OXFORD UNIVERSITY MUSEUM OF NATURAL HISTORY

Annual Review

2017-2018

Museum of
Natural
History

The Oxford University Museum of
Natural History Annual Review 2017–18
was edited from reports supplied by heads of
Collections, Sections and Research Units.

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Photographs are by members of the
Museum staff unless stated otherwise.

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Contents

Oxford University Museum of Natural History

1600s — Tradescant Collection formed

1677 — Ashmole cabinet arrives in Oxford

1860 — Museum of Natural History opens

2018 — Most-visited non-national UK science museum

Second most-visited University museum globally

7 million objects

zoological type specimens

30,000

8,418

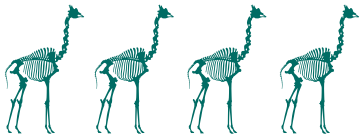
specimen loans made annually

500 active volunteers

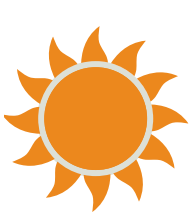
£4.19 million

operating budget

763,239 visitors per year



28,489 student visits



0.78mil web visits

480 events

160 for families

44 museum staff full time equivalent

www.oum.ox.ac.uk

Director's Introduction

In last year's Annual Review I was able to report record visitor numbers to the Museum, with footfall breaking the 700,000 mark during the academic year. It is therefore very gratifying to note that we have now topped even that, with a new high of 763,000 people coming through the doors during 2017–18.

Many visitors return time and again, and while people do come back to see a favourite display or specimen it is also important that we continue to offer something new alongside the familiar.

Installing new permanent displays is complex and time-consuming, but after four years of preparation, planning and funding development we opened our largest new permanent exhibit for many years – *Out of the Deep*. The large display cases feature the remarkably well-preserved skeletons of two very large 165-million-year-old plesiosaurs. *Out of the Deep* marks a new approach in terms of case design and interpretation as we look towards longer-term plans to redevelop the permanent displays.

Our Contemporary Science & Society exhibition series also keeps things fresh with its changing themes and events programmes. The latest in the strand, *Settlers: Genetics, Geography and the Peopling of Britain*, opened in February and brought together research from the University's School of Geography and the Environment, the School of Archaeology, and the Wellcome Centre for Human Genetics. The exhibition, along with specially commissioned artwork by Canadian visual artist Ian Kirkpatrick, presented the story of Britain's ever-changing population. Mindful of the politically sensitive backdrop, it tackled the subject of migration through interdisciplinary evidence that ranged from archaeology to genetics to long-term census data and with a long view, from the end of the last Ice Age to the present day.

While the exhibition programme draws together research from across the University and beyond, our research fellows continue to publish their own work to the world. The discovery by Ricardo Pérez-de la Fuente and colleagues of a parasitic tick trapped in amber, and clutching the feather of a dinosaur, offered the first direct evidence that ticks fed on feathered dinosaurs 100 million years ago. Its name – *Deinocroton draculi*, or Dracula's terrible tick – guaranteed plenty of news coverage alongside the paper in *Nature*.

Another big news story emerged from the Museum's collaboration with WMG at the University of Warwick. WMG's CT scan of the skull of the famous Oxford Dodo revealed that the iconic bird was shot in the head and neck with a 17th-century shotgun. 'Murder most fowl' cried the *Guardian*.

We also hit the news with the story of ten-year-old Sarah Thomas who discovered a rare False Darkling Beetle in her school grounds while taking part in an outreach session for our Project Insect programme. The sessions were part of HOPE for the Future, a Heritage Lottery Fund-supported project to safeguard our scientifically important British insect collections.

One of the Museum's strategic aims is to inspire lifelong interest in the sciences of the natural environment. Nurturing this enthusiasm amongst families was the aim of *Operation Earth*, an initiative set up by the Natural Environment Research Council and the Association for Science and Discovery Centres, and run by ten partner organisations, of which the Museum was one. Our family education officers worked with scientists and other volunteers to deliver a series of lively family science shows exploring climate change and environmental science. These shows, along with a programme of Operation Earth events, reached more than 15,000 people.

Equally important, though less publicly visible, is the behind-the-scenes care of the collections that happens constantly. In June, the first phase of a collections move project saw almost 300 pallets (comprising 30 tonnes) of fossil and rock specimens relocated to a temporary storage facility before being cleaned, catalogued and rehoused in museum-standard conditions.

Finally, welcoming over three quarters of a million people annually tests the Museum's infrastructure, so we were very relieved, if you'll excuse the pun, to open new public toilet facilities on the south side of the building and refurbished toilets on the north side. Funded by the University's Estates Services, the new, larger facilities are a vast improvement in visitor provision, as we hope to welcome many more people to our displays, exhibitions and collections in the year to come.

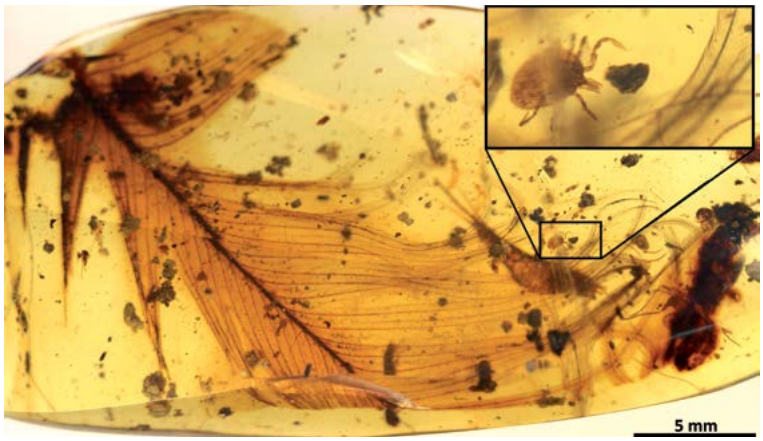
Professor Paul Smith
Director

Highlights

Amber

Right: Hard tick grasping a dinosaur feather preserved in 99 million-year-old Burmese amber

Museum Research Fellow, Ricardo Pérez-de la Fuente made the news in December as part of an international team that discovered a parasite trapped in Burmese amber clutching the feather of a dinosaur. The small fossilised tick formed part of the first direct evidence that ticks fed from feathered dinosaurs 99 million years ago.



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Settlers

Right: Ian Kirkpatrick's artwork Where Do we Come From? What Are We? Where Are We Going? commissioned for the Settlers exhibition

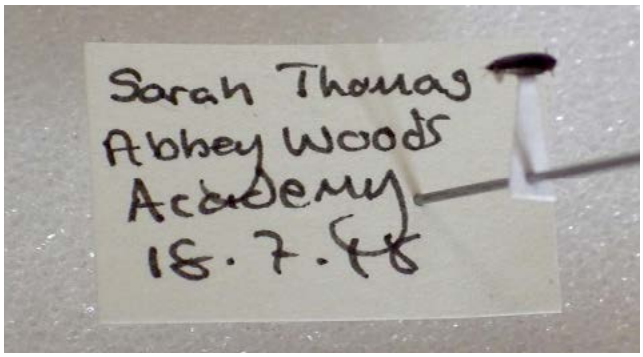
© Ian Wallman

In February, the Museum opened the latest exhibition in its Contemporary Science & Society series, *Settlers: Genetics, Geography and the Peopling of Britain*. The Museum worked with colleagues in the Wellcome Centre for Human Genetics, and the departments of Geography and Archaeology to tell the story of the country's ever-changing population since the end of the last Ice Age, about 11,600 years ago.

Project Insect/One in a Million Find

Right: Sarah Thomas with the rare beetle she discovered

Project Insect used the Museum's British insect collections to engage pupils in primary state schools with the aim of sparking their curiosity in natural sciences. The discovery days were part of the HOPE for the Future project, supported by the Heritage Lottery Fund.



Visiting Fellowships

The Museum launched its first Visiting Fellowship programme in April advertising opportunities to research the Museum's collections. Six Fellowships were awarded for 2018/19. The programme will be run on an annual basis.

Nuneham Courtenay collections move project

June saw the completion of the move of fossils and rock specimens from the Nuneham Courtenay offsite store to a temporary storage facility at Upper Heyford. In total 298 pallets containing around 4000 boxes of material (weighing around 30 tonnes) were moved by the project team – on time and on budget.

Far Left: Cetiosaurus vertebra from the Museum collections

Left: The mezzanine at Nuneham Courtenay after the collections move

Out of the Deep

After four years of fossil preparation, funding applications and planning, the Out of the Deep display opened to the public. The exhibit features two large, complete plesiosaur skeletons, on full display for the first time. One specimen of a short-necked plesiosaur comes from Yarnton near Oxford. The second specimen, a long-necked plesiosaur, was discovered in Peterborough.

Left: The new Out of the Deep cases displaying the two plesiosaur specimens

Operation Earth

The Museum became one of ten partners in a Natural Environment Research Council and Association for Science and Discovery Centres funded project *Operation Earth*. The aim of the project is to engage families with environmental science issues. In February, the education team started to run family shows featuring Earthy, a character dressed in an earth costume based on NASA data.

Right: Earthy discussing environmental issues with a Museum scientist during an Operation Earth show

Who shot the Oxford Dodo?

For the first time, the manner of death of the Museum's iconic dodo specimen was revealed: a shot to the back of the head. This unexpected twist came to light thanks to a collaboration with Warwick Manufacturing Group which employed forensic scanning techniques to discover that the Dodo was shot with a 17th-century shotgun.

Right: A WMG scanned image of the Oxford Dodo which revealed its cause of death

Public Engagement and Education

Record breaking visitor numbers

In an academic year that saw a record-breaking number of 763,239 visitors to the Museum, there was also good attendance at two major temporary exhibitions in the Contemporary Science & Society series. *Brain Diaries* (10 March 2017 to 1 January 2018; www.oum.ox.ac.uk/braindiaries) received 168,433 visitors at an average of 565 per day, whilst *Settlers: Genetics, Geography and the Peopling of Britain* (9 February 2018 to 16 September 2018, www.oum.ox.ac.uk/settlers) saw 131,976 (600 visitors per day).

The successful exhibition of 2016, *Microsculpture: The Insect Portraits of Levon Biss*, featuring beautiful large-scale photographs of insects from the Museum collections has continued to tour and in 2017–18 was seen at the Natural History Museum of Denmark, Copenhagen, Denmark (18 May to 19 November 2017); Naturhistoriches Museum Basel, Switzerland (1 September to 29 October 2017); Naturama, Svendbord, Denmark (6 February to 25 November 2018); Hessischer Landesmuseum, Darmstadt, Germany (4 May to 5 August 2018); and Houston Museum of Natural Science, US (13 July 2018 to 13 January 2019).

Exhibition loans were also made to the Palace Green Library, University of Durham, for their exhibition *Time Machines* (May–September 2017), to the Garden Museum, London, for their Tradescant Gallery (May 2017– present), and to York Museums Trust for *Yorkshire's Jurassic World* (March 2018–1 April 2023).

Big Brain Competition

If you could create an experiment to learn more about the human brain, what would you investigate? The Museum and Oxford Neuroscience posed this question in its Big Brain Competition as part of the Brain Diaries exhibition.

Oxford University's neuroscientists offered people the chance to use the state-of-the-art MRI scanner at the Wellcome Centre for Integrative Neuroimaging at the John Radcliffe Hospital to investigate a burning question about the brain.

Eight hundred entries were received and the winning experiment was suggested by Richard Harrow, who wanted to understand how the brain identifies voices. The winner watched his experiment being conducted whilst Oxford Sparks live-streamed it.

Left: Big Brain Competition winners gather in the Director's office

Settlers

In February, the *Settlers: Genetics, Geography and the Peopling of Britain* exhibition opened. The exhibition, a collaboration with University departments and part of the Contemporary Science & Society series, used objects from the OUMNH and Ashmolean Museum collections, together with archaeological evidence, genetic analysis and demographic data.

Settlers encouraged visitors to add their own family history of movement through gallery and online based interactives, whilst a partnership with the Museum of Oxford added oral history recordings to the exhibition from its Journeys to Oxford project.

Artist Ian Kirkpatrick produced six thought-provoking graphic design panels for the exhibition called *Where do we come from? What are we? Where are we going?* The piece explores the social and natural causes behind human migration in history and the present day.

The exhibition was funded by the Wellcome Trust and a digital version is available at www.oumnh.ox.ac.uk/settlers

© Claire Williams

Right: Visitors viewing the Settlers exhibition during the private view in February

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Settlers programme

The Museum has been developing its public programme with the aim of engaging audiences with the broadest possible diversity of age, background and education level. For the research-led Contemporary Science & Society exhibitions, the Museum has taken the opportunity to add to its public programme by delivering a rich and varied series of interdisciplinary events that explore further the themes of the individual exhibitions.

The *Settlers* exhibition programme spanned from the performance of scenes from a genomics-inspired play that was accompanied by an interactive discussion on current controversial topics in genetics, through to a migration-themed board game night, and a study day aimed at A-level students delivered by researchers involved in the exhibition. The Settlers programme included 23 events, were contributed to by 127 researchers in total, and were attended by 8,790 people.

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Right: Ian Kirkpatrick in front of his artwork (below) and visitors to Settlers (above)

Stones and Bones

Staff and volunteers ran special *Stones and Bones of Early Britain* object handling sessions during the Settlers exhibition. The sessions gave visitors the chance to discover the changing climates, peoples and animals of British prehistory through handling a selection of objects left behind by the early inhabitants of Britain. The objects ranged from the hand-axe of a right-handed Neanderthal, to the vertebrae of a European rhino, and the hair of a ginger mammoth.

Left: The Stones and Bones object handling box

Oxfordshire Art Teachers Network

In February, the Museum ran an evening event for secondary school art teachers in conjunction with the Settlers exhibition. Around thirty art teachers came to see the new exhibition and the artwork created by Ian Kirkpatrick. The session included a talk by Ian about his work and from the Public Engagement team about the commission and content of the exhibition. The teachers were encouraged to create their own artwork inspired by their thoughts on migration.

Left: Teachers producing artwork with advice from Ian Kirkpatrick

Great Debate

The Great Debate, also linked to the Settlers exhibition, saw an audience of over 100 turn out to debate the ethics around the personal genomic revolution and hear the current limitations and the future hopes this advancing field can offer society. The *Getting Your Genome Sequenced – Will You Open Pandora's Box?* panel included: David Nicholson, founding director of Living DNA; Professor Melinda Mills, head of Sociology; Professor Gil McVean, director of the Big Data Institute; and Dr Saskia Sanderson of UCL and Great Ormond Street Hospital. The panel gave great insights into some of the questions that should be asked before getting genomes sequenced.

Operation Earth

The Museum started to run its first ever family shows with *Operation Earth*, which are funded by the Natural Environment Research Council (NERC) and ASDC (Association for Science and Discovery Centres). The aim of the project is to engage 10,000 families with key environmental science issues.

The *Operation Earth* shows were focussed around the character Earthy, and also featured an air-quality testing machine and a pollination game. The aim of the show is to encourage the family audience to do their part in helping planet Earth. The shows are programmed to run until October 2018.

Left: Operation Earth inspired activities

Superscience Saturday Network

Right: A family sampling vegan cheese at Super Science Saturday

In March, the Museum ran its sixth Super Science Saturday themed *People & Planet* linking to the *Settler*s exhibition and to coincide with *Operation Earth's* environmental science theme. Around 100 scientists ran activities investigating a range of topics from meat to mapping, and rocks to renewable energy.

One highlight was visitors trying vegan cheese to learn about alternatives to meat-based products, since animal farming produces more greenhouse gas emissions than all transportation in the world. Research and Collections staff showcased the Museum's collections with their stands *Planet Earth Rocks!* and *Lice of the World.* Over 3,200 visitors attended the event.

Curiosity Carnival

Right: Activities in the Museum during the Curiosity Carnival evening

Curiosity Carnival took place on Friday 29 September 2017. It was the first time that the University of Oxford had participated in European Researchers' Night and was its biggest Public Engagement with Research (PER) event to date.

In Oxford there was a city-wide programme of researcher-led activities across the University's museums, libraries and gardens, and via street activities on Broad Street. This was part of a European programme of events in over 300 cities in 30 countries across the continent. Over 500 academics, researchers and DPhil students delivered over 150 activities covering a diverse array of formats, including interactive games, performances, talks, 'demos' and live experiments, across the eight venues.

The event was attended by 9,400 visitors on the day, with 29,000 online views of live events. The Carnival was organised by staff from across the University in partnership with Oxford Brookes University and MRC Harwell. OUMNH hosted 160 researchers and worked with them in the months leading up to the event to develop their PER activities.

Curiosity Carnival was successful in generating demonstrable impact on visitors including: enjoyment and inspiration; increased understanding of research and/or changes in perceptions and opinions; 83% of visitors surveyed strongly agreed or agreed with the statement "I learnt about research".

Museum Investigators

Right: An investigator working on their project in the Museum's teaching room

The Museum hosted five A-level students for three weeks of the summer holidays. Each student chose an area of natural history that interested them, devised questions to investigate, and worked with Museum scientists and the collections to find answers and produce a scientific report.

The group were given gold CREST awards, a nationally-recognised British Science Association award acknowledging scientific skills that are difficult to develop at school, such as designing experiments and problem solving.

Project Insect/One in a Million Find

Left: Sarah Thomas with rare beetle she found during a Project Insect session

Ten-year-old Sarah Thomas of Abbey Woods Academy in Berinsfield, Oxfordshire discovered a rare beetle in her school grounds while taking part in a Museum outreach session in July. The beetle is so important that it has now become part of the collections at the Museum – it is the first false darkling beetle (*Anisoxya fuscula*) to be added to the historically important British insect collections since the 1950s. The session was part of Project Insect, a HOPE for the Future project supported by the Heritage Lottery Fund. The story was covered in the national and local press.

Dementia Friendly

Left: Mary Anning with the Age of Nature group on a Museum visit

The Age of Nature group, led by Reminiscence Officer Helen Fountain, has met at the Museum from 2016 on a monthly basis. The dementia friendly group was set up to enable older audiences to enjoy and explore the Museum's collections. Each meeting had a different theme and staff members generously gave their time to come and talk to the group about varied topics including fossils and Mary Anning, dung beetles and bees.

Overall 194 participants attended 13 sessions with an average of 15 people per session. Feedback was positive with carers also enjoying the opportunity to take part in a supportive environment. Colleagues from the local Alzheimer's Society also attended the group and were able to refer participants who they thought might enjoy the experience. As a result, many Museum staff have also become Dementia Friends.

Out of the Deep

Left: The Out of the Deep animation

The Out of the Deep display opened to the public in June. It is the Museum's largest permanent display for many years, representing a new approach in design and interpretation. The exhibit features two plesiosaur skeletons in state-of-the-art cases. The specimens on display are a short-necked plesiosaur, known as a pliosaur, which was excavated by Museum staff in Yarnton a village north-west of Oxford, and the second specimen is a 5.5-metre-long long-necked plesiosaur recently discovered by the Oxford Clay Research Group in Peterborough.

The specimens are accompanied by specially commissioned digital reconstructions, a series of videos telling the stories behind their discovery and a touchable 3D print of the pliosaur's flipper.

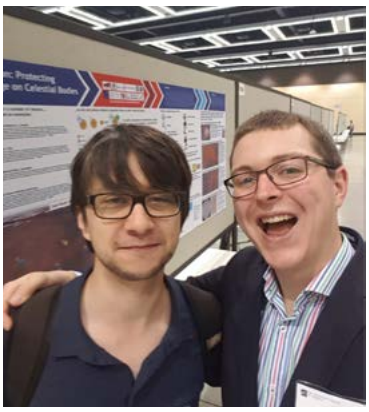
Ambassador's Fund School Sessions

Left: Scientists Dr Ketchum and Dr Giles discussing palaeontology with children

March saw the delivery of the L'Oreal Ambassador's Fund school sessions which were made possible by a grant from the cosmetics firm. Aimed at primary school children, the sessions were linked to the forthcoming Out of the Deep display. They highlighted the role of women in palaeontology to encourage women into science. Over the course of a week, 148 children heard about Mary Anning and how she made her discoveries. They found out about the process of fossilisation and investigated Museum specimens. They also met two scientists, Dr Hilary Ketchum and Dr Sam Giles, who guided the children through modern palaeontological techniques unavailable to Mary Anning such as 3D scanning and printing.

Research

Geological Society of America Annual Meeting

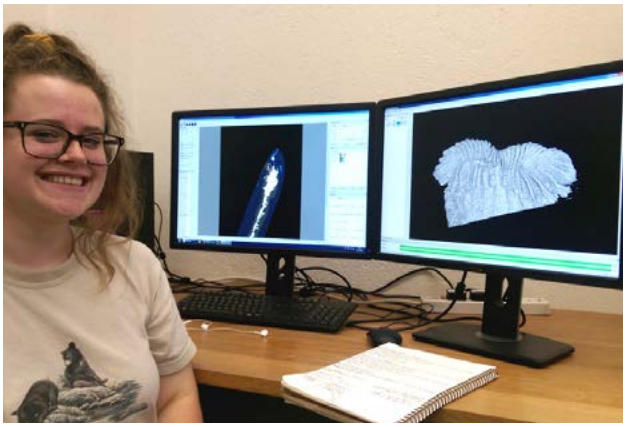


Right: Jack Matthews and Sean McMahon with their poster at the annual meeting

Two Museum researchers visited Seattle in October to present their research at the Annual Meeting of the Geological Society of America. Research Fellow Jack Matthews presented a poster with Edinburgh researcher and former Museum intern Sean McMahon, discussing the need for humanity to consider conserving geologically important sites in the rest of the solar system. Dr Matthews also gave a talk on how the law affects geological fieldwork, and the importance of geoscientists engaging with policy makers to improve geoconservation legislation.

Imran Rahman was an invited speaker in the topical session "Digital, Digital Get Down". Imran spoke about how computer simulations are helping palaeontologists to learn more about what ancient organisms were like when they were alive. He also presented a poster on setting standards for publishing 3-D models of fossils.

Undergraduate Biological Sciences Research Project



Right: Stephanie Woodgate working on fossil echinoderm 3-D computer models at the Museum

Stephanie Woodgate, an undergraduate student studying Biological Sciences at the University of Oxford, began work on her Final Honours School Research Project at the Museum in May. Stephanie's project focused on describing a new species of fossil echinoderm from the Cambrian (510 million years ago) of Morocco. Using the research group's visualisation software she was able to create a high-quality 3-D computer model of the animal. This will help describe it in more detail than would otherwise have been possible, enhancing understanding of the palaeobiology and evolution of early echinoderms.

Palaeontological Association Research Grant

Right: An exceptionally preserved fossil crinoid

Imran Rahman was awarded a grant from the Palaeontological Association to carry out research on exceptionally preserved, 350-million-year-old fossil crinoids with internal soft tissues. The grant will enable Imran to travel to the USA to study fossils in the collections of the Smithsonian Institution National Museum of Natural History and will also support CT scanning of select fossils in order to visualize their morphology in three dimensions. The results will help elucidate the evolution of key organ systems in a major group of marine invertebrates.

Diamond Light Source Synchrotron facility

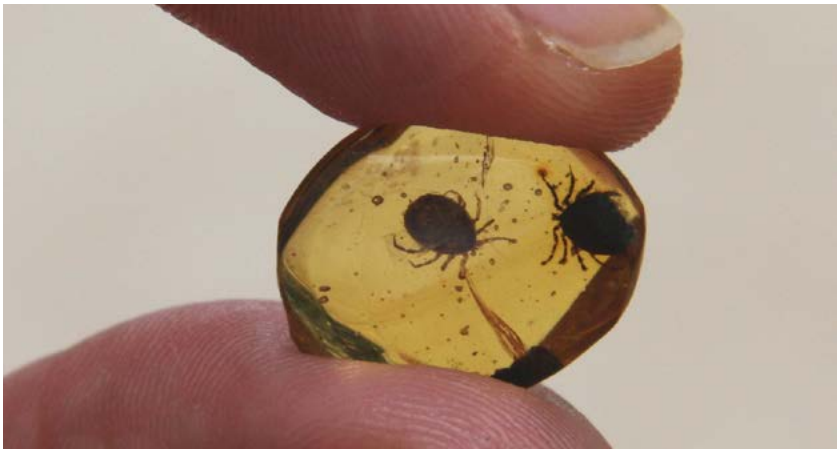
The Research Team, led by Museum Research Fellow Lauren Sumner-Rooney, visited the Diamond Light Source Synchrotron facility in Oxfordshire to create X-ray images of spiders from the Museum's collections. Lauren is interested in documenting the variation in the number and structure of eyes across selected spider families to investigate how it affects spiders' brain structures.

Using the I13–2 beamline at Diamond the team was able to visualise details measuring less than one thousandth of a millimetre without damaging the specimens. Over the course of 72 continuous hours, the team scanned 116 spiders, creating about 14 terabytes of data. This will form the basis of a variety of scientific research projects at the Museum over the coming years.

Left: The Research team at the Synchrotron facility

Amber

In August, Museum Research Fellow, Ricardo Pérez-de la Fuente participated in the excavation of Cretaceous amber in Asturias. Around three pounds of amber was extracted by the team of eight researchers. The amber will be examined for inclusions with the hope of finding small organisms included within the amber, particularly arthropods. The aim of the work is to increase knowledge of forested ecosystems from 100 million years ago and shed light on the evolution of major biotic interactions such as the plant-insect pollination relationship. Ricardo made the news in December when the press covered the story that a parasite clutching the feather of a dinosaur had been discovered in amber from Burma. Ricardo was part of a team who found this first direct evidence that ticks fed from feathered dinosaurs 100 million years ago. The scientific paper published in Nature also described a new group of extinct ticks created from a species the team named *Deinocroton draculi* (Dracula's terrible tick). The news was also covered in the national press.



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Left: Amber piece preserving the holotype and paratype male Deinocroton draculi ticks

Close-Up on Ancient Insects

Gracie Price, a second-year Museum Studies and Archaeology student from Reading, took stunning pictures of nearly 200 amber fossils, namely insects and spiders, during a 10-week placement which was overseen by Collections and Research staff and aimed at digitising the amber holdings from the Earth Collections. Material imaged included Burmese (Cretaceous), Baltic (Eocene) and Dominican Republic (Miocene) ambers. Composite images made of 20 to 30 shots were obtained for each specimen in order to capture their entire focal depth.

Left: An immature aphid from Baltic amber (sample LZ. 124)

Who shot the Oxford Dodo?

Working as part of a long-term partnership, the Museum and Warwick Manufacturing Group at the University of Warwick discovered that the Oxford Dodo's cause of death was a shot to the head. The discovery was a surprise as the scans were undertaken to discover more about the Dodo's anatomy. Particles were found in the specimen during the scans and further investigation of the material revealed them to be lead shot pellets of a type used to hunt wildfowl during the 1600s.

The news captured the imagination of the media and the story was featured in the local, national and international press.

Right: Image of the Museum's dodo specimens

Visiting Fellowships

The Museum's first Visiting Fellowship programme was advertised in April. The Fellowships offered to researchers are 1–8 week-long opportunities to work with Collections staff at the Museum and carry out research based on the Museum's collections. A short list of priority areas were advertised including crustacean taxonomy and systematics, and invertebrate palaeobiology.

The academic year 2018/19 will see the first Visiting Fellows working at the Museum on areas including research on *Cetiosaurus oxoniensis*, a sauropod dinosaur from the Great Oolite, and research work in the Museum's historic shrimp collection.

Right: Part of the Museum's *Cetiosaurus oxoniensis* display in the main court

AHRC Collaborative Doctoral Partnerships

In 2017, a new AHRC-funded doctoral project, in collaboration with the University of Birmingham, started at the Museum. Helen Goulston will research the interior decorative scheme of the Museum's Gothic Revival building. The interior includes portrait statues and busts, decorative stonework and ironwork, as well as murals and bespoke furnishings.

Through analysis of these objects and research in the Museum's archives, Helen aims to examine the function and effect of these decorative objects in a museum dedicated to scientific education. This will be an interdisciplinary project, assessing the art and design of the Museum in relation to institutional history, history of collections, museology and the development of different scientific disciplines.

Right: The central court under construction

Far right: Statue of John Hunter in the main court. His left elbow rests on a plinth concealing a snake coiled round a staff. This is a traditional symbol of medicine

Collections

Enquiries, donations and loans

In 2017–2018 the Museum serviced 1,404 enquiries from external researchers plus another 226 from within the University. In addition, the collections were visited by 481 researchers external to the University of Oxford and 111 from within the institution. Loans activity also continued at a high level, with 64 loans of 1,593 objects to researchers in 25 countries and an additional 72 loans of 7,305 objects to UK researchers. The high level of enquiries, visits and loans in previous years is reflected in the number of publications based on the collections, with a total of 180 academic outputs based on the Museum's collections published between 1 January and 31 July 2018, including 16 monographs and 164 journal articles.

The Museum accepted a donation of over 8000 Syrphidae (hoverflies) from E.T. and D.A. Levy at the end of April. Around 50% of the collection is British and will hopefully be incorporated into the British Insect Collection as part of a future Heritage Lottery Fund project. At present, the British syrphid material is taxonomically out of date with many nomenclatural changes since it was laid out. The new material will be used as a reference source to help reshape these collections.

The late Martin Brasier's collection of world class palaeontological and petrological material has very significant research potential and includes large numbers of specimens that are exemplary for teaching, public engagement, and display. Palaeontological material from the collection was moved in 2014. The petrological collection was moved from the Department of Earth Sciences to the Museum during a six-week project over the summer by Matthew Sutton, a student in the Department.

In May, Earth Collections made their largest ever loan. More than 2000 fossils transferred from the University of Hull in 1992 were loaned back to them as teaching material. The collection came to Oxford following the UK-wide 'Earth Sciences Review' in 1987, which aimed to safeguard university geology collections in the face of funding cuts, and in which the collections of any geosciences departments that closed were relocated to one of six Designated Collections Centres. In 2015, Hull set up a new geology department. Following discussions between the two universities, the collection was divided into research material – to stay in Oxford – and teaching material – to be loaned back to Hull.

JE Bowman Collection

Right: Polished coral from Devon from the JE Bowman Collection

Bingshuai Jiang joined the Museum from the University of Leicester on a placement in Earth Collections to research and curate the J.E. Bowman collection. John Eddowes Bowman (1785-1841) was a banker and naturalist based in the north of England. He was one of the founding members of the Manchester Geological Society, and an associate of the eminent geologist John Salter, who named an Ordovician trilobite (*Ilaenus bowmanni*) after him. The Bowman collection in Oxford was donated in 1944 by Mrs P.E. Bowman, the wife of J.E. Bowman's grandson.

Over the course of her placement Bingshuai unwrapped, re-boxed and catalogued some 1,872 fossils, rocks and minerals, as well as putting together a selection of her favourite specimens for a Presenting... exhibition case on the Bowman collection. These included metamorphic rocks from the Himalayas, polished corals from Devon and some beautiful fossils from Wales, where Bowman lived as a young man. The specimens were displayed alongside some of their wrapping papers, including a report of the German royal wedding in 1913, political comics, and various fashion advertisements.

Objectivity

In August, the Museum was approached by Brady Haran, a video journalist and vlogger, about featuring in 'Objectivity', a YouTube series focusing on rare or fascinating objects from collections around the UK. The Objectivity team came to the Museum to talk to Collections Managers in Life Collections and Earth Collections. Together they discussed the Dodo along with 'Britain's rarest animal', Ivell's sea anemone, down in the invertebrate fluid store. In addition to *Megalosaurus bucklandii* and plesiosaurs, the team also discussed the Museum's taxidermy thylacine and a papier-mâché beehive made by 19th century French artist Jerome Auzoux. Within a short time of its release the Dodo vlog had over 30,000 views. The videos can be found on the Objectivity channel.

Left: Bradan Haran discussing the Museum's taxidermy thylacine with Museum Curator

Nuneham Courtenay collections move project

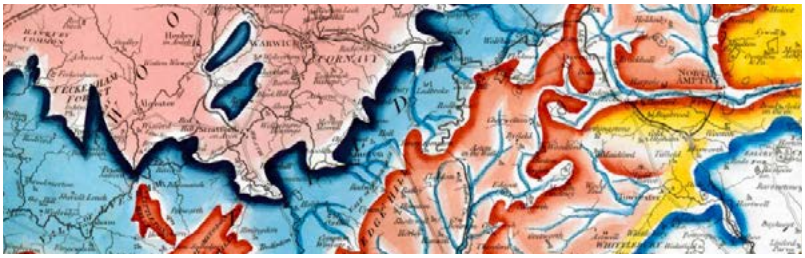
June saw the completion of the first phase of the move of fossils and rock specimens from the Nuneham Courtenay church offsite store to a temporary storage facility at Upper Heyford. Almost 300 pallets containing around 4000 boxes of material were moved from the deconsecrated church by the project team as planned. The next phase at Upper Heyford will see the collections cleaned, inventoried and packaged for storage in museum-standard conditions.

The inventory currently lists 158,200 specimens, weighing in at 30.45 tonnes, and includes mammal bones, fossils from Oxfordshire, historic mineral collections, flint tools, building stones and research samples, gathered over the last several hundred years.

Left: The team starting to clean specimens from the collections moved to Upper Heyford

William Smith – The Poetry of Geology

On 23 March, the Museum celebrated the 249th birthday of William Smith. The event was designed to showcase the achievements and inspiration of Smith, and his legacy both in the sciences and arts. Richard Hughes of the Geological Society opened the event with an introduction to Smith's life and times and his often less than pleasant relationship with the Geological Society. Following this the audience was treated to lightning talks in small groups interspersed with poems from the anthology 'Map' inspired by Smith and compiled and read by Michael McKimm, the Geological Society archivist. The talks included a chance to explore how the Victorians visualised geology with Allison Ksiazkiewicz and a rare chance to see the Museum's large 3D Sopwith model of the Forest of Dean, together with correspondence kept in the archives. There was also an opportunity to discuss modern mapping techniques in Greenland with the museum Director surrounded by specimens, maps and of course the geologically inspired murals of Richard St John Tyrwhitt.



Left: A section of William Smith's first geological map of England and Wales

Illustrating Life

Right: The Illustrating Life temporary exhibition in the Community Case

The Community Case is a way for the Museum to highlight some of the interactions it has with communities, one of which is the use of collections by visiting artists. This display entitled *Illustrating Life* showcased some of the artwork produced by three artists who visit the Life Collections regularly. A few of the key pieces were displayed next to the specimens that inspired them, emphasising the interface between science and art.

In Great Spirits

April saw the start of a collections storage project dubbed 'In Great Spirits'. The project aims to alleviate some of the storage issues in the Museum's spirit stores, to aid better access to the arachnid collections such as the Octavius Pickard-Cambridge exotic Araneae material. This collection is one of the most important historic spider collections globally, and holds 1,200-1,400 type specimens. These are only the species described by Pickard-Cambridge, and further research may uncover more types of species described by other researchers. Access to this collection has previously been poor due to the lack of documentation and work space but the In Great Spirits project will improve this, and the ability to for researchers to access the collection.

Right: The Museum's spirit stores

Cenozoic Bivalves

Right: Cardita specimens from the London Clay of Clarendon, near Salisbury, Wiltshire

4th year Earth Sciences student Charlie Karsten spent a month in Earth Collections measuring Cenozoic bivalves to determine whether there is any statistical correlation between species size and species longevity. The image shows the size difference between bivalves in the genus *Cardita* during warm periods and cool periods from the Eocene to present. The data supports the idea that Cenozoic bivalves were larger during cold periods over this interval. The project was supervised by Erin Saupe and was a useful exercise in exploring ways in which the Museum can increase use of the collections by departmental staff and students.

Bone identification course

Over two days in July, the Museum's conservators hosted a course initiated by Oxford University's GLAM Conservation Group, titled 'Cultural Objects Worked in Skeletal Hard Tissues'. The course, taught by Dr Sonia O'Connor of University of Bradford's Archaeological Sciences department, was attended by 18 participants from across Oxford University's GLAM institutions. It comprised a mixture of lectures and handling sessions, with specimens from the Museums' own collection used to augment the study material available. Participants were encouraged to work in small groups to try their hand at familiarising themselves with the similarities and differences in various kinds of hoof, horn, bone, ivory and teeth, and also manufactured plastics or vegetable-based replacements.

Participants welcomed the opportunity to work together to gain a better understanding of issues surrounding the identification of materials they might encounter in their field of work.

Left: Participants on the Bone ID course

Partnerships

Science in University Museums

University science museums undertake a variety of distinctive educational work due to their position on the interface between higher education institutions and the museum/cultural sector. This may involve research-led teaching, widening participation in HE, or working more broadly to enhance science capital across varied audiences. May 2018 saw the launch of a new informal network to encourage the sharing of best practice and the development of content. The inaugural meeting of the Science in University Museums (SUMs) network was held in the Museum and included natural science museums from the universities of Birmingham, Cambridge, Manchester and Newcastle, together with an international component from Harvard, Porto and Porto Alegre (Brazil). The group aims to meet twice a year and will gradually expand to include other institutions.

Hazards in Geological Collections

Some rocks, minerals and fossils can be hazardous to humans, and their storage and usage must comply with UK and EU law. In November, Monica Price and Jana Horak of the National Museum of Wales repeated a professional training workshop on Hazards in Geological Collections, first run in 2014. It was attended by museum professionals from a range of UK and Irish institutions and members of the Museum's Collections team. The aim of the workshop was to clarify the nature of the hazards (radiation, asbestos, toxicity, etc.), outlining the responsibilities and practical steps that can support those working with geological material in institutional collections. A mixture of talks, practical activities and behind-the-scenes visits took place enabling participants to see real specimens and work areas, discuss how safe conditions can be developed at reasonable cost, and learn where to get expert support and advice.

Right: Participants on the Hazards in Geological Collections workshop

National Museum of Wales exchange

In May, Mark Carnall made the return leg of a work exchange with National Museum Wales curator Jennifer Gallichan, who spent a week at the Museum in 2017. It was a jam-packed and inspiring week talking to colleagues from across the Museum about exhibition programming, preservation techniques, collections documentation, strategic planning, mollusc systematics as well as exploring the botanical, malacological, zoological and palaeontological collections. Hopefully this will be the start of a long-term working partnership with National Museum Wales to share skills and engage in sector advocacy.

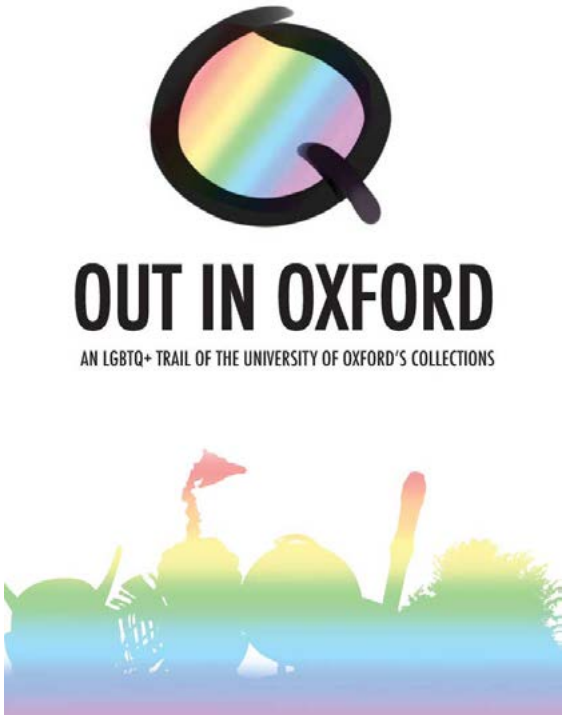
Open University webinar

The Museum was approached by the OU to contribute to a museums career support resource. Museum staff provided profiles outlining their experience. Building on this collaboration Wendy Shepherd, the Head of Operations, delivered a webinar on Building a Successful Career in Museums.

The webinar was delivered live to students and the session was recorded for future use. The aim of the seminar was to show how OU study prepares people for a museum career, understanding the joys and challenges, what employers are looking for and identifying ways to progress in the sector. 74 students attended the session (from locations such as London, Somerset, Scotland, Malta and the US) and the recording has been viewed 350 times.

Out in Oxford

The 2018 Natural Sciences Collections Association conference (NatSCA) was held at the Leeds City Museum in April and three members of the Museum team attended. The topic for this year's conference was "The museum ecosystem: exploring how different subject specialisms can work more closely together." Mark Carnall gave a talk titled "Big Gay Animals", highlighting the GLAM project "Out in Oxford". The trail was created after a lecture given by Prof. Richard Parkinson during LGBT History Month in February 2016. A high demand for more LGBTQ+ representation within GLAM museum displays became apparent and OUMNH responded by showcasing some relevant examples displayed in the main court.



Left: The Out in Oxford booklet

Swift City

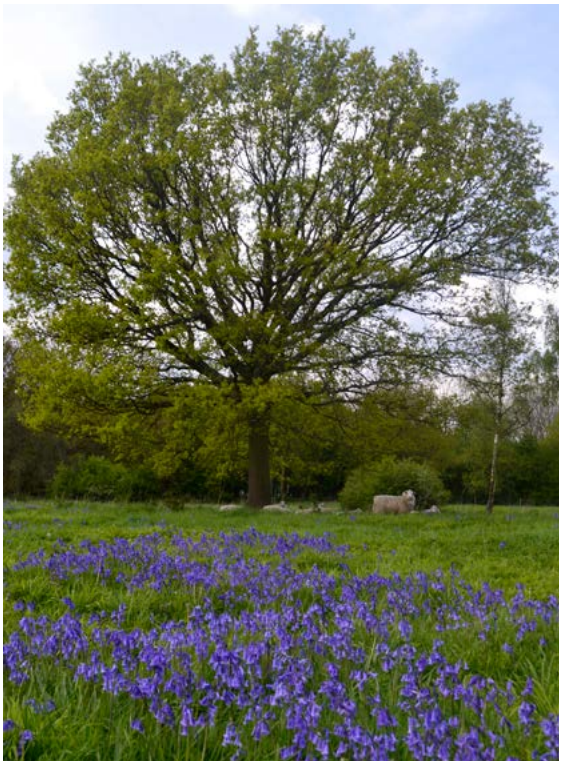
May saw the Museum host the launch of the new edition of *Swifts in the Tower* by David Lack which has been updated with a new final chapter by his son Andrew examining the additional research that has taken place since its first publication in 1956. The first 500 copies were made available via the RSPB website to ensure that all proceeds go directly to funding the Swift City project. Once these are sold it will be available in the Museum shop along with prints of the artwork by the RSPB's Colin Wilkinson. The public launch included talks by Andrew Lack and the Museums' Keeper of the Swifts, George Candelin.

Right: The cover illustration from Swifts in the Tower

Far right: Wytham Woods

Wytham Woods Comes to Town

As part of Wytham Woods's 75th anniversary celebrations the Museum hosted an afternoon of public lectures by scientists from the University's research woods outlining the data gleaned from, and current questions being raised by, their ongoing studies. Dr Keith Kirby discussed Wytham's vegetation followed by Dr Denise Pallett, who discussed the environmental changes seen in the woods. Prof Ben Sheldon gave an overview of the research carried out on the various bird populations and some of the insights that the Wytham Great Tit project has revealed. Julius Bright Ross talked about Wytham's badgers, Dr Martha Crockatt illustrated the impact and evidence for climate change on the woods and finally Dr Danielle Linton revealed what has been discovered about the three species of bat roosting there. The talks attracted an audience of around 150 visitors, many of whom regularly visit the woods and wanted to find out more about what actually happens at the site and why it is an important part of Oxford.



Running the Museum

Events

2017–18 saw the expansion of the events offer in the Museum and the team hosted 175 events (88 commercial and 87 public engagement events). Until January 2018, events had been expertly staffed by members of the Front of House team, but as both areas of work continue to expand, a specialist events team was formed, with staff from across the Museum managing the out-of-hours programme.

Collaborations with external organisations proved an excellent way to introduce new and diverse audiences to the Museum; partnerships included Waterstones, Sofar Sounds, Cult Screens, and several University departments who hosted receptions and prize lectures in the building. Lectures for Biological Sciences undergraduates were held in the lecture theatre, and the Museum hosted a weekly seminar series and several high-profile speakers for the Department of Zoology.

© Ian Walman

Left: Reeps One performing under the *T. rex* during the Sofar Sounds evening

Event highlights of the year include a showing of Jurassic Park on the Museum lawn, with dinosaur activities led by researchers from the Museum and the Department of Earth Sciences; a gig with Sofar Sounds in aid of Amnesty International; and an evening reception for the Malala Fund attended by Malala Yousafzai, the winner of the Nobel Peace Prize. Other events included Curiosity Carnival – Oxford's contribution to European Researchers Night, a lecture by author Robert Macfarlane, filming for Mary Beard's *Civilisations* series and a board games night themed around the Settlers exhibition.

Green Impact Bronze Award

The Museum received a Bronze Green Impact award at the Sustainability Showcase organised by Estates Services. The award reflects the hard work carried out by the Museum to promote cycling and the use of public transport by staff, become more energy efficient, and be sustainability champions.

Improving protection from UV

Far left: *Struthiomimus sedens* under the temporary court netting during the roof work

During the summer a team working for University Estates added UV film to most of the glass tiles on the Museum roof. It is hoped that this measure will reduce UV readings and lower temperatures in the main court.

Fluoresence Tent

The fluorescence tent has been looking a little dark recently, but thanks to the efforts of the workshop, some brand new UV bulbs have been sourced (for some rather obsolete fittings) and installed. The minerals once again shine brightly. The team has longer-term ambitions to create the fluorescence tent's successor and intend to visit other museums with fluorescent mineral displays to source inspiration for this future project.

Left: Inside the refreshed fluorescence tent

Right: The horsebox café on the Museum lawn during summer 2018

Far right: Louis from Front of House captured in a visitor's artwork

Left: The new Museum facilities

Horsebox Cafe

Making the most of the summer weather, the lawn played host to a pop-up café, run by the Horsebox Coffee Co. Aided by good weather, the lawn become a social space, with people lingering before and after their visit to the Museum.

New toilets

The Museum's new toilet facilities opened to the public in July. The long-anticipated toilets on the south side of the building are a better match for the Museum's increased visitor figures (763,239 from August 2017 to July 2018). The building work was funded by the University's Estates department and included the refurbishment of the old facilities in the north-west corner of the Museum.

Front of House Thank You

Louis Lofthouse from the Front of House team received an unexpected thank you gift from a happy visitor in the shape of a portrait of himself. Pablo (age 7) visited the Museum in July and wanted to thank Louis for his help during the visit. Pablo's mother, an illustrator, created the artwork.

Staff Changes

The Museum said farewell to a number of long-serving members of staff in 2017-18. Monica Price had worked in Earth Collections since she joined the Museum in 1979 and Dr Dave Waters, who had a shared Curator/Lectureship jointly with the Department of Earth Sciences, have both become Museum Honorary Associates. Dr Rosemary Painter and Sarah Phibbs left the IT office for a new role in BNDU and retirement respectively. Other colleagues who moved on to pastures new during the year included Hannah Allum, Lily Barnes, Abigail Barter, Natasha Dussold, Helen Fountain, Fiona Gourley, Emma Henderson, Rebecca Hogben, Heidi Kurtz, Magdalena Molinari, Rebecca Spencer, Jessica Suess, Dr Sancia van der Meij and Ceri Watkins.

An increase in HEFCE (now Research England) funding for the Museum led to new posts in Collections (Danielle Czerkaszyn, Robert Knight, Eileen Westwig) and Public Engagement (Kelly Richards). Natasa Stuper also started a one-year Digital Content Officer post to work on the new Museum website. The Operations Team welcomed Corinna Crowther, Georgina Hardy, Lucy Shott (shop) and Brittany Gray (Front of House). The Research team welcomed Dr Lauren Sumner-Rooney who focuses on the function and evolution of the sensory and nervous systems of invertebrates.

Finally, two new teams started to manage the Nuneham Courtenay move project (Susan Beardmore, Peter Brown, Chantelle Dollimore and Neil Owen) and to plan and manage the HLF-funded Project Insect outreach pilot (Rodger Caseby and Fran Long).

Appendices

Appendix 1: Visitors of the Oxford University Museum of Natural History 31 July 2018

Carole Souter CBE (Chair)

The Vice-Chancellor Professor Louise Richardson AAAS AcSS FRSE RIIA

The Pro-Vice-Chancellor (Gardens, Libraries and Museums): Professor Anne Trefethen

Assessor: Dr William Allan

Professor Christopher Ballentine

Professor Tim Coulson

Professor Philip England FRS

Professor Dame Jane Francis

Professor Charles Godfray CBE, FRS

Professor Alex Halliday FRS

Professor Peter Holland FRS

Professor Jonathan Michie

Professor Alice Roberts

Dr Emily Scott-Dearing

Professor Ben Sheldon

Dr Laura Van Broekhoven

Professor Paul Smith (Secretary to the Board)

Appendix 2: People

Staff of the Museum 2017–18

Director: Professor Paul Smith

Deputy Director: Janet Stott

Museum Executive Assistant: Emma Thomas

Life Collections

Head of Life Collections: Darren Mann

Conservator: Bethany Palumbo, Jacqueline Chapman-Gray

Collections Manager: Mark Carnall, Dr James Hogan, Zoë Simmons, Amoret Spooner, Eileen Westwig

Image Technician: Katherine Child

Earth Collections

Curator: Dr David Waters

Collections Manager: Eliza Howlett, Hilary Ketchum, Dr Robert Knight, Monica Price

Earth Sciences Conservator: Juliet Hay

Nuneham Move Project Manager: Hannah Allum

Nuneham Move Project Assistant: Susan Beardmore, Peter Brown, Chantelle Dollimore, Neil Owen

Research

Head of Research: Professor Paul Smith

Deputy Head of Research: Dr Imran Rahman

Senior Research Fellow: Dr Sammy De Grave

Museum Research Fellow: Dr Jack Matthews, Dr Duncan Murdock, Dr Ricardo Pérez-de la Fuente, Dr Lauren Sumner-Rooney, Dr Sancia van der Meij

Postdoctoral Research Assistant: Dr Charlotte Inchley

Research Assistant: Dr Carolyn Lewis

Archives and Library

Head of Archive and Library: Kate Diston

Senior Archives and Library Assistant: Danielle Czerkaszyn

Digital Collections Manager: Dr Sarah Joomun

Digital Content Officer: Natasa Stuper

Documentation Assistant: Lily Barnes

Public Engagement

Head of Public Engagement: Janet Stott

Digital Engagement Officer: Scott Billings

Education Officer: Chris Jarvis, Sarah Lloyd, Carly Smith-Huggins

Education Assistant: Jenny Hulmes

HLF Education Officer: Rodger Caseby, Fran Long

Public Engagement Manager: Rachel Parle

Exhibitions Officer: Ellena Grillo, Dr Kelly Richards

Operations

Head of Operations: Wendy Shepherd

Events Manager: Laura Ashby

Accounts: Anne Atkinson, Beverly Judd

Cleaner: Gary Coates

Front of House Manager: Krista Baker

Visitor Services Assistants: Michelle Alcock, Brittany Gray, Jane Griffin, Matthew Holden, Navigator Ndhlovu, Aishah Olubaji, Kelley Swain

Building Manager: Peter Johnson

Museum Maintenance Technician: Adam Fisk

Retail Manager: Fitri Puspitasari

Shop Assistant: Abigail Barter, Corinna Crowther, Natasha Dussold, Georgina Hardy, Magdalena Molinari, Lucy Shott

Gardens, Libraries & Museums shared services

Head of Programmes and Partnerships: Lucy Shaw

Research and Impact Manager: Dr Harriet Warburton

Research Support Officer: Vanessa Moore

Head of Volunteers and Outreach: Joy Todd

Community Outreach Officers: Nicola Bird, Susan Griffiths

Administrative Assistant: Michalina Syzmanska

Volunteer and Outreach Assistant: Dr Caroline Moreau, Hayleigh Jutson

Head of IT – Gardens and Museums (GLAM): Haas Ezzet

IT Officer: Amanda Clark, Dr Rosemary Painter, Sarah Phibbs

Environmental Archaeology Unit

Director: Professor Mark Robinson

Honorary Associates

Mr D. Michael Ackland
Mr John Cooter
Mr Guillaume de Rougemont
Mr Ray Gabriel
Mr Paul Gaat
Mr Richard Gallon
Professor John Holmes
Dr John W. Ismay
Dr Jeyaraney A. Kathirithamby
Dr Tom S. Kemp
Professor W. Jim Kennedy
Dr Stuart Longhorn
Dr George C. McGavin
Malgosia Nowak-Kemp
Mr Roy Overall
Sarah Phibbs
Dr Adrian C. Pont
Mr H. Philip Powell
Monica Price
Professor Derek Siveter
Sally-Ann Spence
John Tennent
Mr Chris A. O'Toole
Dr Kevin Tilbrook
Dr Dave Waters
Dr Yan Wong

Appendix 3: Finance

Grants Awarded and Donations Received

The Museum is extremely grateful to the many individual donors, foundations and trusts who have generously contributed to its work in 2017/18.

£63,700	**Heritage Lottery Fund**, HOPE for the Future
£55,315	**Negaunee Foundation**
£10,000	**Street Foundation**, Afro Moths
£34,786	**Waste Recycling Environmental Limited (WREN)**, Out of the Deep
£3,000	**Wellcome Trust,** Public engagement with research for animal welfare A-level sessions

£177,235 from IT Capital Fund for Collections Metadata Migration Project

Travel and research grants

Research – five successful grant applications

£16,000	**BBSRC**, Bacterial World
£960	**Hong Kong Research Grants Council**, Phylophysiology of Caridean shrimps
£7,488	**John Fell Fund**, Evolution and development of a highly variable visual system in spiders
£90,000	**Leverhulme Trust**, Early Career Fellowship, Invading the water: Inner ear evolution in convergent aquatic tetrapods
£74,743	**John Fell Fund**, match funding for Leverhulme Trust

Appendix 4: New Acquisitions 2017–18

Earth Collections

Earth Collections

A total of 23 accession lots comprising around 18,400 specimens were received by donation, purchase or exchange.

Notable accessions donated during the year included:

- Ediacaran trace fossils from Brazil (3 specimens, from Luke Parry)
- Devonian trilobites from Japan (18 specimens, from Mark Williams)
- Macro-and microfossils from the Oxford Clay of South Cave, Yorkshire (18,100 specimens, from Kenneth Phipps)
- Invertebrates and vertebrates from the Albian and Cenomanian of Melcombe Bingham, Dorset (219 specimens, from Robert Christian)
- Sperrylite from Talnakh, Russia; apatite from Lake Baikal, Russia; pallasite meteorite from Magadan, Russia; chondrite meteorite from the Sahara; labradorite from Madagascar; orpiment and orpiment with realgar from Guangxi Province, China; precious opal and boulder opal from Queensland, Australia; muscovite with lepidolite from Minas Gerais, Brazil (11 specimens, purchased at Sainte-Marie-aux-Mines Mineral Show)
- Polished slice of banded iron formation from Western Australia (1 specimen, from Andrew Jaunzems)

Life Collections

A total of 28 accession lots comprising around 10,590 specimens were received by donation to the collection.

Archive and Library Collections

The Library subscribed to 34 journals and a further 9 were donated, containing 460 parts and measuring 5.3 linear metres.

The Library purchased 14 monographs and a significant backlog of uncatalogued material was also added to the collection.

A total of three items were received by donation to the archive collection and one artwork was purchased.

Notable accessions and donations during the year included a watercolour landscape by artist Richard St John Tyrwhitt, and an annotated copy of John Phillips, A Geology of Yorkshire, 1829.

Appendix 5: Loans 2017–18

Earth Collections

38 loans of 2296 specimens were provided, of which 36 were to the UK, 1 to Germany and 1 to the USA.

Life Collections

Total of 83 loans of 6004 specimens were provided, which breaks down to 38 UK; 25 other EU and 20 rest of the world.

Archive and Library Collections

No loans in 2017-18.

Appendix 6: Enquiries

Earth Collections

There were 499 enquiries, requiring an estimated 900 hours of staff time.

Life Collections

Staff dealt with 1025 enquiries requiring an estimated 966 hours of staff time.

Archive and Library Collections

There were 188 enquiries to the library and archive this year. Dealing with enquiries required an estimated 125 hours of staff time.

Appendix 7: Official Visitors 2017–18

Earth Collections

There were 157 visitors, of whom 137 came from the UK, 2 from EEA countries and 18 from other countries.

Life Collections

There were 420 visitors in total, 347 of which came from the UK, 29 from other EU countries and 44 from other countries.

Archive and Library Collections

The team welcomed 91 official visitors to the library and archives this year. The majority of visitors were from the UK (84).

Appendix 8: Publications by Museum staff (1 January to 31 December 2017)

Members of OUMNH staff indicated in bold; OUMNH Honorary Associates indicated in bold italics. In addition to these publications, 94 journal articles, 6 books and 8 monographs were published on the collections by external researchers.

Museum staff and honorary associates indicated in bold.

Alamaru, A., Hoeksema, B.W., **van der Meij, S.E.T.** & Huchon, D. 2017. Molecular diversity of benthic ctenophores (Coeloplanidae). *Scientific Reports*, **7**, 6365.

Anker, A., Hultgren, K.M. & **De Grave, S.** 2017. *Synalpheus pinkfloydi* sp. nov., a new pistol shrimp from the tropical eastern Pacific (Decapoda: Alpheidae). *Zootaxa*, **4254**, 111–119.

Briggs, D.E.G., ***Siveter, Derek. J.***, Siveter, David J., Sutton, M.D. & **Rahman, I.A.** 2017. An edrioasteroid from the Silurian Herefordshire Lagerstätte of England reveals the nature of the water vascular system in an extinct echinoderm. *Proceedings of the Royal Society B*, **284** (1862), 1–7.

Carnall, M.A. (2017) How to be more helpful to researchers. *In* The Museum Blog Book. Museums Etc.

Carvalho, F.L., **De Grave, S.** & Mantelatto, F.L. 2017. An integrative approach to the evolution of shrimps of the genus *Palaemon* (Decapoda, Palaemonidae). *Zoologica Scripta*, **46**, 473–485.

Cong, P., Ma, X., Williams, M., Siveter, David J., ***Siveter, Derek J.***, Gabbot, S.E., Zhai, D., Goral, T., Edgecombe, G.D. & Hou, X. 2017. Host-specific infestation in early Cambrian worms. *Nature Ecology & Evolution*, **1**, 1465–1469.

Crandall, K.A. & **De Grave, S.** 2017. An updated classification of the freshwater crayfishes (Decapoda: Astacidea) of the world, with a complete species list. *Journal of Crustacean Biology*, **37**, 615–653.

Crofts, S.B., **Neenan, J.M.**, Scheyer, T.M. & Summers, A.P. 2017. Tooth occlusal morphology in the durophagous marine reptiles, Placodontia (Reptilia: Sauropterygia). *Paleobiology*, **42**, 114–128.

Darroch, S.A.F., **Rahman, I.A.**, Gibson, B., Racicot, R.A. & Laflamme, M. 2017. Inference of facultative mobility in the enigmatic Ediacaran organism *Parvancorina*. *Biology Letters*, **13**, 20170033.

Davies, T.G., **Rahman, I.A.**, Lautenschlager, S., Cunningham, J.A., Asher, R.J., Barrett, P.M., Bates, K.T., Bengtson, S., Benson, R.B.J., Boyer, D.M., Braga, J., Bright, J.A., Claessens, L.P.A.M., Cox, P.G., Dong, X.-P., Evans, A.R., Falkingham, P.L., Friedman, M., Garwood, R.J. Goswami, A., Hutchinson, J.R., Jeffery, N.S., Johanson, Z., Lebrun, R., Martínez-Pérez, C., Marugán-Lobón, J., O'Higgins, P.M., Metscher, B., Orliac, M., Rowe, T.B., Rücklin, M., Sánchez-Villagra, M.R., Shubin, N.H., Smith, S.Y., Starck, J.M., Stringer, C., Summers, A.P., Sutton, M.D., Walsh, S.A., Weisbecker, V., Witmer, L.M., Wroe, S., Yin, Z., Rayfield, E.J. & Donoghue, P.C.J. 2017. Open data and digital morphology. *Proceedings of the Royal Society B* **284**, 20170194.

De Grave, S. & Anker, A. 2017. An annotated checklist of marine caridean and stenopodidean shrimps (Malacostraca: Decapoda) of the Caribbean coast of Panama. *Nauplius*, **25**, 1–40.

De Grave, S., Anker, A., Pindar, C., Sandell, J. & Johnson, M.L. 2017. Eleven new records of caridean shrimps from Cuban waters (Decapoda, Caridea). *Crustaceana*, **90**, 617–624.

De Grave, S., Anker, A., Dworschak, P.C., Clark, P.F. & Wirtz, P. 2017. An updated checklist of the marine Decapoda of Ascension Island, central Atlantic Ocean. *Journal of the Marine Biological Association of the United Kingdom*, **97**, 759–770.

De Grave, S., Piscart, C., Tuekam Kayo, R.P. & Anker, A. 2017. A new groundwater-dwelling species of *Euryrhynchina* from Cameroon (Malacostraca, Decapoda, Euryrhynchidae). *Zootaxa*, **4254**, 120–126.

de Rougement, G. 2017. New species of *Lesteva* Latreille from China (Coleoptera, Staphylinidae, Omaliinae). *Entomologist's Monthly Magazine*, **153**, 101–111.

de Rougement, G. 2017. A new *Belonuchus* Nordmann from Borneo (Staphylinidae, Philonthini) *Entomologist's Monthly Magazine*, **153**, 125–127.

de Rougement, G. 2017. Five new beetles discovered by Alfred Russel Wallace (Staphyliniidae). *Entomologist's Monthly Magazine*, **153**, 235–243.

de Rougement, G. 2017. 'Correction to Rougemont, G. de, 2016, 'Four unusual species of Eleusis Laporte (Staphylinidae: Osoriinae)' *Entomologist's Monthly Magazine*, **153**, 77–78.

de Rougement, G. 2017. New beetles from Hong Kong (Staphylinidae). *Entomologist's Monthly Magazine*, **153**, 261–278.

Esteve, J., Rubio, P., Zamora, S. & **Rahman, I.A.** 2017. Modelling enrolment in Cambrian trilobites. *Palaeontology*, **60**, 423–432.

Falk, S.J., & ***Pont, A.C.*** 2017. A provisional assessment of the status of calypterate flies in the UK. *Natural England Commissioned Reports*, **234**, 265 pp.

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Front and back cover:

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