

OXFORD UNIVERSITY MUSEUM OF NATURAL HISTORY

# Annual Review

2011–2012



OXFORD UNIVERSITY  
MUSEUM OF  
NATURAL  
HISTORY

The Oxford University Museum of Natural History Annual Review 2011–2012 was edited from reports supplied by heads of Collections, Sections and Research Units.

It was designed and produced by Claire Venables at Giraffe Corner Ltd.

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## Director's introduction

It is a great pleasure to be able to write my first introduction to an Annual Review as the new director of the Oxford University Museum of Natural History. The following pages illustrate a great deal of achievement during the 2011–12 year, in work spanning many different areas of activity.

However, the accomplishments and developments presented here are the result of work undertaken both before and after I took up the position of Museum director in February 2012. Many of the projects and changes that came to fruition during the year are thanks to the efforts and guidance of Professor Susan Iversen, who became the Museum's acting director for sixteen months after Professor Jim Kennedy retired in 2010.

Susan was instrumental in the reconstruction of the University's Old Zoology area to create a new research facility comprising a visualisation unit and a laboratory. The lab has already been put to very successful use by our Education team for the delivery of our immensely popular DNA workshops for A level biologists. Funding for our new visitor centre was also secured by Susan during her acting directorship. This space is now used jointly with the Pitt Rivers Museum and is located in the refurbished chemistry glass-blowing lab adjacent to the Museum.

In August 2011, we began the first phase of our roof repair and cleaning work, successfully removing and reinstalling all the glass tiles in the south aisle by February 2012. Following this work it became clear that the remaining work would be disruptive over a long period if it was carried out in separate phases, so one of my first decisions as the new director unfortunately had to be to close the Museum to the public for a year while the remaining two-thirds of the roof was repaired. As I write, we are on schedule to complete the work in time for reopening in February 2014.

The previous year had been one of considerable uncertainty for staff who are funded by the *Renaissance in the Regions* programme. Renaissance was originally administered by the Museums, Libraries and Archives council, but this body was abolished in 2010. Thankfully, a consortium of the Oxford University Museums and the Oxfordshire County Council Museums Service was successful in its bid to become one of Arts Council England's Renaissance Major Partner Museums. This brought £4.5 million of funding to the consortium that secured the posts of a number of Museum staff – and almost all of our Education staff – until March 2015. It also created the new Oxford ASPIRE partnership, which supports and extends the work of the consortium museums.

Another highlight from the year was the launch of an innovative JISC-funded consortium featuring the Museum, along with the British Geological Survey, the Sedgwick Museum, Cambridge University, National Museum Wales, and the Geological Curators' Group. Together this collaborative group is building an open-access online database of all the British fossil type specimens that are held in UK institutions. Meanwhile, and on a rather more basic level of public provision, we trialled a Museum café on the top gallery, offering visitors somewhere to sit, eat and drink for the first time. Not surprisingly, the café was popular and a café is now likely to become a permanent fixture on the gallery when the Museum reopens.

During the year we began to lay the foundations for what has since grown into a strategic vision for the Museum. This set of aspirations and objectives will guide the development of the Museum for the next five years.

With this in mind, and as this is my first formal review of our activities, I would like to say that I am proud to be leading the Museum into a challenging but exciting period of change and renewal. With the strategic vision in place and a desire to revitalise our displays, research, teaching and public engagement programmes, I look forward with confidence to our reopening in February 2014 and, of course, well beyond.



Professor Paul Smith  
Director



# Highlights

May 2012

## British fossil types to go online in JISC project

An innovative project to develop a collaborative database of all British fossil type specimens held in UK institutions began in May 2012. The project is being run by a JISC-funded consortium comprising the Museum and the British Geological Survey (BGS), the Sedgwick Museum, Cambridge University, National Museum

Wales, and the Geological Curators' Group.

Type specimens are the original material upon which a new species is based and are the key reference points to which the scientific name is attached. As such, types are fundamental to all ongoing taxonomic research.

Hosted on the BGS website, the database will contain text details of around 21,000 specimens drawn from the four institutions, along with high quality digital images of each specimen, plus 3D photography and a selection of rotating virtual 3D models. These models are based on high resolution laser scans around which the photography is wrapped to create a virtual fossil.

The online database will provide a single entry point for researchers wishing to discover more about the type specimens of any British fossil species. The website will also contain features for the general public, including grid references for each locality, showing graphical

representations of type fossil localities across Britain, and a range of educational pages on fossils and 3D modelling techniques. The Museum has purchased its own NextEngine 3D laser scanner, which is available to other collections and will be used to augment the material on the Museum website.

All the images and 3D models on the main BGS database will be available for unrestricted free download.

The project is led by Eliza Howlett, with André Ashington working on data improvement and Sarah Phibbs handling database development. Sarah Joomun is applying the 3D modelling to the creation of the laser scans. Lindsay Percival, who is responsible for creating high quality images and stereo anaglyphs, came second place in the Research Digital Image category at the OxTALENT Awards 2012 for her stereo anaglyph of the Ordovician trilobite *Trinucleus abruptus*. ●



Above: Lindsay Percival's prize-winning stereo anaglyph of the Ordovician trilobite *Trinucleus abruptus*

September 2011

## Acquisition of the Sid and Pearl Freeman mineral collection

In September 2011, the Museum's mineral collection was enhanced, for both display and research, by the acquisition of a substantial proportion of the Sid and Pearl Freeman collection. Sid and Pearl Freeman first expressed the desire more than 30 years ago that their personal collection of minerals should come to the Museum. These wishes were realised when their family invited us to make a selection from their extensive collection.

Pearl and her late husband Sid were judicious collectors of aesthetic and scientifically

interesting specimens from all over the world, obtained mainly through dealers and other collectors. We selected around 1,200 specimens, including an exceptional suite of nearly 100 baryte specimens, fine examples of zeolite group minerals from India, and superb examples of copper-lead-zinc mineralisation from the since-closed Tsumeb mine in Namibia. We were also able to add a number of books to our library. We would like to thank Pearl and her family for their generous gift.

A selection of specimens from the collection, along with material

from the Norman Thomson collection (acquired in 2010), were put on temporary display for the one day 'Nature's Treasures' conference. This was hosted by the Mineralogical Society of London, the Russell Society, and the Gemmological Association of Great Britain. Monica Price, assistant curator of Mineralogy, provided meteorites for delegates to view and handle, accompanying the demonstration of a virtual microscope by Andy Tindle and colleagues of the Open University. ●

October 2011

## Arts Council England award creates ASPIRE

Arts Council England (ACE) took control of the Renaissance in the Regions museum funding programme in October 2011, after the Museums, Libraries and Archives council (MLA) was disbanded. Following an open application process, which began in September 2011, a consortium of Oxford University Museums

and Collections and the Oxford County Council Museum Service was successfully awarded Major partner museum status by ACE in January 2012.

The Major Partner award carries funding of £4.5 million for the April 2012 to March 2015 period. It was awarded by ACE in recognition and support of the

University and County Council museums' drive to become a centre of national and international excellence and skills in the museum sector. Following the award, the successful consortium was branded as ASPIRE and the secretariat moved into refurbished offices in the old Zoology wing, led by project manager John Hobart. ●

November 2011

## A two million year old hominid

In November 2011, the Museum was presented with casts of the skull and hand of *Australopithecus sediba*, a 1.9 million year old hominid species discovered in the 'Cradle of Mankind,' north of Johannesburg in South Africa, in 2008. The casts were officially presented by Professor Loyiso Nongxa, Vice-Chancellor of the University of the Witwatersrand (Johannesburg) at a ceremony attended by delegates including the Pro-Vice-Chancellor for Collections Professor Ian Walmsley, the Acting Director of the Museum Professor Susan Iversen, and Malgosia Nowak-Kemp, collections manager for the Zoological

Collections at the Museum.

The skeletons are of a juvenile male and mature female and represent an intermediate grade in the evolution from the still quite ape-like australopithecines to the genus *Homo*, to which humans belong. The cranial cavity indicates that the hominid still had a small brain, but there are signs of distinctly human-like features: the hand has a relatively long thumb and short fingers, indicating a grasping ability perhaps capable of primitive tool-making, and the foot appears to have still been adapted for tree climbing, as well as for fully bipedal walking on the ground.

'We are delighted to have been given these casts, which are incredibly important items in the history of the development of humankind,' said Malgosia Nowak-Kemp. 'It's too early to tell for certain, but *Australopithecus sediba* appears to be the closest relative to *Homo* yet discovered. It will prove an extremely valuable addition to the teaching collection of pre- and early-human casts which are used by students of Archaeology and Anthropology, Human Sciences and Biological Sciences.' When not in use for teaching, the casts are displayed in the Primate and Human Evolution case along the lower northern aisle of the Museum. ●



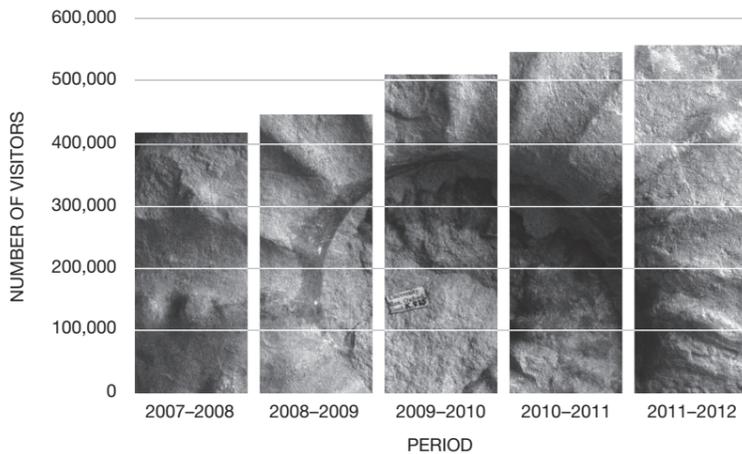
Below left: Cast of the skull and hand of *Australopithecus sediba*, a 1.9 million year old hominid species

Below right: Presentation of the casts by Professor Loyiso Nongxa, Vice-Chancellor of the University of the Witwatersrand

2011–2012

## Visitor numbers

There were 557,644 visitors to the Museum this year, 7,107 more than last year.



January 2012

## School's out, Natural History Club's in

In January, the Museum piloted an exciting new opportunity for primary school students from the Headington Partnership to join a Natural History After-School Club. Club members were selected by teachers from students in the last year of primary school who had demonstrated a genuine interest in natural history.

The weekly, hour-long Club, led by primary education officer Chris Jarvis, is intended to use the Museum and its collections to help nurture students' interests, expand their knowledge, develop independent study skills, and meet

other like-minded children in their age group, some of whom they will meet again at secondary school.

*"I felt privileged and excited... like the chosen one!"*

Natural History After-School Club member

Participants learned how to collect and pin insects, how to date rocks from microfossils, how to classify life from kingdom to species, and how life and technology rely upon minerals.

The club will now run with other primary partnerships as part of our regular service. ●

January 2011

## Le Conte type specimens discovered

While re-curating historical collections, Entomology staff are trained to recognise different handwriting styles, mounting methods, and locality data for individual specimens. This is important because it is often possible to add extra information to a specimen before it is re-housed. During the re-curation of a Hope-Westwood cabinet containing a number of beetle (Coleoptera) families, a series of specimens in the Histeridae family drawers appeared to be worth further investigation due to the style of the handwritten labels.

The four drawers of Histeridae all contained a few specimens featuring the addition of 'mihi' after their scientific names on the labels. This caught our attention because this Latin word translates as 'belonging to me' and is almost always applied to a specimen used by the researcher to describe a new species, indicating that the specimen is a putative type.

The names on these labels were checked against Mazur's World Catalogue of the Histeridae, where we discovered they were published by the naturalist and beetle specialist John Eatton Le Conte (1784–1860), who had been a correspondent of F.W. Hope. In 1845 Le Conte published *A Monography of the North American Histeroides*, in which all these specimen label names were to be found. We discovered 43 species of Histeridae donated by Le Conte, and of these, nine have handwritten species names followed by 'mihi'. They are currently being researched to discover if they are previously unrecognised type specimens. ●

July 2012

## Joint bid secures World Heritage status for Chengjiang

A collection of exceptionally-preserved Cambrian fossils has helped to secure World Heritage site status for their locality in Chengjiang, China. UNESCO granted the World Heritage status to Chengjiang following a bid involving the Chinese government and the Museum. Prior to the bid the fossils have already been the subject of a book, published in 2004, and various research publications, as well as featuring in a major exhibition in the Museum in 2010–11.

The bid resulted from the combined efforts of the Yunnan Provincial Government, two Chinese scientists from Yunnan

universities, and three palaeobiologists from the UK, including the Museum's Professor Derek Siveter. After an application process lasting several years, and involving detailed responses at each stage, along

with a visit to the field area by UNESCO officers, the Chengjiang site was admitted to the UNESCO World Heritage list at the final ratification meeting in St Petersburg, Russia in July 2012. ●



Above left: *Cricocosmia* - nematode worm

Above middle: *Fuxianhuia* - a 'primitive' arthropod

Above right: *Maotianoascus* - a ctenophore (sea gooseberry)

Below: A letter from Alfred Russel Wallace, reproduced with permission from the Alfred Russel Wallace Literary Estate

July 2011

## Wallace letters digitised thanks to volunteer help

The historically important archive of letters from 19th century naturalist Alfred Russel Wallace (1823–1913) was digitised and made available online for the first time. This resource includes material prepared by the Museum for the Wallace Letters Online website, which is hosted by the Natural History Museum, London, but forms part of the larger Alfred Russel Wallace Correspondence Project, of which Sir David Attenborough is patron.

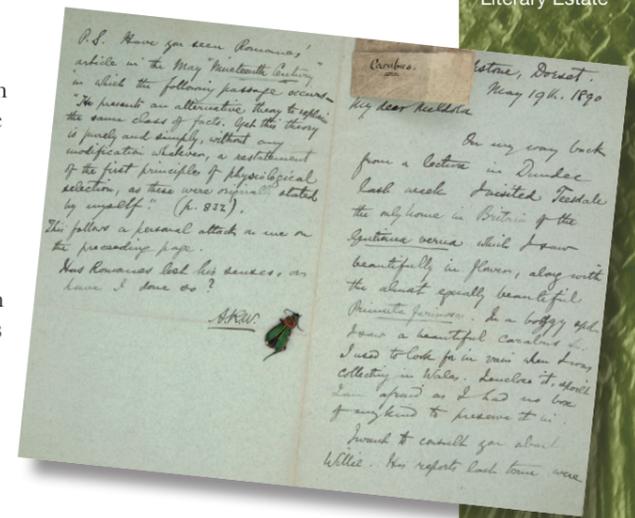
Along with the British Library, Cambridge University Library, Natural History Museum, and the University of Oxford, the Museum provided scans of Wallace letters and other material in a project led by volunteer Annette Lord. Annette carefully scanned and transcribed more than 300 items, including a letter to Wallace from Charles Darwin. Along

with the letters, the archive also contains lists of locations, some photographs, newspaper obituaries, and a booklet on spiritualism written by Wallace, with a note in manuscript at the front by his sister Frances 'Fanny' Sims.

"Topics covered in the letters vary widely, from discussions of scientific topics, and how to promote Darwinism, to family matters - trying to help his son with his studies, or finding a microscope as a birthday gift for his daughter," says Annette Lord. "They also record Wallace's discovery late in life that he was a year younger than he had thought. And there's even a postcard written on his 90th - and last - birthday saying he was "feeling quite jolly".'

Over 4,000 letters written or received by Wallace survive, although the original manuscripts are held in the collections of more

than 100 institutions and private individuals worldwide. Wallace Letters Online brings this material together in one place for the first time and includes correspondence between Wallace and Darwin about evolution by natural selection. [www.nhm.ac.uk/wallacelettersonline](http://www.nhm.ac.uk/wallacelettersonline) ●



Below left and right: The Museum's Natural History After-School Club





July 2012

## A collection of teeth from rare prehistoric mammals

Living in the shadow of a diverse and highly-adapted dinosaur fauna, Mesozoic mammals are rare and little known. It was therefore very exciting to receive a donation of 130 tiny mammal teeth from the Great Oolite (Middle Jurassic) of Kirtlington, Oxfordshire, collected and presented by amateur geologist Eric Freeman. Mr Freeman's

donation brings into the public domain what is probably the most important private collection of such material in Britain, and, alongside our small collection of Stonesfield mammal jaws acquired in the nineteenth century, will be an extremely valuable resource for scientific study of early mammalian evolution and diversity long into the future. ●

Above: Stereognathus crown of molar

Below: Learning at the Ghost Forest exhibition

## Exhibitions

2010 – 2012

### Goodbye Ghost Forest

After two years installed outside the front of the Museum, artist Angela Palmer's Ghost Forest moved to its new permanent home in Wales in July. The trees, which have also been in Trafalgar Square and outside the Danish Parliament in Copenhagen, will now be based

at the National Botanic Garden of Wales, Carmarthenshire. During its time at the Museum the Ghost Forest exhibition has been used for a number of educational sessions and events, as well as the high profile Grand Banquet of Rainforest Insects event. ●



May – September 2012

### Out of the Woods

Wytham Woods, an area of ancient semi-natural woodland just outside Oxford, is owned and used by the University of Oxford as a site of ecology and population studies. During 2011, Robin Wilson and Rosie Fairfax-Cholmeley were artists in residence at Wytham, spending a year drawing and sketching their responses to the changing seasons and landscape of the woods. The resulting work was exhibited at the Museum as a large collection of woodblock and linocut prints.

To accompany the exhibition Robin and Rosie ran a series of workshops including The Art of Scientific Illustration; Linocut Illustration; Bookbinding; and a four-day Illustrated Book Course. Participants included A level and GCSE Art students, as well as adults, who all produced artworks inspired by specimens in the Museum. ●

November 2011

### Mystical minerals

A temporary display of minerals and fossils with alleged mystical and healing properties was put together by Monica Price, assistant curator of Mineralogy, for delegates on the Geological Society's conference on Geology and Medicine in November. The 'Amazing Minerals, Curious Crystals' display attracted so much interest from visitors, that we decided to keep it out for much longer. The mineral component of the display remains on show at the far end of the upper gallery near our gemstone display. ●



Above: 'Terra sigillata', stamped clay prized for supposed medicinal properties

Below: A food web poster produced for the OneOak exhibition

September 2011 – April 2012

### OneOak

An oak tree that had been growing for 222 years on the Blenheim Palace estate in Oxfordshire was the subject of OneOak, a fascinating exhibition of art, science and community participation. The tree was felled on 20 January 2010 and was donated by His Grace the Duke of Marlborough to the Sylva Foundation which has since used it to increase understanding of sustainable woodland management.

To celebrate the OneOak exhibition, the Education team ran a series of themed workshops, reaching 177 pupils over four days. The Sylva Foundation had already worked closely with a group of primary schools to study the living tree, witness the felling and create charcoal from its wood. Chris Jarvis and Rachel Parle continued this relationship by inviting the schools into the Museum for a day.

Each class of Year 5 and Year 6 students took part in three woodland themed workshops linked closely to the exhibition, including sessions on sustainable harvesting and creative work inspired by forest animals from

around the world. Lynn Daley from Harcourt Arboretum brought the woodland indoors in the Tree Discovery workshop, where pupils explored the enormous dimensions of the OneOak tree by mapping it out in the Museum with ropes.

This exhibition was also supported by Entomology staff

who helped to prepare and present specimens from the British collections for display in the upper gallery. The insects were chosen by the OneOak team and arranged by exhibition curator Jane King and Amoret Spooner in the Entomology Collections. ●



# Education and public engagement

## Remarkable Victorian Women

In June, two time-travelling visitors from the past helped the Education team to pilot a new primary session called Remarkable Victorian Women. This special joint project



with the Pitt Rivers Museum centres on two famous female figures from the 19th century – palaeontologist Mary Anning and ethnographer Mary Kingsley.

Education officer Rachel Parle dressed as fossil hunter Mary Anning, revealing the story behind her famous finds through a Museum tour, fossil-handling and the recreation of beach fossil dig. Meanwhile, volunteers coordinator Caroline Cheeseman became Mary Kingsley and explored the West Africa collections in full Victorian dress in the Pitt Rivers Museum.

Remarkable Victorian Women is intended to give teachers a new and exciting way to cover many areas of their Key Stage 2 curriculum. The session was developed by Caroline Cheeseman, Rachel

Parle, and Pitt Rivers Museum primary education officer Becca McVean, and was piloted with two local primary schools, St Ebbes and St Barnabas.

*“There is a tinge of Gold that is false”*

a primary student reports one discovery from the Remarkable Victorian Women session

Feedback from students and teachers was very positive. Teachers commented that they ‘loved the role play’ and ‘would definitely recommend it to other schools’. Remarkable Victorian Women was offered as a full primary school session in autumn 2012. ●

## The evolution of *Homo sapiens*

The popularity of the Museum’s undergraduate classes on *Homo* and hominin diversity and evolution for helped to secure funding of £2,044 from the University’s Boise Fund to purchase further casts to be used as practical teaching aids. The casts, made from a durable material resistant to chipping and breaking, are particularly suitable for handling and teaching. They

were immediately put to use by Malgosia Nowak-Kemp, collections manager for the Zoological Collections, who has used them in a number of classes, as well as at a Boise Fund workshop talk titled ‘From *Eoanthropus dawsoni* to *Australopithecus sediba*: the use of hominid casts in undergraduate practical classes’. ●



## A Question of Taste

In 2011, the Museum was selected as one of 15 organisations to deliver a new DNA workshop for A level biologists. More than 130 students attended the workshops in spring 2012 to explore an unusual human trait, the ability of only some individuals to taste the bitter chemical phenylthiocarbamide.

Chimpanzees share this trait and for a long time scientists thought it had arisen in a common ancestor. But recent DNA research shows this is not the case and that the similarity is a result of convergent evolution.

The five hour workshops were led by secondary education officer Sarah Lloyd and head of education Janet Stott, and supported by a pool of ten University scientist volunteers, volunteering two per workshop. Students used high-tech equipment rarely available in schools to investigate their ability to taste the bitter chemical (their phenotype). They then analysed their own taste receptor genes (their genotype) by extracting DNA from their cheek cells and amplifying it using

the polymerase chain reaction (PCR). The ‘taster’ and ‘non-taster’ genotypes are revealed by visualising the DNA using gel electrophoresis.

A Question of Taste was developed by the Association for Science and Discovery Centres, At-Bristol, the Centre for Life, and Nowgen, with support from the Wellcome Trust. The pilot project was very successful and the Museum plans to embed the workshops into the school programme. ●

## Exploring our family of museums

From June 2012 the University Museums piloted a new joint poster and leaflet, titled Explore. Displayed at each museum, the poster encouraged visitors to take the leaflet, which contained a handy map, and explore the other museums. The leaflet represented the first output from ASPIRE’s joint museums audience development budget and has proven successful enough for an early reprint.

Separately, in May 2012, over 2,000 people enjoyed a brilliant Museums at Night event, jointly marketed across the four University Museums for the first time and billed as The Grand Tour. The Museum provided an eclectic all night soundtrack, a successful bar (with some imaginative cocktails), and the Wytham Artists in Residence delivered hands-on print workshops all evening. ●



## Planet Dinosaur

“A herd of *Spinosaurus* skeletons has taken over the Museum!” So cried visitors to the Museum in November 2011. In collaboration with the BBC’s exciting TV programme ‘Planet Dinosaur’, the Education team offered a fascinating and fun opportunity to discover more about dinosaurs.

In this week-long event, the BBC’s huge *Spinosaurus* skeleton models were built by families, primary school children and a group of 80 Woodcraft Folk children, who explored the Museum by torchlight. Education officers delivered a bespoke workshop for primary schools, exploring new evidence about the dinosaurs featured in the BBC series, and including

object handling, a Museum tour and an amazing 3D film.

The public activities were so popular that we allocated timed

tickets in advance. More than 1,800 children took part in Planet Dinosaur during the course of the week. ●



Above: Dmanisi *Homo erectus* skull

Below: School pupils build a model *Spinosaurus*

## Students, families and volunteers

The Education department’s wide-ranging schools programme continued to be extremely popular, with 27,454 UK school students visiting in 769 groups during the course of the year.

It was a record year for Family Friendly events too, with more than 120 days of activities. For the first time, families were offered

activities throughout the summer holidays, with Bags of Fun backpacks available every Tuesday and Wednesday afternoon.

Volunteers remained an indispensable element of our provision, with 271 people helping out at 164 different educational sessions, as well as events for families, schools and adults. ●



Above: Caroline Cheeseman (left) and Rachel Parle become Remarkable Victorian Women

Right: The Explore branding promotes all the University Museums and Collections

Below: A young visitor rummages for material to create a Museum Masterpiece

## Revealing architecture

The history and craftsmanship of the Museum's magnificent 19th-century neo-Gothic architecture was illuminated through new architecture tours for adults, delivered by specially trained volunteers. A pool of volunteer tour guides completed a six week training programme by



volunteers and outreach manager Joy Todd, volunteers coordinator Caroline Cheeseman, and primary education officer Chris Jarvis.

The training included information about the history of the Museum, the characters involved in its inception, and its architectural significance. The training also included tips and personal mentoring on public speaking, presentation of information, and group management.

These tours, running alternate Saturday mornings, have expanded the Museum's small offering for adult public engagement. Although participant numbers have not been enormous – possibly due to timetabling – feedback has been overwhelmingly positive and we hope to continue with the tours and to recruit more volunteers in the future. ●

## Geologists at large

Staff from the Geology Collections contributed to numerous public engagement events throughout the year. Derek Siveter presented research papers on the Herefordshire Lagerstätte at the University of Kunming, China and at the 5th Conference on Trilobites and their Relatives in Charles University, Prague. He also gave talks on the same topic to the Bath Geological Society and at the one-day meeting, titled

'Nature's Treasures', organised by the Russell Society and Rockwatch, held in the Museum in February.

Paul Jeffery spent two days on-site in Nettlebed, Berkshire, examining local 'Puddingstones' (early Palaeogene silcrete, or dissolved and re-solidified silica) before giving updated details to Nettlebed Parish Council for a new information board. He gave tours of the Geological Collections to Brighton and Hove Geological Society; Warwickshire Geological Conservation Group; a group attending a conference on the history of medicine wishing to see geological items attributed with healing properties; and to a family group who had won the tour at a charity auction. He also gave an evening tour for the Museum's Natural History After-School Club.

Following a collections tour given last May to the Malvern branch of the U3A, Eliza Howlett worked with course leader Alan

## A prize-winning experience

Luke Berry of Northfield School, Blackbird Leys, undertook a work experience placement at the Museum and was then awarded a school prize, presented by Radiohead bassist Colin Greenwood. Luke worked with Geology staff Eliza Howlett and André Ashington for six half days during April and May. He hopes to return to the collections as a volunteer. ●



## HLF Skills for the Future

During the year, the Oxford University Museums and Collections hosted the first four trainees in an ongoing Heritage Lottery Fund 'Skills for the Future' training programme in Museum Education and Outreach. The initial three year grant from HLF, since expanded, funds trainees for 18 months to undertake six month placements in three of the four Museums and the Botanic Garden and Arboretum.

The traineeship provides on-the-job training in museum education work, supported by a special programme of workshops looking at many aspects of the role, as well as the wider heritage sector. Scott Billings was the first trainee to be hosted by the Education department, starting in May 2011, and was followed by Lea Kloepfinger in May 2012.

### Science Saturdays

In November 2011, the Museum launched a new drop-in family event aimed at delivering hands-on, specimen-led science activities to older children, aged eight-plus. The weekly Science Saturdays strand is delivered by scientist volunteers drawn from the University and specially trained by the Joint Museums Education

Service and Education teams. A team of up to five scientists offers visitors one to one interaction with four different activities, each drawing on one of the Museum's four principal collections: Entomology, Geology, Mineralogy, and Zoology. Visitors handle specimens, ask questions and solve a series of scenarios to learn more about the natural world and the work of scientists, naturalists and museums.

Science Saturdays was developed by Scott Billings during his six month HLF training placement with the Museum's Education department. The activity has since been entered for an award in the Educational Initiative category of the Museums + Heritage Awards.

### Renaissance Globe Project

A collaborative project focused on the art, science and craftsmanship of globe-making featured extensive involvement by a number of the HLF trainees. The HLF-funded Renaissance Globe Project was led by the Museum of the History of Science, which worked with this Museum, the Ashmolean, and the Museum of Oxford to create giant, metre-diameter polystyrene globes for use in a wide variety of creative



activities for school groups, families and the public.

Lea Kloepfinger coordinated a team of volunteers at the Museum, who worked with a range of audiences to create a globe that revealed information about different animal habitats. The globe also featured secondary schools students' responses to Charles Darwin's voyage on the Beagle. Working in the Joint Museums Education Office, HLF trainee Vicki Wood coordinated 26 volunteers who combined gave around 200 hours of time to the project.

[www.mhs.ox.ac.uk/globes](http://www.mhs.ox.ac.uk/globes) ●

Above: Learning about skeleton adaptations at Science Saturdays

Below: *Onthophagus spinifex*, a dung beetle from Sri Lanka

## Bugs alive!

Entomology staff hosted a number of events for societies and the general public throughout the year. These included playing host to the British Entomological Society Annual Meeting and the Amateur Entomologists' Society's Bug Club annual event, where young entomologists met for a day of insect talks and activities, including behind the scenes tours of the Hope Entomological Collections.

Oxford city's first 24 hour 'Bioblitz' saw assistant curator

Darren Mann and education officer Chris Jarvis working with Science Oxford and local experts from the county's wildlife trusts and organisations. The Bioblitz involved running around an area in East Oxford to the top of South Parks looking for life of all kinds.

National Insect Week, from 25–29 June, saw plenty of insect handling in the upper gallery. Each day Entomology staff ran two sessions with an assortment of hands-on 'bugs': from stick insects

and grasshoppers to scorpions and tarantulas, much of which came from the menagerie in Entomology. ●

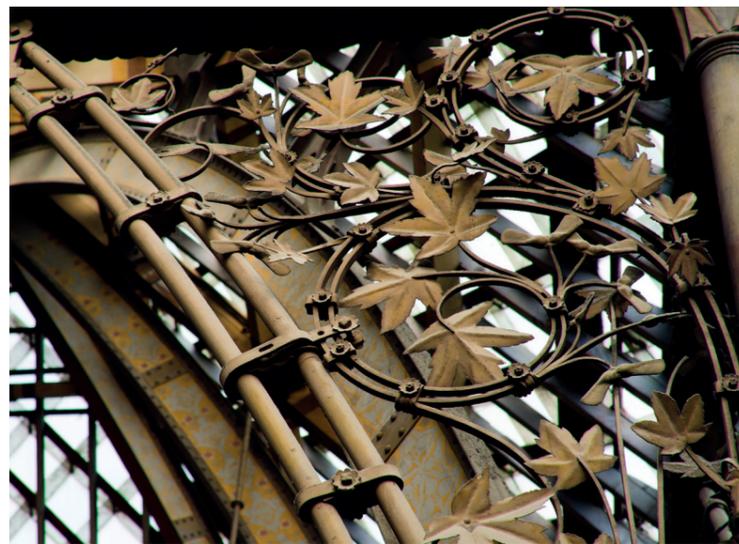


# Research

## The Pre-Raphaelites and the Museum

The Museum supported a bid by Dr John Holmes, Senior Lecturer in English Literature at the University of Reading, for an AHRC Research Fellowship focused on The Pre-Raphaelites and Science. The fellowship was awarded in May 2012 and is run in collaboration with the Natural History Museum, London, the Manchester Museum and the Manchester Art Gallery.

The Pre-Raphaelites were actively involved in the design of the Museum itself, while their art was directly cited as a model for its decoration. The Museum agreed to support Dr Holmes's research from October 2012, with the ultimate aim of producing an exhibition, together with a programme of talks, and scholarly and educational literature. ●



Above left: Delicate architectural ironwork in the Museum

Above right: Simuliidae (biting blackfly) pupae in the River Azat, Garni Gorge, Armenia, May 2012.

Below: Sorting material from the House of the Epigrams at Pompeii

## Sacrificial secrets at Pompeii

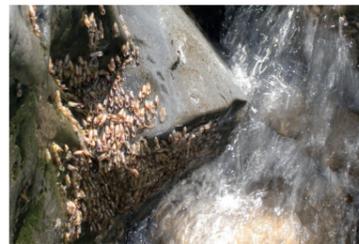
The remains of sacrifices and burnt offerings were uncovered in the House of the Epigrams at Pompeii thanks to work carried

out by students for the Museum's Environmental Archaeology Unit. According to Professor Mark Robinson, who leads the Unit, a number of different discoveries were made at the site, including some curiosities, such as an ostrich egg, apparently displayed around the edge of the garden. Sacrificial offerings included entire domestic fowl, but only token parts of sheep and pigs. Plant offerings included stone-pine cones, fruits such as figs, and even a couple of seeds of black pepper, which would have been imported from India. Mark Robinson was invited to the University of Lund to lecture on the project. ●



## Blood-sucking flies in Armenia

Honorary associate Dr Adrian Pont spent two weeks in Armenia during May 2012 collecting flies, in a project supported by the Natural History Museum, London. The fieldwork was carried out in association with the International Science and Technology Centre in Moscow under a project titled 'Molecular genetic monitoring of blood-sucking flies (Diptera) as a basis for the biological control of vectors of dangerous infectious diseases and precautions against the acts of biological terrorism'. The fieldwork was conducted under the direction of Drs Maria and Karina Harutyunova of the Institute of Molecular Biology, National Academy of Sciences, Republic of Armenia. ●



## Collecting in Kazakhstan

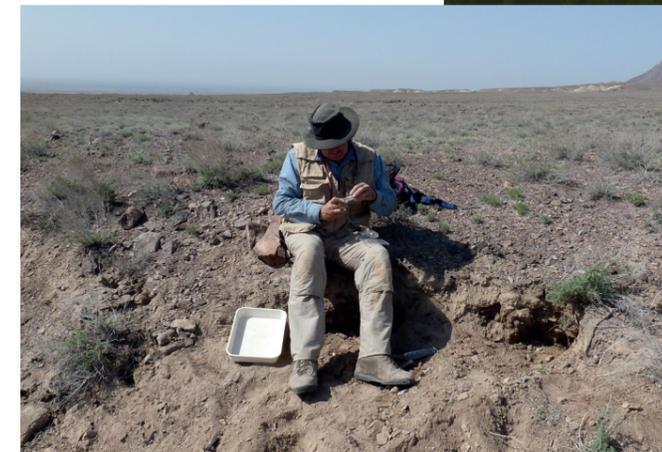
Entomology Collections assistant curator Darren Mann and honorary associate curator Jon Cooter were invited by the Siberian Zoological Museum of the Institute of Animal Systematics and Ecology, Siberian Branch of the Russian Academy of Sciences, to join a collecting expedition to Kazakhstan. Darren and Jon visited the Altyn-Emel National Park, covering some 4,600 square kilometres of desert and rocky terrain in southeast Kazakhstan, between the Ili River and the Ak-Tau mountain range.

Around 4,000 specimens were collected during the expedition, mostly of beetles, but also numerous other bugs, bees and even a shrimp. A good-sized field collection of Coleoptera was made in Kazakhstan and a smaller collection in Siberia. This included several very poorly known dung beetles; a wide variety

of wetland species from the banks of the Ili river, Karasuk lake and in the environs of Novosibirsk; and some scarce 'oil beetles' in Kazakhstan. The majority of this material was new to the Museum's collections and, in cases where we have long series, can be used as valuable exchange material.



In October 2011 and March 2012 Jon also visited the International Insekten Börse, Prague and collected several loans on behalf of the Museum and obtained a number of beetles including a recently-described new species and paratype material for the collections. ●



## Work continues on the Herefordshire Lagerstätte fossils

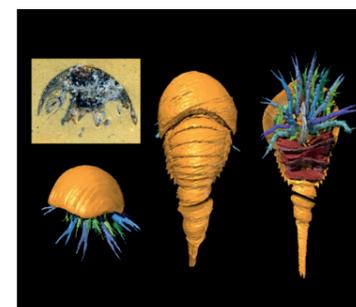
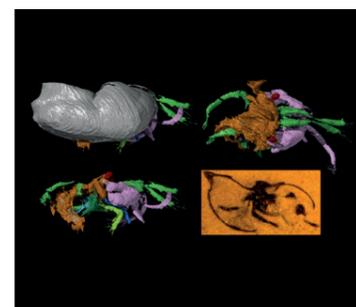
Professor Derek Siveter stood down after 23 years as assistant curator, and later as acting curator, to take up a senior research fellowship, but research continued on the exquisitely preserved soft-body tissue fossils of the Herefordshire (Silurian) Lagerstätte.

Although the £336,000 NERC-funded research grant for the 'Reconstruction of the Herefordshire Lagerstätte' came to an end in September 2011,

research and publication will continue for several years yet on the fossils that have been analysed. There are many more exceptionally preserved fossils still to be investigated from this geological horizon and Derek has subsequently returned to the Museum in a part-time capacity to continue this work.

Derek has also worked on the Chengjiang (Cambrian) Lagerstätte and was, in recent years, one of

the key authors of a world heritage bid to UNESCO, which reached a successful outcome in the summer of 2012 (see Highlights). ●



Above: Fieldwork in Kazakhstan

Below left and middle: 3D reconstructions of Silurian arthropods from the Herefordshire Lagerstätte.

Below right: Professor Derek Siveter

# The collections

## Improving the online collections

A comprehensive upgrade of the collections databases was completed during the year and a bid was submitted to Arts Council England's Designation development fund to digitise the Museum's William Smith archives and make them available online.

In July 2012 an EP Abraham Internship Programme student began a project to digitise archives relating to the building of the Museum. The project provided

a valuable learning experience ahead of future digitisation projects in the Archive.

The historically important Corsi collection of polished stone is now available on a specially-compiled website, thanks to an Esmée Fairbairn Foundation-funded collaboration between the Museum and the University's Web Design Consultancy.

Lindsay Percival was appointed project assistant in September 2011,

working with Mineralogy Collections assistant curator Monica Price and head of IT Sarah Phibbs to clean and code the data and prepare images of the 1,000 stones. Lisa Cooke's English translation and commentary of Faustino Corsi's (1771–1845) *Catalogo ragionato* was checked and augmented by Monica, and Dr David Bell, a retired member of the Earth Sciences department staff, gave welcome help in preparing geological descriptions of the igneous material.

The Corsi website was launched at the end of May 2012. A launch event including a short talk by Monica about the collection, displays of Corsi specimens, and informal demonstrations of the website, was attended by the University Vice-Chancellor, colleagues from other museums and institutions, artists and members of the stone trade.

[www.oum.ox.ac.uk/corsi](http://www.oum.ox.ac.uk/corsi) ●

## Eliza Howlett assumes care of Palaeozoic collections

Eliza Howlett has taken over responsibility for the Palaeozoic collections. Eliza has continued her work on improving their curation, arranging a series of trips to Nuneham Courtenay church to bring back material from the University of Hull Collection, which was then cleaned and

sorted by a number of volunteers. She began work on Paul Clasby's database of the 16,000 Lyell specimens, adding full stratigraphic details in order to make searching easier. Since November, she has been running the Oxford end of the JISC-funded project 'GB/3D Fossil Types Online'. ●



Above: *Dialutocrinus polydactylus*, Carboniferous Limestone Caldy Island, Pembrokeshire

## Wager archive grows with donation

The archive of material relating to geologist and explorer L.R. Wager (1904–1965) was augmented in September 2011 when, following the death of his widow Phyllis Wager, his family agreed to donate a substantial amount of material to the Museum. The donation was mostly composed of photographs, but also included diaries and maps relating to East Greenland and the Himalaya.

We are in the process of digitising this material, beginning with photographs and diaries relating to Wager's 1933 Mount Everest expedition. The geological diaries and around 550 photographs have already been scanned, and a start has been made on a transcription of the diaries.

In January 2012 Dr David Waters, curator of Mineralogy Collections, gave a presentation

using Wager's photographs and diary entries to a meeting of Himalayan researchers from Oxford and the Open University. The presentation highlighted Wager's observations on the structure now known as the South Tibetan Detachment System, and showed how Wager's work could be applied to modern research. The presentation can be seen in full at [bit.ly/oumwager](http://bit.ly/oumwager) ●

Below left: E Greenland, sledging on frozen fjord, spring 1936

Below right: E Greenland, field camp beneath pointed peaks



## Name that beetle!

The Guardian's online Name a Species competition featured an image of *Brindalus porcicollis* – a shiny sand scarab – which was supplied by the Entomological Collections. The Guardian competition asks readers to invent common names for ten threatened UK species. ●



Above: *Brindalus porcicollis*, a scarab beetle in want of a common name

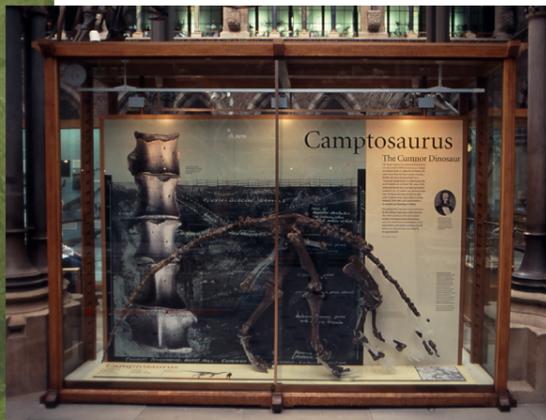
## Dismantling dinosaurs

Dr Paul Barrett and Dr Susannah Maidment of the Natural History Museum, London worked with Paul Jeffery and Juliet Hay from our Geology Collections on the careful dismantling of the skeleton of the dinosaur *Cumnoria* in the main court. As well as being examined and photographed, the

presence of expert help allowed us to identify and re-mount previously mis-allocated bones, particularly in the dinosaur's feet. A new fixing technique was applied which leaves the specimen more secure and gives individual bones far better support and freedom from wear and abrasion. ●

Below left: The Cumnor Dinosaur display in the Museum

Below right: The left foot of the dinosaur *Cumnoria* after being re-mounted



## Library sets strategy

The Hope and Arkell Libraries have seen considerable change in the past year. In August 2011, Kathleen Santry was appointed as assistant librarian and archivist, with Mark Dickerson continuing as librarian one day a week. During the year, Kate completed training in cataloguing on Oxford's new system, Aleph, and in Oracle financial software. She also attended a Heritage Lottery Fund funding workshop, in preparation for funding bids for archival projects. At the same time, the Library Committee was reformed to oversee the strategic direction of the libraries, and comprised library staff, the director, and representatives from each of the collections, IT and Education departments. ●

## Cataloguing, documenting (and scaling spires)

Cataloguing the Museum's collections is an ongoing task, but a vital one in order to create a resource for further study and teaching. Here is a selection of some of the important cataloguing work that took place during the year.

### The George Rolleston archive

A professional archivist was appointed in January 2012 to complete a basic catalogue of the archive of Professor George Rolleston (1829-1881), who became the first Linacre Professor of Anatomy and Physiology at the University of Oxford in 1860, the same year the Museum opened. This appointment was made possible thanks to an award of £6,750 from the University's John Fell Fund, after an application by Malgosia Nowak-Kemp, collections manager for the Zoological Collections, and Alison Roberts, curator of European and Early Prehistoric collections at the Ashmolean Museum, which holds the archive.

Rolleston was a close colleague and protégé of the evolutionary

biologist Thomas Huxley, and was one of the most influential and distinguished scientists in Oxford during the later nineteenth century. Presently, only the papers relating to his archaeological work in Oxfordshire are catalogued – less than 15% – but there is strong potential for the remaining material in the Museum and Ashmolean to contribute to research on the history of science at Oxford, as well as to the documentation of his collections, including human remains, which are held at the Museum.

### Cataloguing the Cretaceous

Over the course of the year Geology's André Ashington succeeded in cataloguing some 10,372 specimens from the historic Cretaceous collections, working under a twelve month project funded by the E.P.A. Cephalosporin Fund. With the contribution from other staff, interns, temporary workers and volunteers included, we have catalogued a grand total of 12,725 specimens this year.

Jacqui Machin was employed for a month to continue work on Palaeozoic material from the J.H. Huxtable and J. Parker Collections. In all, 379 specimens were catalogued, completing the documentation of the Huxtable material, while additional Parker material found in our 'boxed series' means that there are some 600 Parker specimens still to be catalogued.

### Cenozoic mammal fossils catalogued for JISC project

Renaissance money transferred from the Mineralogy Collections following the departure of Jo Corp enabled the Geology Collections to pay Sarah Joomun for five months to start upgrading records of UK type specimens in readiness for the start of the JISC project (see Highlights). With Eliza Howlett,

Sarah co-supervised E.P. Abraham Internship student Emma Jude, cataloguing and researching Cenozoic mammal specimens, including Eocene material from France presented by Georges Cuvier to William Buckland, and Pleistocene material from Kent's Cavern, Devon, collected by W. Pengelly.

### Wasps and beetles

A donation to the Museum of around 8,500 beetles (Palearctic Coleoptera) housed in some 30 cabinet drawers was made by Chris Rayden. After being frozen at -30°C for two weeks after arrival, to destroy pests that had infested the specimens, the entire collection was accessioned as one lot and is being labelled and re-curated for inclusion in our main holdings.

Entomology's Amoret Spooner undertook more beetle cataloguing when she arranged and expanded the world (non-British) collection



of Coleoptera according to the up-to-date Bouchard catalogue of 2011. The collection space has been expanded to allow for the cataloguing of more beetle families in the collection, such as Carabidae, Cerambycidae and Scarabaeidae. The new cataloguing and labelling makes the world Coleoptera collection much easier to navigate for staff, volunteers and visitors.

Honorary research associate Chris O'Toole finalised the manuscript of a catalogue of the families of aculeate Hymenoptera, or stinging wasps, whose type series were split between the Museum and the Natural History Museum, London.

### Scaling the spire of the University Church

Finally, Philip Powell has continued to catalogue material collected

during the construction of the M40 through Oxfordshire, and to answer enquiries on building stones. In April, he was invited to climb the scaffolding on the spire of the University Church of St Mary the Virgin to identify stones for two research students working with Professor Heather Vine from the School of Geography and the Environment on agents of deterioration in building stone. ●

## Idlewild Trust grant for net-winged insect specimens

An Idlewild Trust grant of £3,000 was successfully secured by Amoret Spooner for the conservation and digitisation of our internationally important Neuropteroid collection, or net-winged insects. This is a significant collection, not only in quantity, but in the quality of the specimens. Families included in the order Neuroptera are Ascalaphidae (Owlflies), Chrysopidae (Lacewings), Mantispidae (Mantidflies) and Myrmeleontidae (Antlions).

The grant, which was awarded in May 2012, was used to transfer the collection from Victorian cabinets in the Museum's Huxley

Room to new drawers and cabinets in the Upper Poulton Room. Although the Victorian cabinets are in good condition for their age, there was still a high risk of pest infestation; because Neuroptera are so fragile any pest damage could easily result in the destruction of a potentially important specimen.

As part of the move, Amoret and Zoë Simmons photographed the original drawers, before relabelling and organising the draws and cabinets into a catalogue arrangement, leaving room for further expansion. Re-curating specimens in this way involves

some investigation into their provenance and importance. 'It is necessary to check each specimen to identify its importance', says Amoret. It was expected that there would be type (original) specimens in the collection that had not been recognised previously. Identifying these involves researching the hand-writing of the collectors, the locality data, and the way in which the specimen was originally curated. We found 21 specimens consisting of four species that were types and these are now placed within the Hope Entomological Collections type collection.' ●



Below: Professor George Rolleston (1829-1881)

Right top: A damaging beetle, *Anthrenus verbasci*

Right middle and bottom: Examples of the Rayden collection in the Museum



Left top: Neuroptera cabinet situated in the Huxley Room

Left bottom: Example of original Neuroptera drawer before reorganisation

## Partnerships

### Oxfordshire Goes Wild

The ninth annual Oxfordshire Goes Wild event took place in the Museum in April, in partnership with the Oxford Nature Conservancy forum, attracting well over 1,000 people. Along with live animals, games, specimens, and information about local wildlife and botany, visitors were also able

to meet 17 local and national nature and wildlife conservation groups and find out about their work. The Museum acts as a focal point in this effective partnership, bringing together different interested groups and engaging the public on a range of wildlife conservation issues. ●



Right: The crowd goes wild at Oxfordshire Goes Wild

Below left: Redisplayed ichthyosaur bones at Abingdon Museum

Below right: Woodeaton Quarry

### Ichthyosaur conservation for Abingdon Museum



Collaboration with Abingdon Museum continued, with Geology Collections staff Juliet Hay, Eliza Howlett and Philip Powell visiting the Museum in April to install the ichthyosaur skeleton that Juliet had conserved prior to the formal reopening of the Museum in July. The near-complete ichthyosaur originates from the Kimmeridge Clay (Upper Jurassic) of Curtis's Pit, Abingdon, and comprises some 200 separate bones. Most of these were in fragments, which were cleaned and re-joined in the Museum's lab, before being carefully packed for transport back to Abingdon. ●

### Fossil rescue for Woodeaton Quarry

The year saw the start of a collaborative project with the University's Department of Earth Sciences and the Natural History Museum, London, to provide advice on maintenance and to undertake a rescue dig of vertebrate-bearing geological horizons at Woodeaton Quarry, Oxfordshire. Woodeaton is designated as a Site of Special Scientific Interest (SSSI) thanks to the exposed highly fossiliferous Middle Jurassic strata that are found in the disused quarry.

The site has previously yielded cetiosaur and stegosaur bones, but it is scheduled for a partial landfilling operation in 2013 onwards. With the help of local geologist Alan Banyard, staff from the Museum have secured the cooperation of site operators McKenna Plant Hire, and negotiations began with the land owners, the Church of England, for permission to temporarily extend a small portion of the current excavation. Grant funding to continue will be sought once all appropriate permissions are in place. ●



## Running the Museum

### A new space for visitors... and a new place to eat

Work began on a new space for visitors to both the Museum of Natural History and Pitt Rivers Museum, through the conversion of the old glassblowing laboratories adjacent to the Museum. This flexible space is designed to give both museums new facilities to expand and diversify their

activities, as well as provide much-needed additional toilets. The visitor centre will be used for educational sessions with schools groups and the public, as well as for other special events. Separately, plans for the trial run of a café area on the upper gallery were agreed, giving visitors a chance

to enjoy a hot or cold drink and a snack inside the Museum for the first time. Feedback from this trial was positive and it is now expected that a café will become a permanent feature of the Museum when it reopens early in 2014 following completion of the roof repairs. ●

### Towards a new Museum strategy

In 2012, we began the process of developing a new strategy for the Museum that will express our ambitions over the next few years. To kick things off the executive group and Board of Visitors convened for an away-day at Jesus College in

June to pull together initial thoughts and ideas. Numerous aspects of the strategy were further developed over the summer of 2012. A series of working groups on public engagement, interpretation, research, and collections started to meet ahead of

an open discussion of the plans with staff. Museum director Paul Smith subsequently presented a strategic vision document to all staff, which laid out the Museum's ambitions for education, exhibitions, research, stewardship and leadership. ●

### Raindrops stop falling on our heads

The first phase of roof repairs, which commenced in August 2011, was completed by our contractors Beard Construction and specialist heritage architects Purcell in February 2012. The careful removal, cleaning and resealing of the roof's original glass tiles has resulted in light, but no longer water, flooding into

the Museum's south aisle, setting the stonework aglow. Following the success of this first stage the Board of Visitors decided in May 2012 to proceed with the initial three-year plan to repair the whole of the roof.

After all the requirements for the repair work were carefully considered it became clear that

the Museum would have to close to the public for the duration of the work, throughout 2013. To remain open during the work, or to carry it out in two phases, would be much more complex, time-consuming and considerably more expensive, with a much impaired visitor experience in the meantime. ●

### Staff changes

Renaissance-funded curatorial assistant in the Mineralogy Collections, Jo Corp, left to pursue a new career with Thames Water. Jo had continued to make excellent progress in addressing cataloguing backlogs in the petrological collections and we would like to thank her for an exceptional contribution. Jo's efforts included: Cleaning and reorganising some 26,000 thin sections; reorganising 2,100 specimens in the Miscellaneous Rocks collection; cataloguing

and digitising in excess of 9,400 specimens; and the decanting and rearrangement of much of the collections of Lawrence Wager (Professor of Geology, 1950–1965) following the transfer of the old Earth Sciences basement store into the Museum's control.

Lindsay Percival was appointed in September as project assistant for development of the Corsi website and her post was extended for a further three months. In addition to her work on the website, Lindsay catalogued

archives relating to the Corsi collection, and she assisted with the preparation of displays, the transfer of the Freeman collection and other curatorial activities.

Bethany Palumbo accepted the post of life sciences conservator in June, moving to Oxford in August 2012 from the American Museum of Natural History where she undertook a conservation fellowship. Bethany became responsible for the integrated pest management (IPM) at the Museum. ●

## Unsung Hero

Roy Overall, carer and documenter of the Museum's swift colony for almost 50 years was justly awarded the Unsung Heroes prize in the 2012 round of Art Fund Prizes. Roy took over the monitoring of the swifts in 1962, ringing more than 4,000 birds during his involvement with the Oxford Swift Project. In 1965 a roof repair made it possible to increase the number of glass-backed nest boxes in the tower ventilation holes from 40 to 80 and add another 67 beneath the eaves, quadrupling Roy's work.



Above: Roy Overall (front, centre) receives the Unsung Heroes Art Fund prize in 2012.

Image courtesy of the Art Fund. Photo: Simon Rawles.

Roy recorded every breeding season of the swifts, making at least 25 visits per nesting season year and climbing the tower at least 1,200 times. In 2011, Roy handed over the reins to the Edward Grey Institute of Field Ornithology to record the breeding numbers.

However, it is disappointing to report that the swifts in the

Museum's tower had a very difficult year in 2011-12. The colony population appears to have been in decline for several years, although the cause is unknown. Consequently, Andy Gosler of the Edward Grey Institute of Field Ornithology, and monitor of the swifts, had already decided to keep disturbance to a minimum during the year and no adult swifts were handled. However, the wettest summer on record did not help matters.

The swifts arrived back very late and were low in number. By 30 May nests had started in 26 boxes, and at least ten of these had eggs. But torrential rain on that day prevented the adults from feeding and of the 26 adults sitting in 17 boxes, only six were incubating. By mid-June we were observing egg rejection and it was clear that clutches were being abandoned by parents. The first chick to hatch died a few days later, which is exceptional for swifts. In the end, of the 32 nests started only 14 chicks fledged from just eight nests, about a quarter as many as usual.

It is to be hoped that the small number of birds returning this year indicates that they might have bred elsewhere further south, and that they might return in 2013 if the weather is better. Nevertheless, 2013 will be a critical year for this colony. We shall monitor again without handling adults, and hope that the swifts are not too disturbed by the essential repair work to the Museum roof. ●

## Landscaping gets underway

The year marked the start of a substantial exterior landscaping project to improve the area immediately in front of the Museum. The scheme may include some subtle lighting of the architecture to enhance the appearance of the Museum at

night without causing excessive light pollution. Some original features will also be reinstated as the new railings and the shape of the redrawn lawn will mimic the Museum's original landscaping design, created in mid-19th century when the Museum was founded. ●

## On the TV

For three days in May, Sir David Attenborough filmed a new television series called 'Natural Curiosities' in the Museum. The series, which is produced for UKTV's Eden channel, featured the chameleon, giraffe, midwife toad and butterfly collections from the Museum. Our librarian Mark Dickerson provided archive material for the series and many curatorial staff helped facilitate the filming. The series was broadcast in January 2013.

ITV also took over the Museum in July to film an episode of crime detective drama 'Lewis'. The episode featured Sanjeev Bhaskar as a murderous professor based at the Museum, and was broadcast later in the autumn. ●

## High speed connectivity

The IT department completed a substantial upgrade to the Museum's ICT infrastructure with the installation of four new 1GB network switches. Three replace the older 100MB switches and a new switch serves the new laboratory, offices and visualisation suite. The Museum's link to the outside world – our FroDo switch – was also upgraded from 100Mbit per second to 1Gbit per second, and our wireless network was expanded with the installation of new access points.

IT officer Sarah Phibbs also added the necessary code to each page of the Museum website – nearly 1,000 pages in total – for analysis by Google Analytics. ●

# Appendices

## Appendix 1: Visitors of the Oxford University Museum of Natural History at 31 July 2012

The Vice-Chancellor A.D. Hamilton, MA, PhD, FRS  
Lord Krebs, MA, DPhil, FRS (Chairman)  
Pro-Vice Chancellor Professor I.A. Warmley, BSc, PhD  
The Junior Proctor Dr A.B. Zavatsky, BSc, MA, DPhil  
Assessor: Dr H.L. Spencer, BA, MA, DPhil  
Professor P.C. England, MA, DPhil, FRS  
Professor R. Fortey, BA, MA, PhD, ScD, FRS, FGS, FLS  
Professor C. Gosden, MA, PhD  
Dr L. Gilmour, MA, PhD, FSA, AMA  
Professor A.N. Halliday, BSc, PhD  
Professor P.H. Harvey, MA, DPhil, DSc, FRS  
Professor P.W.H. Holland, MA, PhD, DSc, FRS  
Professor J. Michie, MSc, MA, DPhil  
Dr M. O'Hanlon, MA, PhD  
Professor M.P. Smith, BSc, PhD (Secretary)

## Appendix 2: People

### Staff of the Museum at 31 July 2012

Director: Professor M.P. Smith, BSc, PhD  
Administrator: Ms W. Shepherd, BSc

#### The Hope Entomological Collections

Curator: Professor D.J. Rogers, MA, DPhil  
Assistant Curator: Mr D.J. Mann, BTEC  
University Support Staff: Ms K. Child, BA; Mr J.E. Hogan, BSc;  
Ms Z.M. Simmons, BSc (maternity leave); Ms A. Spooner, BSc;  
Miss J. White, BA, MA.

#### Geological Collections

Assistant Curator: Mr P.A. Jeffery  
Curatorial Officer: Ms E.A. Howlett, BN  
University Support Staff: Mr A.P. Ashington; Ms J. Hay, BA;  
Dr S. Joomun, BSc, MSc, PhD; Ms L.J. Percival, BSc  
Research Assistant: Dr C.A. Lewis, BSc, MSc, PhD

#### Mineralogical Collections

Curator: Dr D.J. Waters, MA, DPhil  
Assistant Curator: Miss M.T. Price, BSc, MSc

#### Zoological Collections

Assistant Curator: Dr S. De Grave, BSc, MSc, PhD  
Curatorial Officer: Mrs M.B. Nowak-Kemp, BSc, MSc

#### Hope and Arkell Libraries

Librarian: Mr M. Dickerson, MA; Dip.Inf.Man.  
Assistant Librarian: Miss K.L. Santry, BA, MLIS

#### Information Technology

IT Officer: Ms S. Phibbs, BA  
IT Assistant: Dr R. Painter, BA, MSc, DPhil

#### Education and Outreach

Head of Education: Mrs J. Stott, BA, PGCE, MA

Secondary School Officer: Ms S. Lloyd, BSc, PGCE  
Primary School and Family Officer: Mr C. Jarvis, BA, PGCE, FLS  
Community Officer: Mrs S.J. Griffiths, BA, MA  
Volunteers Co-ordinator: Mrs J. Todd, MSc  
Volunteer and Outreach Assistant: Dr C.J. Cheeseman, BA, MSc, DPhil  
Education Assistants: Mrs R. Parle, BA, PGCE; Ms S. Dogherty, BA, MSt  
HLF Skills for the Future Project Co-ordinator: Mr N. Stevenson  
Trainee Education Officer: Scott Billings, Rana Ibrahim, Lea Kloeppinger and Vicki Wood

#### Central Services

Administrator's Assistant and Director's Secretary: Ms K.A. Andrews-Speed  
Accounts Clerk: Mrs K. King  
Front of House Manager: Mr A. Archer  
Deputy Front of House Managers Mr I. Hussain; Mr A. Woodward, BA, MA  
Front of House Staff: Ms A. Edwards, BA; Mr J. Chu, MA; Mr S. Williams, BA  
Facilities Manager: Mr C. Burras  
Cabinet-maker: Mr W. Richey  
Workshop and maintenance: Mr P. Johnson  
Shop Supervisor: Mrs Y. Cawkwell, BA Hons, CGMIC  
Shop Assistants: Ms F. Puspitasari; Miss G. Moffa, BA; Ms G.M. Moretta;  
Cleaners: Mr G. Coates

#### Honorary Associates (Curation)

Mr M. Ackland, BA  
Mr J.B. Davies, MA, MSc  
Mr R. Gabriel  
Dr J.W. Ismay, BSc, PhD  
Mr I. Lansbury, MPhil  
Dr A.C. Pont, MA, DSc  
Mr H.P. Powell, MA

#### Honorary Associates (Research)

Mrs E.M.H. Cooke, MA  
Mr J. Cooter, BSc  
Mr G. de Rougemont, BA  
Dr J. Kathirithamby, BSc, PhD  
Dr T.S. Kemp, MA, PhD  
Professor W.J. Kennedy, MA, BSc, PhD, DSc, FGS  
Dr G.C. McGavin, BSc, D.I.C., PhD  
Mr C.O'Toole  
Mr R. Overall  
Professor D.J. Siveter, MA, BSc, PhD, DSc  
Professor K.S. Thomson, MA, BSc, PhD

## Research Units

#### Environmental Archaeology Unit

Director: Professor M.A. Robinson, MA, PhD, FSA  
DPhil students: D. Challinor MA, MSc (St Cross), R. Hesse BA, MPhil (Merton), L. Lodwick BA, MSt (St Cross), E. Rowan BSc, BA, MSt (St Cross)

## Volunteers and temporary staff; interns and work experience

### Hope Entomological Collection

*Volunteers*

Willow Bowes, Stella Brecknall, Jason Davis, Graham Forbes, Jason Gosling, Brian Harding, Samantha Hayes, Rosemiranda Hibbert, Peter Hughes, Stephen Jordon, Miranda Keys, Andreas Lösekamm, Annette Lord, Fidelis Mannack, Ellie Passingham, Russell Payne, Harriet Scott, Emma Sheard, Shaun Waters, William Stevens, Hollie Thompson, Judith White, and Steven Williams.

*E.P. Abraham Cephalosporin Interns*

Andrew Maclean (Jesus College)

*Work experience*

Laura Peckham (Nottingham University)

Alice Bux (Brookes)

Mike Jackson (Brookes)

*Nuffield Science Bursary Students*

Kara Watson (Headington School)

Jack Oliver (Wheatley Park)

### Geological Collections

*Temporary worker*

Jacqui Machin

*Volunteers*

Izzy Carr, Mark Ebden, Sarah Joomun, Ted Smith, Tim Hedgeland (University College), Emma Jude (St Anne’s College), Fiona Walker (St Anne’s College)

*E.P. Abraham Cephalosporin Interns*

Moya Woolley (St Edmund Hall), Emma Jude (St Anne’s College)

*Work experience students*

Daniel Waite (Marling School, Stroud), Luke Berry (Northfield School, Oxford), Matthew Skinner (Braunton School and Community College)

### Mineralogical Collections

*Volunteers:*

Mrs Jean Allen, Miss Sarah Beggs, Mrs Joy Irving, Mrs Jane Randle,

*E.P. Abraham Cephalosporin Interns*

Peter Spooner (University College); Fiona Walker (St Anne’s College)

### Zoological Collections

*Volunteers*

Marlies Albers (Brookes University); John Chu; Lucie Cox (Brookes University); Alejandra Duarte (Brookes University); Ellie Dobson Gomez; Haley Dolton (Brookes University); Lauren Gilhooly (Brookes University); Amanda Grey (Brookes University); Sarah Harding (Brookes University); Alison Mckenna (Brookes University); Katie Major (Brookes University); Kristian Purchase (Brookes University); Maira Seeley (Brookes University); Paulina Sladowska; Daniel Smith; Asli Tatliadim (Brookes University); Nicola Thurley (Brookes University); Roseina Woods(Brookes University); Kit Yates.

*Work experience students:*

Annie Osborne (Buxton Community School)

Elliot Reeks (The Grange Senior School, Hartford)

Luke Berry (Northfield School, Oxford)

E.P. Abraham Cephalosporin Interns

Invertebrates: Isobel Routledge (Wadham College); Jack Howe (Hertford College)

Vertebrates: Philip Chapman (St John’s College)

### The Hope and Arkell Libraries

*E.P. Abraham Cephalosporin Interns*

Christina Lee (Corpus Christi); Caitlin Spencer (Corpus Christi)

### Education and Outreach

*Work experience*

Zoe Morgan-Jenning (Cherwell School), Sinead Adams (Gosford Hill School), Manu Ahmed, Umah Dogar, Joanna Hindley, Emma Stone, Daniel Masters, Katy Clarke, Ella Nicol-Harper (Cheney School), Wilf Holdcroft (Burford School)

*Other placements*

Sara Mikail (Leicester University), Scott Billings, Lea Kloepfinger (HLF funded traineeship)

## Appendix 3: Finance

### General

The University’s General Board made a grant towards recurrent costs totalling £676k for the financial year ending 31 July 2012.

In addition we received this year’s instalment towards recurrent costs from HEFCE amounting to £330,000.

### Grants awarded and donations received

This year we again raised considerable amounts through external grants and awards:

H B Allen Charitable Trust	£35,000
Negaunec Foundation	\$70,000
Pilgrim Trust	£10,000
Lord Faringdon Trust	£2500
The Swire Charitable Trust	£10,000
Idlewild Trust	£3,000
Sir David and Lady Yardley	£500
NERC JISC Project	£50,500

We are very grateful for the support of all our donors and supporters.

## Appendix 4. New acquisitions

### Entomological Collections

A total of 86 accession lots of 49,422 specimens were received by donation to the department.

Notable donations include:

58 Calliphoridae & Muscidae from Thailand (from K. Moophayak)

10,000 Coleoptera from Borneo (from E. Slade)

1,000 World Coleoptera (from G. de Rougemont)

2,000 insects from Honduras (from T. Creedy)

Paratype: *Usia susanae* x1 ♂; *Usia susanae* x1 ♀; *Mythenteles rameli* x5 ♂ D.J. Gibbs

2,000 British Lepidoptera (from C. Gibson)

Paratype: *Chersodromia leleii* x2; *Chersodromia stenopsi* x4, *Chersodromia mohican* x4 and *Chersodromia nubifera* x4 (from T. Maeda)

Paratype: *Psalmopoeus victori* (♂ & ♀) (from E. Hijmensen)

20,000 British Insects (from C. Diver)

396 Sphingidae from Zambia (from M.N. Mitchell)

Paratype: *Psychristus cooteri* Wrase & Kataev, 2008, *Sprecodes socotrensis* Schuh, 2012, x *Lasconotus hajeki* Schuh, 2012 (x6) (from J. Cooter)

229 Coleoptera from Texas (from B.T. Raber)

Paratype: *Xiphomorphus hoffmannorum* (♂ & ♀) (from S. Longhorn)

2,000 Insects from Kazakhstan (from J. Cooter and D.J. Mann)

### Geological Collections

*By purchase*

None

*By donation*

Plaster casts of trace fossils from the Ediacaran of Shropshire and Newfoundland, 16 specimens (from Dr A.G. Liu)

Arthropods from Devonian of Japan, 2 specimen, (from Professor David J. Siveter and Dr M. Williams)

Collection of fossil, mineral and rock specimens, including important Jurassic mammal remains from the Great Oolite of Kirtlington, Oxfordshire, c.7,000 specimens (from Mr E.F. Freeman)

Cretaceous invertebrates from Texas, 30 specimens (from W. Jolley)

Large collection of fossil, mineral and rock specimens, mostly Eocene fossils from the Barton Beds of Barton on Sea, Hampshire, and other Cenozoic material c. 10,000 specimens) (from P.S. Clasby)

*By bequest*

None

*By fieldwork*

Jurassic invertebrates from the Lower Lias of Blockley, Gloucestershire (21 specimens)

Jurassic invertebrates from the Rutland Formation at Woodeaton Quarry, Oxfordshire (12 specimens)

Unusual Forest Marble roof tile with trace fossils and ripple marks, found in a garden in Oxfordshire, but likely to have originated in Gloucestershire

Massive specimen of Cotham Marble from Gloucestershire

### Mineralogical Collections

*By donation*

Gypsum var. desert rose from Algeria (for education use) (from Mrs S. Beaton)Minerals from Welsh localities (from Dr T. Bridges)

Sid and Pearl Freeman Collection (minerals + books), (presented by Mrs P. Freeman and her family)

Gypsum from Kazakhstan (from Mr D. Mann)

Galena, pyrite and anglesite from Anglesey, Wales (from Mr R. Starkey)

Various minerals and polished decorative stones, part of the Paul Clasby collection transferred from Geological Collections

Decorative rock samples (from Mr I. MacDonald, McMarmilloyd Ltd.)

Ledmore marble from Highland, Scotland (from Kim Roberts)

Remaining samples from the metamorphic rocks teaching collection. Transferred from the University of Reading

*By fieldwork*

Decorative stones (Campan, griotte etc.) from the French Pyrenees.

Archives

Further negatives and archives from members of Professor L.R. Wager’s family.

### Zoological Collections

Casts of skull and hand of *Australopithecus sediba* (from Witts University, South Africa)

### The Hope and Arkell Libraries

Over the year 3.4 linear meters of new material was added, including 46 books and 303 periodical parts. In addition over 200 archival items were scanned or photographed, including nitrate negatives from the L. R. Wager collection and manuscripts and photographs from the History of the Building of the Museum collection.

*The most significant purchases were*

Australian Journal of entomology 51(2012); Insect systematics and evolution 43(2012); Palaeontology 55(2012); Systematic entomology 37(2012); and Invertebrate Systematics 25(2012)

*The most significant donations were*

British Dragonfly Society publications for 2011-12 (from Mr D. Mann)

Studia dipterologica (from Dr P Pont)

Zoology in the Middle East (from Dr A. Pont)

British Tarantula Society Journal (Angela Hale)

Arthropoda Selecta (Dimitri Logunov)

## Appendix 5. Loans

Jan Savery Dodo picture (1651) loaned for Beauté Animale exhibition at Grand Palais Galeries nationales, Paris, 21 March to 16 July 2012.

### Entomological Collections

In total 91 loans were issued of 7321 specimens.

### Geological Collections

8 loans were sent out (5 to the UK, 2 to Germany and 1 to Sweden). A total of 34 specimens were sent, including Cambrian and Silurian trilobites, Devonian fish, Jurassic invertebrates, Cretaceous coleoids and a cirriped.

### Mineralogical Collections

Seventy six specimens formed 10 short term loans during the course of the year, all to departments of the University for undergraduate and summer school teaching, and for public lectures.

Sixty four mineral specimens are on long-term loan to the Earth Sciences Department for undergraduate. Museum specimens employed for teaching by the Curator include the usual Stanton ore collection for third-year teaching Natural Resources; and about 30 Accessions Series hand specimens and thin sections from Rum as support for undergraduate mapping projects: these reveal the remarkable history of the development of the volcanic centre. The Curator took this opportunity to acquire over 100 photomicrographs of selected thin sections, partly to aid the Earth Science examiners in project marking, but ultimately as a teaching resource in igneous and metamorphic petrology.

29 samples were supplied for destructive research.

### Zoological Collections

Total of 42 invertebrate and vertebrate loans (totalling several hundred specimens).

Vertebrate – 8 loans. 7 loans for filming and 1 for research

(Senckenberg-Forsch ungsinstitut und Naturmuseum

Senckenberganlage 25, D-60325 Frankfurt am Main, Germany ) for 20 specimens plus circa 200 specimens for practical classes.

## Appendix 6. Enquiries

### Entomological Collections

Staff and Honorary Curators have, as usual provided a free identification and entomological information service to University staff and students, as well other university students and academics, entomologists and the general public. In total there were over 2,700 enquires to collections staff requiring an estimated 250 hours of time.

### Geological Collections

This year, staff dealt with 255 enquiries, of which 90 were identification enquiries and 165 were other enquiries.

### Mineralogical Collections

Thirty five specimens brought into the Museum, a total of 13 requests were identified for members of the public during the year. In excess of 150 enquiries by email, telephone or letter were also answered.

### Zoological Collections

Total invertebrate and vertebrate: 354

Vertebrate inquiries – 278 (researchers, students and general public).

Vertebrate specimens identified - 33 requests (additional to the inquiries covered by above) for the identification of 48 specimens submitted by the general public and other museums. One of the more unusual identifications was of a human radius found by two little girls in a field. Consequently the police had to be informed.

## Appendix 7. Official Visitors

### Entomological Collections

There were 202 collection based visitors, comprising of 164 from the UK, 12 from the EU (Germany, France, Norway, Switzerland, Czech Republic) and 26 Non-EU (USA, Canada, China, Uganda, South Africa). In addition to these the staff also gave tours and talks on the department to 300 visitors. We also hosted and helped organise the national Coleopterist Day, the Young Entomologists Day, British Entomology and Natural History Society AGM, the Bees Wasps & Ants Recording Scheme AGM and members’ day.

### Geological Collections

There were 45 scientific visitors, from the UK and southern Ireland, Germany, Norway, China, Colombia and the USA. Material examined included Palaeozoic invertebrates, Silurian and Devonian fish, Jurassic ammonites and bivalves, the whole range of Mesozoic reptiles, and Paviland palaeoliths.

There were 66 other visitors, including 52 individuals in organised parties, and 14 other individuals.

### Mineralogical Collections

The collections has had 20 research visitors this year. They include:

- Dr Trevor Emmett (Anglia Ruskin University) to use the Corsi collection for identification of Fitzwilliam Museum collection artefacts.
- Dr George Ma (National University of Taiwan and Hong Kong University), to select specimens from Gavin Chan collection (Accession Series) for a Re-Os isotope study of sulphides from the Tibetan ophiolite complexes (Tethyan ocean floor)
- Richard Thomas (alumnus of Earth Sciences Department) 6 March 2012, to see alkaline intrusive rocks from the Kola peninsula, Russia in the Accessions Series and Wager’s collections; and Dr Peter Thy of the University of California, also to see Wager’s collections and archives.
- Professor Christopher R Hallpike, 5 Jan 2012, sample identification and geological context for pot-making clays, Konso, Ethiopia

### Zoological Collections

Invertebrate and vertebrate 126 visitors totalling 157 days.

Vertebrate visitors (60 visitor days): 123 visitors to the collection; over 200 students attending practical classes; 6 organised groups for talks and tours (about 100 individuals); Harvard University (16 students + 3 teachers); Texas University (14 students +1 teacher); Oxfordshire Architectural and Historical Society (14 members); Abilene Texas University (15 students +3 teachers); Scientific Writing workshop (15 participants +2 teachers); Sumatran Orangutan Society (Oxford based charity).

Oxford University – introduction to the OUMNH (16 students)

## Appendix 8. Publications

### Entomological Collections

**Cooter, J.** and Kilian, A, (2011). *Leiodes confusides* Nom. Non. for *Leiodes confusa* Cooter & Kilian, 2002 (Coleoptera: Leiodidae). *Entomologist’s Monthly Magazine*, **147**, 155.

**Cooter, J** and Švec, Z. (2011). A new species of the subgenus *Cyphopeble* C.G.Thomson 1859 of Agathidium Panzer 1797 (Coleoptera: Leiodidae) from China. *Folia Heyrovskyana* (Series A), **19**, 21-24.

Couri, M.S., Carvalho, C.J.B. de and **Pont, A.C.** (2012). Taxonomy of the Muscidae (Diptera) of Namibia: a key to genera, diagnoses, new records and description of a new species. *African Invertebrates*, **53**, 47-67.

**Gabriel, R.** (2011). A new species of *Aphonopelma* from Panama, (Araneae: Theraphosidae). *Journal of the British Tarantula Society*, **26**(4), 157-166.

**Gabriel, R.** (2011). Some Notes and Observations on the Breeding of *Poecilotheria regalis* and *P. striata*, *Journal of the British Tarantula Society*, **27**(1), 12-28.

**Gabriel, R.** (2011). Weitere Fälle von zusammengewachsenen Vogelspinnen (Araneae: Theraphosidae). *Arachne*, **16**(5), 4-7.

**Gabriel, R.** (2011). Some Notes on the Development of the young and some Parasites of *Eusparassus walckenaeri*, collected in Turkey. (Araneae, Sparassidae), *Newsletter of the British Arachnological Society*, **121**, 11-13.

**Gabriel, R.**, Hamilton, C, Reynolds. E, and Pedersen. N, (2011). Six Days Spider Hunting in Panama (Araneae: Theraphosidae). *American Tarantula Society*, **19**(1), 10-21.

**Gabriel, R.**, Hüsser, M, and Ehrler, R. (2012). *Sphaerobothria hoffmanni* Karsch 1879 a Species New to Panama (Araneae: Theraphosidae), *Newsletter of the British Arachnological Society*, **123**, 2–3.

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Gallon, R. C, **Gabriel, R.**, and Tansley, G. (2012). A new Chaetopelma species from the Eastern Mediterranean (Araneae, Theraphosidae, Ischnocolinae). *Journal of the British Tarantula Society*, **27**(4), 128-139.

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Lucas S.M, Hector M. O. Gonzalez Filho, H. M. O. Felipe dos S. Paula, F, **Gabriel, R.**, Breviscot, A. D. (2011). Redescription and new distribution records of *Acanthoscurria natalensis* (Araneae: Mygalomorphae: Theraphosidae), *Zoologica*, **28**(4), 525–530.

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**O’Toole, C.** (2012) *Pollinating Bees*. Wildlife World Information Leaflet. Wildlife World, Tetbury. 6pp.

**O’Toole, C.** (2012). Plants for Solitary Bees. *In*: Kirk, W.D.J., Howes, F. N., Carreck, N. L., Aston, D., Bucknall, S., Stout, J. and **O’Toole. C.** *Plants for Bees*. International Bee Research Association, Cardiff, 41-55.

**Pont, A.C.** (2011). A review of the Diptera described by Ferdinand Kowarz (1838-1914) or described from Kowarz’s collecting. *In*: Brake, I. and Thompson, F.C., Contributions to the *Systema Dipterorum* (Insecta: Diptera). *Myia*, **12**, 17-112.

**Pont, A.C.** (2011). The G.H. Verrall story – a centennial appreciation. *Dipterists Digest* (2) **18**, 107-118.

**Pont, A.C.** (2012). *Helina richardi* (Diptera: Muscidae), a remarkable new species from the Mediterranean subregion. *Canadian Entomologist*, **144**, 348-352.

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**Kemp, T.S.** (2011). The origin and radiation of therapsids. 1-28. *In*: Chinsamy-Turan, A. (ed.). *Foverunners of mammals: radiation, history,*

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**Kennedy, W.J.** (2011). A new species of *Lyelliceras* from the Albian (Lower Cretaceous of France. *Netherlands Journal of Geosciences*, **90**, 95-98, 3 figs.

**Kennedy, W.J.** and Klinger, H.C. (2010). Cretaceous faunas from Zululand and Natal, South Africa: the ammonite subfamily Acanthoceratinae de Grossouvre, 1894. *African.Natural History*, **6**, 1-76, 63 figs.

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Angiboust, S., Langdon, R., Agard, P., **Waters, D.** and Chopin, C. (2012). Eclogitization of the Monviso ophiolite (W. Alps) and implications on subduction dynamics. *Journal of Metamorphic Geology*, **30**(1), 37-61. doi:10.1111/j.1525-1314.2011.00951.x

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Law, R.D., Jessup, M.J., Searle, M.P., Francis, M.K., **Waters, D.J.** and Cottle, J.M. (2011). Telescoping of isotherms beneath the South Tibetan Detachment System, Mount Everest Massif. *Journal of Structural Geology*, **33**, 1569–1594. doi:10.1016/j.jsg.2011.09.004

Palin, R.M., Searle, M.P., **Waters, D.J.**, Horstwood, M.S.A. and Parrish, R.R. (2012). Combined thermobarometry and geochronology of peraluminous metapelites from the Karakoram metamorphic complex, North Pakistan; New insight into the tectonothermal evolution of the Baltoro and Hunza regions. *Journal of Metamorphic Geology*, **30**(8), 793-820. doi:10.1111/j.1525-1314.2012.00999.x

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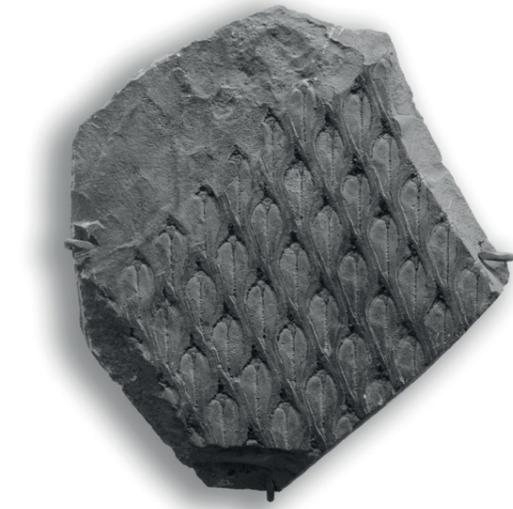
### Environmental Archaeology Unit

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Front and back cover:  
*Lepidodendron aculeatum*, a fossilised tree bark  
imprint from the Carboniferous period

