lottery players, we ran a project that allowed us to collaborate with young people aged 15 to 25 to create films, artwork and performances in response to themes in *Science City*. Partners included Epic-CIC in Kensington and Chelsea, the Lyric theatre in Hammersmith, and the Caxton Youth Organisation in Westminster.

Funders The Linbury Trust, National Lottery Heritage Fund, DCMS/Wolfson Museums and Galleries Improvement Fund, The John S Cohen Foundation, Iain and Jane Bratchie

MIRACLE MAKER

Wonderlab, the interactive gallery concept at our London and Bradford museums that encourages children to discover the joy of science, continues to draw in bigger audiences as it adds more fun-filled activities



Clockwise from above
A parent and child investigate how gases move and flow in the Matter zone; children learn about our nearest star in the Space zone; visitors investigate the properties of light and colour in the Colour room

‘One of the best things you can do in London with the kids’

You Need to Visit (family travel blog)

380,000

Number of people Wonderlab at the Science Museum welcomed over the past year, of which more than 100,000 were educational visitors



The pioneering *Wonderlab: The Equinor Gallery* at the Science Museum has cemented its position as one of the UK’s leading interactive science galleries since it opened in 2016. Year on year, visitor numbers are increasing with a third of this number free education visitors.

Where else can you watch clouds form and lightning strike in front of your eyes, feel friction in action on three giant slides,

watch live experiments at the Chemistry Bar, or learn about the solar system through a giant interactive orrery?

Key to the continued success of *Wonderlab* in 2019 were two new additions to the gallery, enhancing the exciting range of exhibits and immersive experiences across its seven zones. *The Wonder Show* opened in October, showing live, imaginative demonstrations using everyday ingredients



from the kitchen cupboard, as well as don’t-try-this-at-home experiments – from making fire ‘dance’ to the tune of *Tetris* using a Rubens tube, to daring to sit on a chair of nails in a test of how surface area can impact forces. The museum also unveiled a new exhibit, Shadow Trap, that allows visitors to ‘freeze’ their shadow on a canvas using energy and light absorption.

Spreading the wonder of science across the country, the National Science and Media Museum’s *Wonderlab* also launched a new live, interactive gameshow for February half term, *Science Showdown*. This pitted different historic computing geniuses against each other – such as Ada Lovelace, Alan Turing, Dorothy Vaughan, Mary Jackson and Katherine Johnson – and visitors were then able to vote on their favourite at the end.

The museum also ignited curiosity in Bradford’s youngest scientific minds when it hosted its first Baby Rave in November, in collaboration with Better Start Bradford. *Wonderlab* welcomed hundreds of little ones bouncing around the gallery across several sessions organised as part of Baby Week Bradford.

Plans for *Wonderlab* at the National Railway Museum in York continue apace as part of Vision 2025 (see *page 16*); the gallery is due to open in 2022 with a focus on the principle of motion. Manchester’s Science and Industry Museum is also planning its own *Wonderlab* in the near future to inspire countless more children to see the world around them in new and exciting ways.

Funders Equinor, Urenco, Stavros Niarchos Foundation, Royal Commission for the Exhibition of 1851

‘We are delighted to help bring the Science Museum Group’s The Sun exhibition to Manchester, giving thousands more young people the chance to learn more about humankind’s long fascination with this unparalleled source of energy’

Bechtel

RISING AND SHINING

More than 23,000 visitors to the Science and Industry Museum have been walking on sunshine since last July when *The Sun: Living With Our Star* exhibition and event programme landed in Manchester after its successful premiere at London’s Science Museum.

The exhibition takes a close look at mankind’s relationship with our closest star, examining its profound influence on human life and culture, from the earliest ancient myths to our health, our sense of time, and solar technologies.

As a highlight in Manchester’s cultural calendar this year, the exhibition gave residents and visitors the chance to see beautiful objects, including an ancient Babylonian tablet, a prototype fusion reactor and even former US president Jimmy Carter’s solar panels from the White House. They have watched the Sun rise around the world, relaxed on an indoor beach, and tried on special sunglasses with digital interactive lenses.

A packed programme of family events included more than 5,000 children and grown-ups at a Sun Playground weekend

making spectacular diffraction sunglasses, building virtual reality solar systems and learning about exotic animals who use the Sun in many different ways. An energy themed learning programme was also delivered at the Science and Industry Museum during October half term. The programme included an immersive science show, drop-in tinkering activity and an early years offer with families learning about past, current and future uses of energy and discovering how these energies may impact their lives.

Sold-out *Lates*, our adult evenings, meanwhile, saw a live performance of poetry and music derived from solar data by Katrina Porteous, the acclaimed poet, with recorded sound from Peter Zinovieff, the pioneer of electronic music. There

were also talks from leading scientists on our solar bodies and solar geo-engineering technology. Naturally, there was plenty of time to relax with sundowners and Salute the Sun yoga workshops.

Presenter Rick Edwards and science writer Michael Brooks discussed the issues raised by *Sunshine*, the sci-fi film directed by Danny Boyle, for a special Science(ish) Live event. They covered the really big questions, including: when will the Sun die, can we journey to the Sun and will sunshine be created on Earth?

Funders Bechtel, supported by Players of People’s Postcode Lottery. Education programme supported by The Granada Foundation
Media partner The Telegraph

1,000

Number of visitors who took part in workshops and crafts hosted by Little Sun, the socially responsible energy business

DRIVERLESS

WHO'S DRIVING?

The development of driverless technology and how it will transform our lives is the subject of an important exhibition at the Science Museum



2,800

Number of people who attended a special Lates that explored Driverless technology

Autonomous vehicles have been heralded as a technology that could radically change the way we live and work. To explore how close we are to a world driven by artificial intelligence (AI), the Science Museum opened a major exhibition in June 2019: *Driverless: Who is in Control?* From self-driving cars to autonomous flying drones and smart underwater vehicles, the exhibition explores how much of this seemingly futuristic technology already exists, how much control we are willing to transfer to it and how its wider deployment could shape our habits, behaviour and society.

There are three distinctive zones in the exhibition: *Land*, *Air* and *Water*. Each section explores the different technologies already operating in these environments, the motivations of their developers, and their potential to transform a range of activities and industries.

In *Land*, visitors can see examples of real self-driving vehicles. The Group's collection includes a classic 1960 Citroën DS19 car that was modified in the UK in the early 1960s to 'self-drive' in early experiments in driverless technology. This beautiful car, which has long been a design classic, was able to follow a magnetic field from embedded cables in the M4. More modern examples include the Robocar, a self-driving electric racing car, and the Westfield POD, a fully electric autonomous vehicle for first and last-mile journeys (those to and from public transport).

In *Air*, visitors can also explore the stories behind flying drones developed to deliver vital goods and services rapidly, from defibrillators for emergency medical response teams to hot dinners

for the hungry. This section also features autonomous drones designed by the Mine Kafon project to clear minefields.

And in *Water*, the final section, visitors can see a scale model of one of the best-known marine vessels in the world – *Boaty McBoatface*, the name given to an autonomous submarine that is part of the Natural Environment Research Council's Autosub Long Range fleet. It is being used deep beneath the Antarctic ice to study the effects of climate change.

Driverless technology may not appear to be commonplace in our everyday lives, but it is already changing the way we live, learn and respond to the challenges of the 21st century. As Roger Highfield, Group science director, says: 'Autonomous technology may seem like the stuff of sci-fi but it has been around longer than many realise. In *Driverless* we ask timely questions about how much control we're willing to cede to AI machines and how driverless technology could transform our world.'

'A thought-provoking exhibition... full of surprises'

New Scientist

Top The 1960 Citroën DS19 that was modified in the UK to drive autonomously **Left** A stained-glass driverless concept car with a bed inside, conceived by the artist Dominic Wilcox



Funders MathWorks, Direct Line Group and PwC. **Technology partner** Samsung Electronics UK

MUSEUM MASTERPLAN

As part of an ongoing programme to revitalise our spaces, the Science Museum's IMAX Theatre is preparing a major upgrade to offer the latest in immersive cinema technology. Over the past year, the Science Museum has continued to transform the experience it offers to visitors, including our many film fans. Our much-loved IMAX Theatre, which opened in 2000, is undergoing a complete refurbishment.

Renamed IMAX: The Ronson Theatre, our updated cinema is set to be Europe's leading destination for film buffs, bringing together the original champion of giant-screen analogue format with next-generation IMAX® with Laser technology, which offers the latest in immersive cinema.

For 20 years the IMAX Theatre has been drawing in large audiences to see some of the biggest blockbusters in original 70mm

film – the highest-quality projection format – from J J Abram's *Star Wars: The Force Awakens* to Christopher Nolan's *Interstellar* and an unrestored print of Stanley Kubrick's *2001: A Space Odyssey*. As one of only two screens in Europe to feature the very best of digital and analogue technology side by side, the refurbished theatre will allow us to host newly released blockbusters, 3D educational films and cinema classics, as well as an exciting diary of live events.

With an aspect ratio of 1.43:1, our original IMAX projector offers viewers up to 40% more film image on screen than in standard cinemas. The new IMAX® with Laser, meanwhile, will deliver brighter images with greater contrast as well as the widest range of colours available to film-makers. The refurbishment will also see the introduction of IMAX's incredible 12-channel sound system, producing a thrillingly immersive

3D sound experience. The design by Ellis Williams Architects features modern, comfortable cinema seating and a bar.

Alongside screenings of films and documentaries, IMAX: The Ronson Theatre will continue to welcome the greatest minds in science and culture. The IMAX Theatre has previously hosted a lecture by Stephen Hawking, Q&As with musicians such as Jarvis Cocker, Brian May and will.i.am, a live recording of the *Guilty Feminist* podcast and comedy, dance and theatre performances.

Mark Cutmore, Group head of commercial experiences, says: 'Cinema audiences expect a high-quality, comfortable experience and they'll get that and more at IMAX: The Ronson Theatre. We're thrilled to provide our visitors with such a unique offer for film fans.'

MAXIMUM IMPACT

As part of an ongoing programme to revitalise our spaces, the Science Museum is poised to reopen its IMAX Theatre, offering the very latest in immersive cinema technology

The Science Museum's IMAX is home to one of only 20 operational 70mm 3D IMAX projectors left in the world



'The Science Museum has my favourite IMAX theatre anywhere – and I've been in a few over the years'

Paul Franklin, director and Oscar-winning visual effects designer

Funder The Gerald and Gail Ronson Family Foundation

THE LISTENING PROJECT

Our Bradford museum broke new ground with Above the Noise, an exhibition that relied directly on the input of local residents and inspired the BBC to change the way it researches news



Left Drummonds Mill, 1991, from the Bradford Heritage Recording Unit; local students interviewed parents and grandparents
Below Jo Quinton-Tulloch, director of our Bradford museum; Sabbiyah Pervez, BBC Look North; Tim Smith, BBC Yorkshire; Kersten England, Bradford Council; Sajidah Shabir, Speaker's Corner

120

Number of people who collaborated with the National Science and Media Museum for Above the Noise

A pioneering project at the National Science and Media Museum took an entirely fresh approach to an exhibition, one involving an extensive collaboration with the local community to shine a light on lesser known aspects of life in Bradford.

Above the Noise: 15 Stories from Bradford, which opened for three months in 2019, showed how groups and individuals used various forms of technology and communication to bypass mainstream media channels, which in many ways did not represent their experiences or serve their needs and interests. The idea emerged from Bradford's National Museum, a research project and three-year programme (funded by the Arts and Humanities Research Council and in partnership with the University of Leeds), in which the National Science and Media Museum sought to develop how its focus on science could be combined with making a greater connection with Bradford and its people.

Above the Noise was a major public element of the Bradford's National Museum Project, and there are further developments in 2020, the final year of research. A gallery show, *Ideas Hub*, scheduled to open in 2021, aims to

discover the ways in which visitors prefer to experience object displays and exhibitions, and how the museum's collections can be made more accessible. A partnership with Bradford Museums and Galleries is also under way for a permanent installation of photographs from the Belle Vue studio, which, between 1902 and 1975, was a popular photographic portrait studio among Bradford's residents, many of whom had come to live and work in the city from other parts of the world. A report of the project's key findings will be produced, along with academic papers.

The legacy of *Above the Noise* has also extended far beyond the museum. The exhibition influenced the way the BBC approaches its own news output. The organisation set up a pop-up newsroom in the city, *We Are Bradford*, after David Sillito, BBC arts correspondent, was inspired by our exhibition's approach to local stories. The BBC also co-organised a debate at the museum about national media representation of the city. Following the success of *We Are Bradford*, the corporation increased its news gathering resources in the district, as well as opening *We Are* newsrooms in Middlesbrough, Stoke and Aberdeen.



'Above the Noise taught us a simple lesson: open up. Make time to listen to people, and you'll find some great stories'

Tim Smith, former head of BBC Yorkshire

Funders Bradford's National Museum Project: Arts and Humanities Research Council

SOMETHING FOR EVERYONE



'A bright well-designed shop appealing to kids and with a well-defined area for adults'

Association for Cultural Enterprises

£140,000

Rise in retail income since the shop opened in June 2019, compared with the same period the previous year

Left The Science Museum's spacious new shop is situated across two floors

A world-leading destination store for science-inspired gifts and children's educational products has opened in the Science Museum. Conceived by the top creative agency Drinkall Dean, the retail space has expanded onto the mezzanine floor, allowing the museum to offer a greater range and variety of products to visitors of all ages.

The big, spacious, colourful shop, which opened last summer, is filled with books, science toys, learning products, homeware, lifestyle items and unusual gifts. It features a co-branded collaboration with Amazon Launchpad, giving visitors an opportunity to interact with science-inspired products from some of the UK's most exciting start-ups and technology entrepreneurs.

The shop's space on the ground floor has also been renovated and extended, and continues to buzz with activity and

experimentation, with plenty of things that appeal to the whole family.

The Science Museum's range of gifts and souvenirs has also been refreshed. Working with key product partners, we have provided exclusive lines for visitors to buy, including collaborations with the top design brands Darkroom London and Pentatonic. A new stationery range includes ethically sourced notebooks and desk accessories, while stackable lab stools from King and Webbon – inspired by the ones designer Andy King remembers from his schooldays – combine nostalgia and cutting-edge design that exemplify the fun and sophistication of our new shop.

The space-themed range has also been refreshed and expanded, and items from Fat Face's collection of Science Museum-licensed, space-themed clothing are also available to buy.

The shop has been very well received. The stationery, print and adult textile ranges have become bestselling ranges, while the lab stools were shortlisted for a 2019 Wood Award in the Furniture Production category. The shop was also shortlisted for the Best Shop Over £1m category in the annual awards of the Association of Cultural Enterprises, which promotes commercial best practice in the cultural and heritage sector.

In accordance with the Group's wider strategy (*see page 20*) sustainability features in many of the shop's products, including Pentatonic tableware made from old smartphone screens – the least recycled glass on the planet – and wallets made from recycled plastic bottles. A newly sourced range of children's toys has been made entirely from ocean plastics, while refillable water bottles sold in the shop are made from 100% recycled plastic.

ILLUMINATE

ROOM WITH A VIEW

Illuminate, the Science Museum’s spectacular top-floor private events space, has been a huge hit with blue-chip clients – and won a major award

Come for the view, stay for the experience: that seems to be the message from delighted guests who have given the Science Museum’s new private events space, Illuminate, glowing praise since it opened in spring 2019. Illuminate was also proud to win the ‘Best Venue with a View’ category at the prestigious London Venue Awards.

Situated on Levels 4 and 5 of the museum, the space enjoys spectacular floor-to-ceiling picture windows with a panoramic vista over the city’s rooftops and landmarks, including Harrods, the London Eye and St Paul’s Cathedral.

Such has been the success of Illuminate, our events team receive an average of 100 inquiries a month from event-bookers looking for an exceptional space in which to host events ranging from large award ceremonies to bar and bat mitzvah celebrations. By far the most attractive feature for prospective clients is the glorious view the venue offers.

‘Thank you very much for your support in helping us to deliver the event – your knowledge was invaluable. It was great working with you ... in your lovely new venue’

Rhea Sethi, events manager, BP

Over the past year, we have welcomed companies celebrating anniversaries and milestones, and high-profile charitable events such as Unicef’s Soccer Aid Gala, which raised £800,000 in donations to help protect children in danger around the world. A star-studded guest list included an exclusive performance by Robbie Williams. ‘Illuminate had the modern feel we were looking for,’ says Roxanne Portnoi, special events manager at Unicef. ‘We received a lot of great feedback after the event, especially regarding Illuminate and the beautiful views over London.’

By early 2020, the events team and Illuminate’s in-house partners, Moving Venue catering and White Light production, had hosted 81 events in the space, and had taken three repeat bookings. ‘Illuminate has not only established itself as a key contributor to the events market,’ says Alistair Otto, associate commercial director of the Science Museum Group, ‘its operational success proves invaluable to the progression of the Group’s ambitious development plan, and in sustaining our role as a world leader in both the science and museum sectors.’

WINNER

‘Best Venue with a View’ at the London Venue Awards

Left Robbie Williams gave an exclusive performance at Unicef’s Soccer Aid Gala
Below The top floor of Illuminate has dazzling views across London

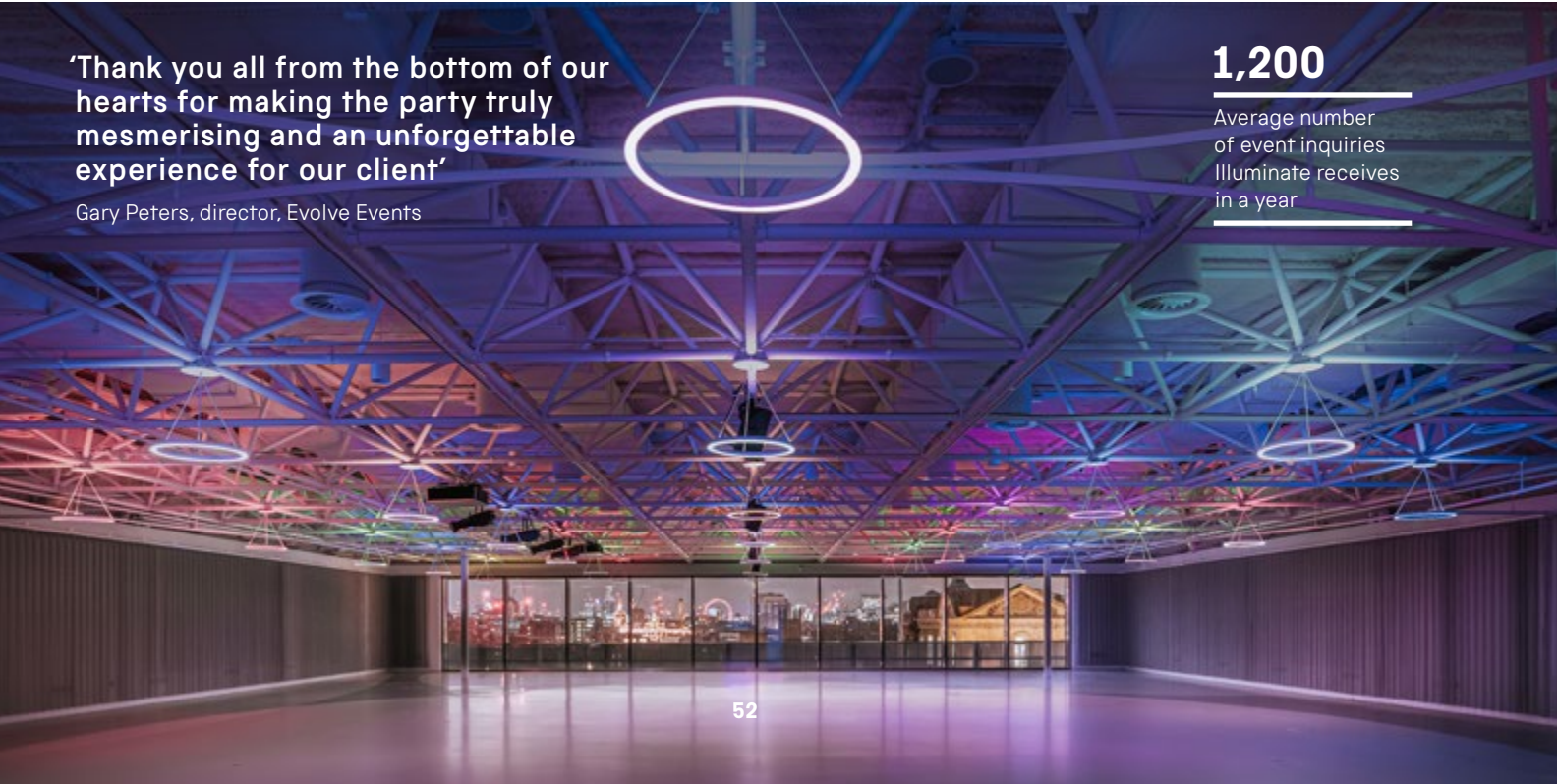


‘Thank you all from the bottom of our hearts for making the party truly mesmerising and an unforgettable experience for our client’

Gary Peters, director, Evolve Events

1,200

Average number of event inquiries Illuminate receives in a year



SMITH CENTRE



200

Number of events and meetings the Smith Centre has hosted in less than a year

WHERE IDEAS HAPPEN

Our new Smith Centre in the heart of Kensington is a vital gathering place for the Group’s patrons, fellows and supporters, and has already hosted events of worldwide significance

Since its official opening by Her Majesty The Queen in March 2019, the Smith Centre, a beautiful new multi-purpose events venue at the Science Museum, has hosted more than 200 high-profile and VIP meetings and conferences.

The elegant suite of rooms occupies a 19th-century building with fine period details, and replaces the old Smith Centre, named in honour of Martin and Elise Smith, who wanted the museum to have a centre for debates, lectures and philanthropy. It also serves as a peaceful oasis in the cultural buzz of Albertopolis, where Group patrons, fellows and supporters can drop in throughout the week.

The Smith Centre has hosted several significant events in the past year. In February, the government chose the venue to launch the United Nations Climate Change Conference and the Year of Climate

Action, which was attended by many top figures, including Sir David Attenborough, Prime Minister Boris Johnson and Nick Stern, chair of the Grantham Research Institute on Climate Change and the Environment. The event attracted huge international media attention.

The centre has also hosted: the Kensington and Chelsea Culture Conversation, which brought together 120 cultural organisations in the area; a conference celebrating the opening of *Medicine: The Wellcome Galleries* at the Science Museum; meetings and awaydays for the Group’s funders and sponsors; and two Arts and Media Lunches, which attracted celebrity attendees. With many original features, museum artefacts, books and artworks, including the magnificent *Electrical Engineering Workshop* by Terence Cuneo, the Smith Centre is an inspiring environment in which to think, debate, collaborate and work.

Above Roger Highfield, Group science director, joins the luminaries at an Arts and Media Lunch in the Smith Centre. Guests included Michael Wilson, Maureen Lipman, Margaret Drabble, Ben Kingsley, Stephen Poliakoff, Ben Okri, Sheila Hancock, Sarah Sands, John Sessions and Terry Gilliam

‘The Smith Centre proved the perfect setting for sparks to fly between actors, scientists and leading luminaries’

Sarah Sands, editor, BBC Radio 4 Today

Funders Sir Martin Smith and Lady Smith OBE

PATHS OF INQUIRY

The Group continues to research innovative ways to showcase our collections and devise our exhibitions

Research is reaching the parts that other museum activities cannot, whether by embracing immersive technology or bringing specialists together to explore new approaches to space exploration displays. Last year, when we announced the Science Museum Group's aim to become the world's most research-informed science museum organisation, we also vowed to take the power of research and to apply it in every way possible to the work and future programmes of our museums.

Digital diversity

People may come to our museums to admire the amazing objects on display, but today they also expect us to play our part in the digital realm, too. And where there is a need, research is on standby to enable its delivery. This year will see the first public incarnation of an experiment in 3D immersive storytelling, which will be on the theme of robots. Funded by Innovate UK, part of UK Research and Innovation (UKRI), the aim is to produce a multi-room, multi-sensory, immersive experience in which groups of visitors collaborate to solve a series of challenges. Research undertaken by a cross-disciplinary group at the University of Exeter hopes to understand how individual and group-visitor experiences in this kind of 'mixed reality' attraction can be designed and evaluated to benefit the creative industries sector in the future.

Another digital project, Responsive Interpretive Storytelling, funded by the Arts and Humanities Research Council

(AHRC), is part of its Creative Industries Cluster led by the University of York. Our project will combine a ColliderCase (which allows digital content, such as explanatory information, to be projected onto cased objects) and The Cutting Room, an editing tool using a technology called 'object-based media' that allows for highly individualised viewing experiences, in which the content can vary according to someone's age or preferences.

Alongside these project initiatives, our *Science Museum Group Journal*, the international digital ambassador for science-museum research, goes from strength to strength. With a dozen issues under its belt, the journal has been read by 75,000 people over 95,000 sessions.

Crossing continents

Time. Culture and Identity is an AHRC-funded project researching the history of 18th-century clocks made in London, and watches and automata in the collection of the Palace Museum, Beijing. Here the research is being pursued along three paths: historical (what is the history of the Anglo-Chinese clock trade?), digital (what interpretive resources can be developed for this fascinating collection?) and public engagement (what do audiences make of these exquisite pieces?).

Another project, Bradford's National Museum, now in its last year and also funded by AHRC, looks at the international scene in an unusual way. The project explores how the National Science and

Media Museum can be both a national and a distinctively Bradford institution. By researching and engaging with the diaspora communities that live in the city, it investigates the theme of 'translocal' connections between countries, and how this can affect how the museum is experienced.

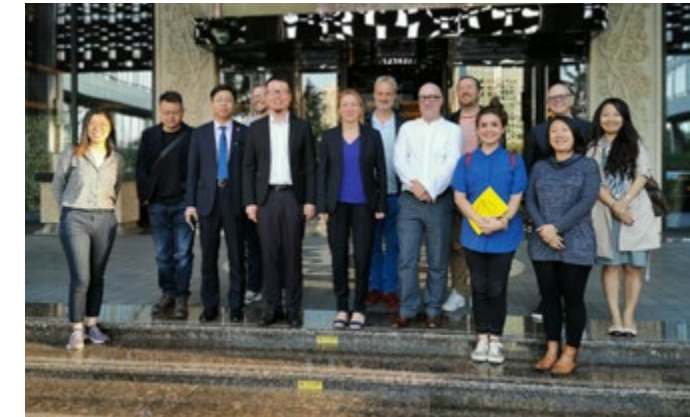
Meanwhile, Culture Space was a three-workshop project in 2019, designed to start a conversation about how a new space gallery could reflect the international diversity of space exploration. The workshop met at the Science Museum, at the European Space Agency in the Netherlands, and at the Mullard Space Science Laboratory near Guildford to discuss how we can apply the lessons learnt from our 2015 *Cosmonauts* exhibition to a larger, permanent gallery.

Tomorrow's museum

Towards a National Collection, which launched in October, is a UKRI multi-million-pound research programme to enable Britain's national museums to become a unified, searchable online collection. The Science Museum Group is leading Heritage Connector, part of the first round of digital projects under this funding, and we are looking forward to full participation in the programme over the next five years.

Funders Arts and Humanities Research Council, The Leverhulme Trust, Wellcome, UK Research and Innovation, Innovate UK

Right Research workshop attendees visit the Chao Centre for Art and Technology in Beijing



75,000

Number of people who have read the Group's journal over 95,000 sessions

Left and right Bradford Grand Mosque and Tyersal Primary School in 1986. Both images are part of the Bradford's National Museum research project
Below Culture Space workshops discussed the international diversity of space exploration





94%

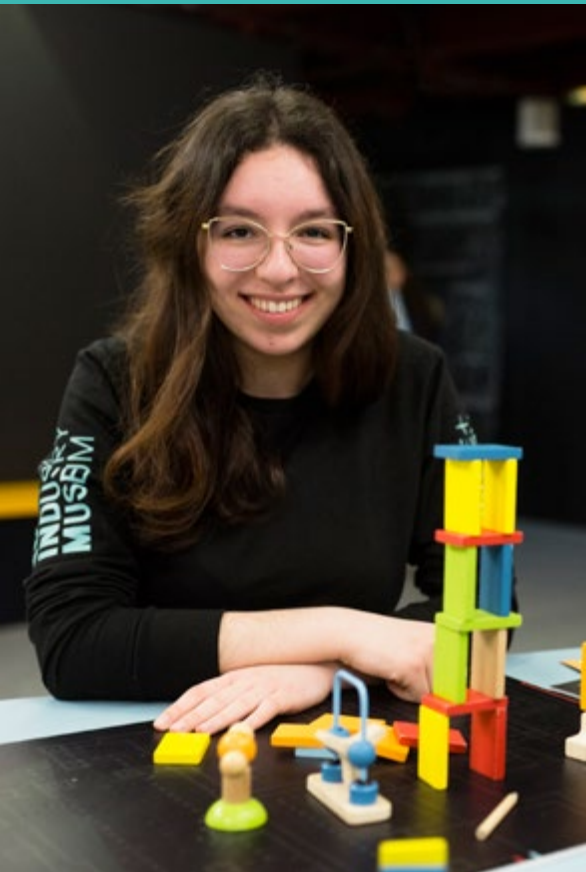
Proportion of our team who say volunteering with us benefits their well-being

Over the past year our volunteers have helped the Science Museum Group achieve its potential in innumerable ways, and reach its operational, strategic and social objectives. Contributing a staggering 100,000 hours of their time, they have helped to ignite curiosity in our visitors, reveal the wonders of our collections and harness the power of digital by supporting our imaging work in projects such as One Collection (*see page 10*).

Collections-based volunteering is a fantastic way for us to nurture ‘science capital’ (a person’s knowledge of science and exposure to it) and complete important work. Nowhere is this better seen than in One Collection, where volunteers have increased capacity in documentation by 56%, packing by 83% and photography by 159%. The role has also had a powerful social impact, with 10 of those taking part going on to find employment in the museum sector after volunteering with us.

TOP TEAM

Our amazing team of volunteers are the unsung heroes of the Group, giving our visitors a warm welcome, bringing our collections to life and inspiring a love of science across the country



‘Volunteering for the One Collection project at Blythe House has been an amazing experience. It has also sparked more interest in STEM and boosted my science capital’

Collections digitisation volunteer, One Collection

At the National Railway Museum in York, archive volunteers played an important role in helping Search Engine, the museum’s research and archive facility, gain accreditation by assessing, listing, digitising and rehousing thousands of items. Meanwhile, at the National Science and Media Museum in Bradford, our photography team has created 1,000 publicly searchable records for the archive of the British photographer Tony Ray-Jones, which we acquired in 1994.

Our volunteers, crucially, ensure that our museums and collections are friendly and ‘open for all’, thereby helping to increase the diversity and size of our audiences, build science capital and foster careers. This year, we have created new roles and partnerships that support this. In London, we have worked with Kensington and Chelsea Volunteer Centre to engage new communities in science and volunteering. In Manchester, we have partnered with The Growth Company and the Manchester Art Gallery to support people back into work by helping to develop their science capital

‘The SMG’s role in leading the Heritage Volunteering Group means that quality volunteering inspires futures not just within the group, but across Britain’

Shaun Delaney, volunteering development manager, NCVO

Top left A volunteer inspires the next generation of scientists and technicians during Future Engineers at the National Railway Museum
Above right Robin, a Science Museum volunteer, explains the science of optical fibres to some young visitors
Left Alba, a volunteer at the Science and Industry Museum, helps inspire budding scientists at Electricity: The Spark of Life

£250,000

Revenue that was generated through volunteer-led activities over the past year

and employment skills. At Locomotion, in Shildon, we have worked with the North East Autism Society, Step Forward and Tees, Esk and Wear Valleys NHS Foundation Trust to provide opportunities for people in front-of-house roles and our workshop. In Bradford, volunteers from the local Deaf Centre helped to repack our small objects store, as well as explore how we can make our opportunities more accessible to the deaf community.

Across a range of roles, our volunteers combine their expertise with our

By supporting the development and interpretation of exhibitions, volunteers bring our collections to life. At the Science Museum, they gave talks to 11,500 visitors in the *Exploring Space* gallery, provided spotlight tours to 1,000 visitors to our *Top Secret* exhibition, and 615 guided tours to *The Art of Innovation*.

In Manchester, we introduced object handling experiences into our newly refreshed *Textiles Gallery Conversation Space* and in York, volunteers undertook research and prepared objects for display



collections to inspire visitors. Last year, the Science Museum object handling team helped 9,000 visitors get to know artefacts relating to communications, computing and chemistry.

In Manchester, 44 *Power UP* volunteers took gaming to the next level, transforming the experience for our visitors and helping to generate significant revenue for the museum. And at Locomotion, our Cab Guides provided footplate access to 28,000 visitors, talking to them about the science, technology and engineering behind the railways.

as part of the museum’s award-winning *Brass, Steel and Fire* exhibition.

The Group has also played a leading role in volunteering across the sector. Through our leadership of the Heritage Volunteering Group, we have worked with the National Council for Voluntary Organisations to ensure the heritage sector is reflected in national discussions on volunteering. At a local level, we have helped to develop a city-wide heritage volunteering strategy in York which, over the coming years, will deliver a range of activities to open people’s minds and inspire their futures.

ACQUISITIONS

WHAT WE ACQUIRED

In 2019-20 we added 539 objects to the Science Museum Group Collection. Here are 10 highlights



Covid-19 collecting
In response to the Covid-19 pandemic, the Group's curators are identifying objects and stories to collect on the nation's behalf. These items will join the Group's collection, providing a permanent record of medical, scientific, cultural and personal responses to the outbreak and chronicling its impact on society.



Pacer No. 142001
With its distinctive flat front, bus-style seating and functional design, the Pacer train may seem an unlikely candidate for museum preservation, yet these vehicles provided an essential rail link for commuters in many parts of northern England and Wales over the past 30 years.

LOANS

WHAT WE LOANED

In the past year, the Group loaned 2,178 objects to 162 different venues in the UK and 127 objects to another 17 venues overseas. Here are 10 highlights



High Speed Train power car no. 43002, Sir Kenneth Grange
Britain's most influential modern locomotive has joined the national collection after more than 40 years in service. The HST was the fastest train in Europe when first built in 1975, the year the National Railway Museum opened, and this class of locomotive still holds the world diesel speed record of 148mph.



The Railway Chronicle – From the King's Cross Pass Loco
The everyday life of railway workers in post-war London is revealed in this collection of more than 100 drawings and watercolours by the artist Arthur Gooch. Dating from 1947-8, they depict railway workers maintaining steam engines at the King's Cross Passenger Locomotive Depot. The humorous cartoons also document the extreme winter of 1947.



Archive material from the collection of music journalist Jon Savage
This wonderful resource for historians of the Manchester music scene contains archive materials and oral histories relating to Joy Division, New Order, Factory Records and Factory Communications Ltd.



Bench micrometer, made by Joseph Whitworth and Co
Although built in 1883, this machine speaks to the post-industrial decline of Manchester's textile industry. In 1984 it was bought by a Bradford steel pin company so it would remain in the UK and not be used by international competition.



The Level Crossing, Poole, 1953
To: Poole Museum, Dorset
The figurative painter Henry Taylor Lamb also painted townscapes. This picture was lent for the retrospective exhibition Henry Lamb: Out of the Shadows.



Working replica of Rocket, 1979
To: Vintage Trains, Birmingham
Built to commemorate the 150th anniversary of the Rainhill Trials, and loaned for the Tyseley Locomotive Works Open Weekend.



Photograph, Iris and The Gnome, 1917
To: National Galleries of Scotland, Edinburgh
One of the series of 'Cottingley Fairy' photographs by Elsie Wright and Frances Griffiths. Lent for the exhibition Cut and Paste: 400 Years of Collage.



Steam locomotive No. 120, 1899
To: Great Central Railway, Loughborough
This T9 class London & South Western Railway locomotive was a star attraction at the railway's Autumn Steam Gala.



Measuring machine, c.1855
To: Whitworth Art Gallery, Manchester
Made by Sir Joseph Whitworth and Company. Whitworth revolutionised precision engineering. Lent for the exhibition Standardisation and Deviation: the Whitworth Story.



Electric taxi cab, 1897
To: British Motor Museum, Warwickshire
Designed by Walter Bersey of the London Electrical Cab Company, the ground-breaking design eventually proved unreliable. Lent for the exhibition The Car. The Future. Me.



Folding plate 'Cameo' camera
This camera was given to Frances Griffiths by Edward Gardner and Sir Arthur Conan Doyle in 1920 around the time that Frances and her cousin Elsie Wright took their fifth and final photograph of 'fairies' in their back garden in Cottingley, Yorkshire.



Chinese shadow ball
This 19th-century brass shadow ball from China has engraved bird and fauna filigree patterns which enclose a gimballed oil lamp. The lamp remains upright and casts shadows across the wall of a darkened room when rolled or rotated.



Table clock made by Thomas Tompion
This Barnard Tompion clock is thought to have been designed for Queen Anne by Thomas Tompion and Edward Banger in 1708 and was later given by King George II to Andrew Stone, tutor to George III. It was acquired for the nation via the Acceptance in Lieu scheme.



Sample of metallic elements
These 12 metal samples were given out by the Hong Kong Science Museum to those celebrating 2019 as the UN International Year of the Periodic Table. We acquired these as part of a collecting project to record how the periodic table's 150th anniversary was celebrated across the globe.



Restaurant Car, c.1935
To: Museum MORE, Gorssel, Netherlands
Original railway poster artwork by Leonard Campbell Taylor. Lent to this museum of modern realist art for the exhibition For Real: British Realists in the 1920s and 1930s.



Empire type world clock, 1909
To: Somerset House, London
Lent to the exhibition, 24/7: A Wake Up Call for a Non-Stop World, this clock uses longitudinal lines to indicate the time at any given point on the globe.



Three-wheeled motor car, 1888
To: Victoria and Albert Museum, London
This 1888 Benz is reputed to be the oldest petrol-engined car in the UK. Lent for the exhibition Cars: Accelerating the Modern World.



Picture receiver, c.1960
To: National Maritime Museum, London
Lent for the exhibition The Moon, this picture receiver was used to receive the first photographs from the Moon from the Soviet probe Luna 9 in 1966.

FINANCIAL OVERVIEW: COMMERCIAL AND CULTURAL SUCCESS

By Jonathan Newby, managing director of the Group

The Science Museum Group attracted a total of 5,007,000 visits during the past year. Up to the end of February visit numbers overall were 1.5% ahead of the previous year. The Covid-19 outbreak in March had a major impact on visitor numbers followed by the closure of the museums from 18 March, meaning the group ended the year -4% behind the previous year.

The Science Museum attracted 3,160,000 visits and up to the end of February was +7% ahead of the previous year. A brand awareness campaign, capitalisation of the 50th anniversary of the Apollo 11 mission, the popular *Top Secret: From ciphers to cyber security* exhibition and the opening of *Medicine: The Wellcome Galleries* all drove footfall. The total includes 423,00 visits in education groups which up to the end of February was +11% ahead of the previous year and set for a record-breaking year.

The Science and Industry Museum attracted 539,000 visits and up to the end of February was -14% behind the previous year. Major closures and conservation work took place across 40% of the site, including the closure of the Power Hall for two years, temporary closures to the Air and Space Halls and building works disconnecting the upper and lower parts of the museum for a three-month period. The museum remodelled its targets to anticipate a 35% reduction in visitors and took action to revise the public programme and communications strategy to mitigate this impact, which reduced this deficit significantly (by 20%) up to the end of February – a significant achievement. The total includes 83,000 visits in education groups which up to the end of February was +3% ahead of the previous year despite the conservation works on the site.

The National Railway Museum attracted 698,000 visits and up to the end of February was -8% behind the previous year. The Museum saw historically strong visitor numbers in 2018-19 as a result of a new brand campaign and the successful visit of Tim Peake’s Soyuz capsule. Up to March 2019-20 visitor figures reflect a return to the historical range, with visitors seeing the exhibition *Brass, Steel and Fire* and Stephenson’s *Rocket*. The total includes 33,000 visits in education groups, which up to the end of February was at the same levels as the previous year.

Locomotion attracted 189,000 visits overall and up to the end of February was +28% ahead of the previous year. The museum has moved away from community-style events, which do not have a connection with the STEM subject matter of the museum, to deliver a programme more rooted in the national collection and the stories of Shildon with a focus on improving programming, marketing and the core offer. This year’s total includes 5,000 visits in education groups which up to the end of February was -23% behind the previous year due to changes in the number of workshops available to schools.

The National Science and Media Museum attracted 421,000 visits and up to the end of February was -3% behind the previous year, remaining ahead of the decline experienced in 2016-17 prior to the Museum’s relaunch in 2017-18. The programme included the popular summer exhibition and programme *Hello Universe* and *The Forgotten Showman* exhibition. The cinema operation, called Pictureville, is now managed by the SMG and we are working to grow audiences to this new offer. The total includes 33,000 visits in education groups, which up to the end of February was level with the previous year.

Off-site visits In total there were the 132,000 instances of participation in off-site learning activities delivered across the Group; almost 1.5 million visits to our touring exhibitions – our largest annual attendance since launching the programme in 2014; and tens of thousands visited *Flying Scotsman* as it toured heritage railways and provided mainline services.

SMG’s digital audience There were 11 million visits to the Group’s websites, +5% ahead of the previous year (+8% up to the end of February), indicating the new museum websites have now bedded-in and are having an impact.



Jonathan Newby, managing director of the Group, and Yasumasa Nagamine, Japanese ambassador to the UK, at the Science Museum

SCIENCE MUSEUM GROUP VISIT NUMBERS 2019–20

Total number of visits to the museums	London	Manchester	York	Locomotion	Bradford	Group
2018–19	3,168,000	652,000	782,000	153,000	455,000	5,210,000
2019–20	3,160,000	539,000	698,000	189,000	421,000	5,007,000

Visits in education groups	London	Manchester	York	Locomotion	Bradford	Group
2018–19	433,000	88,000	37,000	7,000	38,000	603,000
2019–20	423,000	83,000	33,000	5,000	33,000	578,000

Any anomalies in totals and % differences arise from roundings

SCIENCE MUSEUM GROUP FINANCIAL SUMMARY 2019–20

The Science Museum Group saw a significant increase in its activities during the year, primarily as large capital projects moved to completion or delivery.

Key projects and acquisitions
We proudly opened the £24 million *Medicine: The Wellcome Galleries*, generously supported by Wellcome, National Lottery Heritage Fund, GSK, The Wolfson Foundation, Vitabiotics, Art Fund, Stavros Niarchos Foundation (SNF), Britford Bridge Trust, Dr Martin Schoernig, Medical Sciences Historical Society and an anonymous donor. We continued with our One Collection project to move our collections from a store in west London to a purpose-built facility in Wiltshire, with £25.8 million of funding from our sponsoring department, the Department for Digital, Culture, Media and Sport, for this activity. The DCMS also made a valuable contribution of £3.5 million from the Capital Infrastructure Fund to support our project to repair the Power Hall in Manchester.

We started an ambitious project to develop a new *Technicians* gallery at the Science Museum, funded by a generous grant from the Gatsby Foundation, and completed *Science City 1550–1800: The Linbury Gallery*, funded by the Linbury Trust and the National Lottery Heritage Fund.

We also increased our collection with the accessions of the Barnard Tompion Clock, Rowland Emett’s *A Quiet Afternoon in the Cloud Cuckoo Valley*.

acquisitions part-funded by the Science Museum Foundation and the Art Fund. Further additions included a Eurostar and the Sir Kenneth Grange high-speed train.

Covid-19 pandemic
The end of the 2019-20 financial year was overshadowed by the global Covid-19 pandemic and the resulting shut down in the Group’s museums from mid-March. The direct effect of the closure of our sites will become clear over the summer of 2020, but the indirect effects on visitor numbers and behaviour, on the wider economy, and on the philanthropic environment will play out over a much longer time frame. The financial future of the Group is profoundly uncertain and more precarious than during the recovery from the global financial crisis over the past decade. The Group will apply the lessons it learned over recent years on entrepreneurial attitudes, operational efficiency and effectiveness as it seeks to navigate the challenges of the coming years.

Moving forward
While focusing on our future, we are looking to build on the progress in 2019-20. The figures presented below are not prepared on a statutory accounting basis, but instead show capital and non-capital expenditure, excluding depreciation and amortisation. £67.7 million (54%) of our current year income was grant-in-aid received from the DCMS, including the significant contributions to the

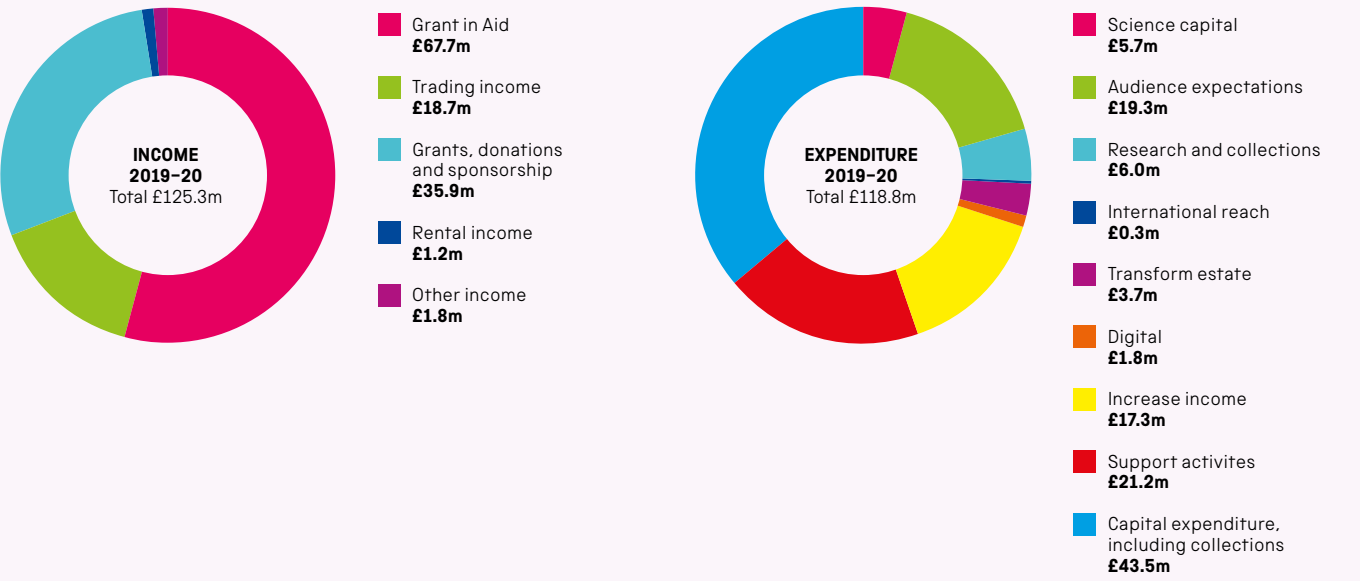
One Collection and Power Hall conservation projects, in addition to our core support. Trading income of £18.7 million represented a 20% increase on 2018-19, as before the Covid-19 disruption we benefited from a full year’s activity at our Illuminate corporate events space in London and a refurbished retail store on the site.

Donations and grants of £35.9 million were gratefully received from all our donors and supporters for a variety of capital and non-capital activities, as outlined above. Our non-capital expenditure remained in line with 2018-19, and 72% of this was directed to our strategic objectives. Support costs of £21.2 million included the running costs of our large estate, as well as back-office and management functions; these are also in line with previous years.

Our capital expenditure on major projects and on collection items increased by 60% to £43.5 million, as we delivered on the projects described above. Full statutory results are available in our Annual Report & Accounts.

2019-20 was a year of significant achievement for the Group and our financial results reflect this. 2020-21 and the following years will bring significant challenges, as the world recovers from the effects of the Covid-19 pandemic. We will do our utmost to meet these challenges and to ensure the continued achievement of the Group’s strategic objectives.

SCIENCE MUSEUM GROUP INCOME/EXPENDITURE 2019–20



These charts are based on unaudited financial information extracted from management accounts as at 31 March 2020. Restricted and unrestricted income are combined; the surplus shown above derives from restricted funding received for projects we intend to deliver in the coming years.

OUR GENEROUS SUPPORTERS

The financial support of visitors and partners provides critical funding for the Science Museum Group’s core priorities and future plans. We are hugely grateful to everyone who has supported our work during 2019-20

Our supporters have come together over the last year to enable a wide range of exhibitions, new galleries and programmes of work that have reached hundreds of thousands of people across the UK and further afield. Together we are bringing science, technology, engineering and mathematics to life, creating curiosity and wonder, and inspiring the next generation of creative thinkers.

We thank all the individuals and organisations listed below, and those donors who wish to remain anonymous, who have made a significant contribution to this vital work.

SCIENCE MUSEUM
Individual philanthropists, trusts, foundations and government
Art Fund
Arts and Humanities Research Council
Biotechnology and Biological Sciences Research Council
Blavatnik Family Foundation
The Douglas Bomford Trust
Iain and Jane Bratchie
The Britford Bridge Trust
Dana and Albert R Broccoli Foundation
The John S Cohen Foundation
DCMS/Wolfson Museums and Galleries Improvement Fund
Department for Digital, Culture, Media and Sport
Fidelity UK Foundation
Fieldfisher
Frank Parkinson Agricultural Trust
The Gatsby Charitable Foundation
The Gerald and Gail Ronson Family Foundation
The Helen Hamlyn Trust
The David and Claudia Harding Foundation
The Hintze Family Charitable Foundation
Horizon 2020 European Union Funding for Research & Innovation
Innovate UK
Lee Kai Hung Foundation
The Leverhulme Trust
Linbury Trust
Lloyd’s Register Foundation
The Lord Leonard and Lady Estelle Wolfson Foundation
Medical Sciences Historical Society
Henry Moore Foundation
National Lottery Heritage Fund
Players of People’s Postcode Lottery
Royal Society of Chemistry
The Dr. Mortimer and Theresa Sackler Foundation
Dr Martin Schoernig
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Stavros Niarchos Foundation (SNF)
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The Vitabiotics Foundation and the Lavani Family

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The Keniston-Cooper Charitable Trust
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Robin Wilson and Yana Alexandroff
Eric Winkler
Dame Fiona Woolf

NATIONAL RAILWAY MUSEUM
Individual philanthropists, trusts, foundations and government
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The Holbeck Charitable Trust
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Players of People’s Postcode Lottery
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Michael G Wilson and Barbara Broccoli

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Ian Robinson
Joe Tonks
Sandy and Colin Turnbull
Dean Welbourn
Rodney Wilson

SCIENCE AND INDUSTRY MUSEUM
Individual philanthropists, trusts, foundations and government
The Bowland Charitable Trust
Department for Digital, Culture, Media and Sport
Garfield Weston Foundation
The Granada Foundation
Kirby Laing Foundation
Sally MacDonald
Players of People’s Postcode Lottery
University of Salford
Wellcome
The Zochonis Charitable Trust

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Manchester Science Partnerships
Raytheon
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Siemens PLC
Waters Corporation

NATIONAL SCIENCE AND MEDIA MUSEUM
Trusts, foundations and government
City of Bradford Metropolitan District Council
Players of People’s Postcode Lottery
West Yorkshire Combined Authority

Corporate partners
The Broadway Shopping Centre
Surfachem
University of Bradford
Royal Society of Chemistry

LOCOMOTION
Trusts, foundations and government
Players of People’s Postcode Lottery

SCIENCE MUSEUM FOUNDATION
The Science Museum Foundation is a registered charity committed to providing resources and advocacy to support the vision and mission of the Science Museum Group.

Trustees
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Dr Bob Cowell
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Claudia Harding
Michael Hoffman
David Jacob
Ravi Rajagopal
Dame Fiona Woolf CBE

SUPPORT THE SCIENCE MUSEUM GROUP

Do you have a passion for inspiring the next generation of scientists? Does your organisation need a STEM-literate workforce? Or do you want to ensure that the wider public engage with science and our scientific heritage? If the answer is yes, then you have a stake in our mission to inspire futures. We can only achieve this with your support and hope you will consider partnering with us to continue our vital work.

By collaborating with the Science Museum Group, you will get to know our work, collections and experts better, gain insight into how science has shaped the world we live in, and how it can tackle the pressing issues of today and tomorrow. You can help us fulfil our mission, while we support you to fulfil your philanthropic or business objectives in creative and tangible ways. Together we will inspire the nation, including your staff, customers and stakeholders.

For further information please contact us at development@sciencemuseum.ac.uk



Above Supporters of Medicine: The Wellcome Galleries join Dame Mary Archer and Sir Ian Blatchford at the opening of the new permanent space. They include representatives from the National Lottery Heritage Fund, GSK, The Wolfson Foundation and Vitabiotics

WHO’S WHO IN OUR GREAT SCIENCE ALLIANCE

THE SCIENCE MUSEUM GROUP COMPRISES

Science Museum, London
National Railway Museum, York
Science and Industry Museum, Manchester
National Science and Media Museum, Bradford
Locomotion, Shildon
SCMG Enterprises Ltd

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The Board of Trustees of the Science Museum is responsible for the whole of the Science Museum Group. The trustees, who may number between 12 and 20, are appointed by and responsible to the prime minister through the Department for Digital, Culture, Media and Sport (DCMS). The director of the Science Museum Group, as chief executive officer, is responsible to the Board of Trustees: and, as accounting officer, is accountable to DCMS for compliance with the management agreement. Within the framework of their statutory duties as stated under the National Heritage Act 1983, the role of the trustees is to establish group policy, review performance and endorse appointments to key management positions. Their primary activity is to assist the chair in meeting the board’s overall responsibilities, in accordance with the policies of the secretary of state, and in compliance with charity law. The Board of Trustees also offers guidance and expertise on setting and implementing the strategy for the group.

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* Joint members

NEW FELLOWS OF THE SCIENCE MUSEUM

The Science Museum Fellows Programme recognises scientists and individuals who have changed our world through academic research, design, technology and philanthropy.

Lord Darzi of Denham in recognition as one of the world’s leading surgeons. He holds the Paul Hamlyn Chair of Surgery at Imperial College London, specialising in the field of minimally invasive and robot-assisted surgery.

Dame Sally Davies in recognition of her dedication to raising awareness of the problem of Antimicrobial Resistance and assistance with our *Superbugs* exhibition in her role as Chief Medical Officer and UK Special Envoy.

Sir John Gurdon in recognition for his work as a developmental biologist, pioneering research in nuclear transplantation and cloning; was awarded the Nobel Prize for Physiology or Medicine.

Sir Gregory Winter in recognition of his contributions to medicine and chemistry, leading key antibody research and developing technologies for an entirely new class of drugs to benefit humankind.



Luke Jerram stands beneath Gaia in the foyer of the National Science and Media Museum, Bradford

93%

Proportion of National Science and Media Museum visitors who engaged with the installation

‘I hope visitors to Gaia get to see the Earth as if from space; an incredibly beautiful and precious place’

Luke Jerram

EARTHLY POWERS

A beautiful installation by the artist Luke Jerram at our Bradford museum recreates the sense of awe that astronauts feel when they see Earth from space

A very special artwork featured in the National Science and Media Museum’s *Hello Universe* exhibition, which explored the sights and sounds of space in the 50th anniversary year of the first Moon landing.

Gaia, by Luke Jerram, is a visual recreation of Earth as seen from space, using detailed NASA imagery. It is 1.8 million times smaller than our planet, and each centimetre of the internally lit sculpture describes 18km of Earth’s surface. The sculpture’s title comes from Greek mythology – Gaia was the personification of Earth and the name given to a highly influential hypothesis about how our planet behaves like a living organism.

Almost 86,000 visitors saw the revolving artwork during the seven weeks it was suspended three metres above the floor in the National Science and Media Museum’s foyer. The piece has also been seen at arts and science festivals around the world.

Gaia recalls the first time an image of Earth, viewed in its entirety, was produced – in a photograph taken on NASA’s Apollo 17 mission in 1972.

Jerram said: ‘I hope visitors to *Gaia* get to see the Earth as if from space; an incredibly beautiful and precious place. An ecosystem we urgently need to look after – our only home.’

The installation is designed to create a sense of the ‘overview effect’, a term first coined by author Frank White in 1987 to describe the feeling of overwhelming awe that astronauts experience when seeing Earth from space. According to White, the effect imparts a profound understanding of the interconnection of all life, the fragility of our planet, and a renewed sense of responsibility for taking care of the environment.

To complement the installation, a specially made surround-sound composition by Dan Jones, the BAFTA-award-winning composer, played alongside the exhibit.

In partnership with the Natural Environmental Research Council (NERC), Bluedot, The Association for Science and Discovery Centres, Culture Liverpool and Liverpool Cathedral

MECHANICALLY MARVELLOUS

An eccentric and beguiling kinetic sculpture by Rowland Emmett is delighting visitors at Locomotion

Constructed in 1984, *A Quiet Afternoon in the Cloud Cuckoo Valley* is the last work by one of Britain's best-loved artists and sculptors, Rowland Emmett (1906-90). This delightful moving sculpture has been saved for the UK after being purchased for the Science Museum Group Collection, with the support of Art Fund, the Science Museum Foundation, the Friends of the National Railway Museum and private donors.

Emmett first came to prominence as a cartoonist for *Punch* but his career took a different path when his fanciful drawings of locomotives were turned into real-life versions as part of the celebrations for the Festival of Britain in 1951. His miniature 15in-gauge railway, which he called the Far Tottering and Oyster Creek Branch Railway, was ultimately one of the most popular attractions, carrying more than two million children through Battersea Pleasure Gardens during the course of the festival.

Following this success, Emmett focused on inventive sculptures and was later commissioned to make the inventions that were used in the 1968 film *Chitty Chitty Bang Bang*.

A Quiet Afternoon in the Cloud Cuckoo Valley comprises eight separate machines that together tell the story of a journey aboard the imaginary Far Tottering and Oyster Creek Railway. When the artwork comes to life in the daily demonstrations, the automata wheels turn and colourful characters go fishing, cycling and toast teacakes aboard a fantastical locomotive. The sculpture is one of Emmett's largest pieces and was originally commissioned for a shopping centre before being exhibited at Spitalfields Market in London. In 1999, while in storage, it was stolen for scrap metal, but was later recovered.

A Quiet Afternoon in the Cloud Cuckoo Valley has since been refurbished and was exhibited at the Chelsea Flower Show, Birmingham Museum and Art Gallery, and Compton Verney Art Gallery in Warwickshire.

Currently on display at Locomotion, it will tour other Science Museum Group sites before being put on permanent display at the National Railway Museum.

'Rowland Emmett regarded *A Quiet Afternoon in the Cloud Cuckoo Valley* as his finest work and I am delighted that it has found such a prestigious home, and will be available for future generations to enjoy'

Jon Baddeley, global head of collectors' sales, Bonhams

Funders Art Fund, Science Museum Foundation, Friends of the National Railway Museum, The Richard Broyd Trust, Michael Wilson and Barbara Broccoli

