

The University of Oxford

96

Botanic Garden & Harcourt Arboretum

Friends'
newsletter



Autumn 2017



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Saturday 21st October
11.00am-4.00pm

Autumn Fair & Apple Day

Harcourt Arboretum

Come along to experience live music, delicious food, local crafts and fairground games in the beautiful, autumnal setting of Harcourt Arboretum.

- The event is free with an entrance ticket: adults £5.00 (Gift Aid £5.50), concessions £3.50 (with Gift Aid £4.00) Children (16 and under) free when accompanied by an adult family member.

OBGA News

Record numbers visit OBGA! Chris Thorogood

OBGA saw nearly double the number of visitors this spring despite the cold. Garden visitors for March 2017 were 9250 compared with 4761 in 2016. April saw 17,861 visitors, a figure more reflective of August - traditionally OBGA's busiest month. A number of contributing factors appear to be at play here including the good weather and the GLAM (Gardens Libraries and Museums) Mind Growing marketing campaign. However, some of these visitors came specifically to see the 'wow plants' we have been promoting on social media and via the website. We are currently gathering data to measure the success of these social media promotion mechanisms. Social media so far seems to be an extremely effective (and free) mechanism for 'advertising' OBGA and we will continue to use these mechanics to promote the Garden and Arboretum this summer to maintain this incredible visitor trajectory.

We would like to say a big thank you to the whole team, and in particular, to the ticket office staff for all their hard work.



Nymphaea x daubenyana in flower

Update from the Glasshouse Collection

Kate Pritchard

This spring has seen a flurry of horticultural activity in the glasshouses. We have been up to our elbows in pond mud, water and new plants. With the help of staff from the University Parks Department, we have completed the biennial tropical water lily pond clean. Fifty cubic metres of water were drained, six cubic metres of loam dug out, and all replaced in less than 10 days! *Nymphaea x daubenyana* is creating a floral frame around the *Victoria cruziana* which is now spectacular in leaf. We have also been re-landscaping areas of the Carnivorous

House to increase the variety of plants on display. We removed some rather thuggish ferns and have been regrouping the wandering *Sarracenia*.



The Carnivorous Plant House collection

Successful staking Clare Kelly

In April we held two morning sessions on the art of successful staking as part of the Garden's Public Education Programme.

This was a hands-on practical course to demonstrate that with the right materials and a little technique, a sculptural piece of art can be created to enhance spring borders and strongly support perennial plants during the summer. To be truly successful, staking should be carried out early in the season to give plants time to grow naturally through the structure and to distribute the weight of the stems evenly to avoid trussed foliage after rainstorms.

European birch (*Betula pendula*) and European hazel (*Corylus avellana*) are coppiced annually at Harcourt Arboretum. These trees yield a soft, pliable wood that is easy to weave and craft into a variety of shapes. The standard mould we use for our plants here at the Garden is a dome shape which encircles the root plate of the plant. This allows the structure to naturally fill upwards towards the light; the height of the structure should ideally support at least two thirds of the stems when in full growth. This is easier on the eye than manufactured bamboo canes and metal hoops.

We support our plants at the Garden with over five hundred branches of birch and hazel, but inevitably we miss one or two! We then resort to a combination of staking, steppe, coppice and stool pruning, or the popular Chelsea Chop and Wimbledon Whack, to tame the garden for another year.

From the Director

by Professor
Simon Hiscock



Staking underway in the Garden

Monkey Orchid Safari

Chris Thorogood

On Saturday 13th May, Simon Hiscock and I took an adventurous group of enthusiasts into the Chilterns to see some very special plants. Hartslock Nature Reserve is a stronghold for the exceptionally rare monkey orchid (*Orchis simia*) which grows at just one other site in the U.K. The species has been known to occur here for centuries but the numbers and vigour of the plants have declined in recent decades.

The weather was perfect. We took a gentle stroll from Goring and Streatley Station up the hill, noting one or two other plants of interest along the way. We began at the top of the hill, taking some time to observe the very special plant we came specifically to see. We then wandered down a little foot path to see another rarity, the lady orchid (*O. purpurea*). There are only two specimens that grow here (we saw just one), which were most likely deliberately planted (DNA data show that the plants are of French rather than British origin). The most prominent orchids at the site however were the hybrids between the monkey orchid and the lady orchid (*O. x angusticruris*). This year there was a spectacular swathe of these robust hybrids in full bloom. We discussed the potential conservation concern these plants represent but admired their beauty nonetheless.

We look forward to our upcoming excursion in June to see another local rarity, the military orchid (*O. militaris*) and given the success of our first 'Orchid Safari' we will be planning lots of similar events in the future.

I will begin with a big thank you to everyone who gave so generously to the Friends' benches appeal launched in the last Newsletter. The appeal exceeded all expectations, raising the total needed, and more besides within just a few weeks. The first four benches are currently being built by Gaze Burvill, and we expect them to be in place around the fountain by mid- to late-summer.

This year's mild and virtually frost-free months of March and April provided exceptional conditions for spring blossom. I cannot remember a better year for magnolias - our collection flowered profusely at both the Garden and Arboretum. Moreover, Ben Jones and I were fortunate enough to see the blooming magnificence of the collection at Wespelaar Arboretum (near Leuven, in Belgium), where owner and Director agreed that this was indeed an exceptionally good year for magnolias, probably their best ever. Given the importance of magnolias and their Magnoliid relatives in the evolutionary history of flowering plants we are actively acquiring new species and cultivars as part of the continuing strategic enhancement of OBGA's collections, specifically within the theme of 'Evolution and Taxonomy'.

In addition to 'Evolution and Taxonomy', our collections strategy focuses on three further themes: 'Heritage and Landscape' (celebrating Oxford's unique place in the history of botanical science as the UK's oldest botanic garden), 'Biodiversity and Conservation' (embracing our commitment to the Global Strategy for Plant Conservation), and 'Plants and People' (showcasing the importance of plants to us and all life on earth). Supporting these four core collection themes will deliver high quality interpretation to enhance the visitor experience - 'Plants that Changed the World' in the Lower Garden (within the 'Plants and People' theme) shows how this approach can work.

Outreach and public engagement activities have shown a sharp increase since the arrival of Chris Thorogood in January and as well as re-launching a public education

programme (PEP) at OBGA, Chris has been using social media and the website to increase our visibility. This has also helped to increase visitor numbers, which saw a noticeable spike after Chris's 'twitter takeover' and promotion of the flowering of *Amorphophallus konjac* (see cover image).

Fascination of Plants Day took place on May 21st and brought cell biology and the Linnean Society to the Garden. 'Inside a plant cell', an interactive exhibition produced by Dr Charlotte Kirchhelle (a researcher and former DPhil student in Plant Sciences) and Dr Rhys Grant (Education Officer at the Linnean Society) showcased how modern techniques in microscopy can be used to look inside living plant cells. This exhibition was generously sponsored by the *New Phytologist Trust* and will move to the Linnean Society later this summer. It will then return to the Botanic Garden for 'Curiosity Carnival' on September 29th; this is a University-wide celebration of Oxford's world class research as part of *European Researchers Night*. Fascination of Plants Day also featured 'One Zoom', an app that allows you to explore the tree of life (see: <http://www.onezoom.org/>). This digital gem, the work of former Plant Sciences student Dr Yan Wong and Dr James Rosindell (a researcher at Imperial College), is already proving to be transformative as a new teaching and learning tool for all ages.

As I started, so will I end, with a thank you - this time to Richard Mayou for his 15 years of devoted service as Chair of the Friends. During this time, Richard has led many successful fundraising initiatives and appeals to generate money for OBGA, finishing on a high with the benches appeal. He has also helped steer the Garden through some difficult times and his role in getting us to where we are today is probably his greatest, yet less well-known achievement. On May 1st Sarah Taylor took over from Richard and everyone at OBGA welcomes her and wishes her well. I look forward to working closely with Sarah as we plan and fundraise to celebrate the Garden's 400th Anniversary in 2021.



Public Engagement at OBGA

By Chris Thorogood

We have been busy building our new Public Engagement strategy with the mission to engage, educate and inspire as many people as possible with our collections. In line with this new strategy we have taken bold steps to maximise our outreach. On Tuesday March 14th we took part in a 'Twitter Takeover' for Oxford Sparks - an online portal through which Oxford University's scientists engage with the public. We interacted with 4,600 online followers with a line-up of weird and wonderful plants. A top hit was *Psychotria elata* with its extraordinary lip-like floral structures. Overall the Twitter Takeover generated an incredible 70.7K impressions in just one day - a phenomenal success. We will continue to pull our social media levers this year with more Twitter Takeovers and live Facebook Streaming.



Psychotria elata proved highly popular in our Twitter Takeover

We have also been using social media channels to 'push' some of our more unusual plants, which have been a real hit with the public. For example our social media announcements on *Amorphophallus konjac* in mid-April made an incredible 10K impressions on Twitter and brought visitors directly to the Garden to see it. Indeed, despite the cold spring, we saw nearly double

the number of visitors walk through our doors in March from 4761 in 2016 to 9250 in 2017, some of whom we know came specifically to see our 'wow plants'. We will continue to promote these as a visitor attraction throughout the year.

We have been proactively working with the media to showcase our wonderful collections and increase visitor footfall. We hosted BBC Gardeners' World's Carol Klein earlier in May who was filmed talking about our National Collection of euphorbias. We will continue to actively collaborate with TV companies to promote the Garden, increase our TV media presence, and consequently our visitation trajectory.

Our Public Education Programme is in full swing. Subscribers have enjoyed learning about how to stake successfully



Filming Carol Klein for Gardeners' World



Ali led a highly successful Creative Pot Displays course as part of our PEP

(see p 2), plant creative pot displays, and about the ecology of rare wild orchids on the hillsides of Oxfordshire (see p 3). There are plenty more courses lined up for 2017!

Finally we brought plant science to life on May 21st when we celebrated Fascination of Plants Day. As described by Simon Hiscock (see p 3), our interactive journeys into the plant cell led by Dr Charlotte Kirchhelle and Dr Rhys Grant, and tree of life led by Dr Yan Wong and Dr James Rosindell were both tremendously successful. 363 people attended the event and a further 473 people watched our live videos of the exhibit remotely. Feedback from the day showed that 100% of attendees thought the level of science was pitched correctly, and one even commented "You changed the way I look at plants".



The team at Fascination of Plants Day

Autumn Plant Sciences Lectures 2017 Research and Conservation in Botanic Gardens

2nd October

Dr Paul Smith, General Secretary,
Botanic Gardens Conservation
International (BGCI)

16th October

Professor Simon Hiscock,
Director of the University
of Oxford Botanic Garden

30th October

Professor Beverley Glover,
Director of the University of
Cambridge Botanic Garden

13th November

Professor Pete Hollingsworth,
Director of Research, Royal
Botanic Gardens, Edinburgh

27th

November
TBC

- All lectures take place in the Daubeny Lecture Theatre, Rose Lane, Oxford, OX1 4AZ at 7.30pm
- Lectures £10 each or £40 for the whole series.
- Online booking soon to be available here: <http://www.oxforduniversitystores.co.uk/product-catalogue/botanic-garden-harcourt-arboretum/botanic-garden-harcourt-arboretum/public-education>

A trip to Ethiopia

By Ben Jones



Nursery management at Jimma Botanic Garden

Botanic gardens and arboreta are an integral part of plant conservation, according to the *Global Strategy for Plant Conservation* (GSPC). In particular, botanic gardens and arboreta enhance our understanding of plant diversity, promote education and awareness, and support public engagement. Under this remit, I was invited to work with *Botanic Gardens Conservation International* (BGCI) to deliver two weeks of training in Ethiopia in March. The focus of the first week was a practical workshop in Jimma, Ethiopia. There were 65 participants from Ethiopian botanic gardens, arboreta and similar institutions. The training centred on collection management, seed collection, propagation, nursery management and tree planting.

The workshop was an important networking opportunity, enabling new partnerships to be made, friendships to form and collaboration between institutions. These links began the formation of a national network which will encourage institutions to share plant material. This will provide increased security for target species because a greater genetic diversity will be held within collections. Partnerships such as these also facilitate knowledge sharing, for example on propagation and care, which can be critical for species with just a few remaining specimens.

Participants identified their core mission and developed collection policies for their gardens to reflect this mission. Each member was encouraged to 'adopt' a threatened tree local to their botanic garden as a flagship for their institution. This will drive the

conservation mission of their gardens forward and generate wider interest and support for local tree conservation. The skills developed during the training course will now be applied directly to these flagship tree species in population restoration programmes.



Workshop Session led by Dr Tesfaye from the Ethiopian Biodiversity Institute

Palmer's Leys

By Ben Jones

In 2006 there was an opportunity to expand the Arboretum when the 50-acre field known as Palmer's Leys was put on the market. It had been uncultivated for three years but prior to that was used to grow a variety of arable crops. The land was purchased for £185,000 following an appeal to the Friends of OBG and two national charitable trust funds. It was gratifying that so many people responded quickly to the appeal, demonstrating the strong desire to support Oxfordshire's native species. Since then significant work has been carried out, such as the restoration of 30 acres of wild flower meadow and the planting of 13,000 British native trees. Ten years on, Palmer's Leys is flourishing. The meadow is fully established, has an incredible array of plant species, and requires little annual maintenance.

For the last ten years we have allowed the trees to put down roots, but now the work begins. The lower section of Palmer's Leys has thrived, especially the beech and hornbeam trees which are now over 10 feet tall and will soon require thinning in some areas. Amid the beech and hornbeams, yew trees were planted which now exceed the browsing height for deer and should flourish over the coming sessions. This year we will open up the yew plantings by removing the fence around them and controlling some of the brambles that are now dominating some areas.

By contrast, the upper part of the Palmer's Leys wood is a relatively exposed location and has taken longer to establish. Natural regeneration in the form of willow and birch has protected our young trees



Harcourt Arboretum Meadow in late spring

from the elements but will require management. Last year we removed a large section of willow and birch on the left of the vista. This is a significant task which we wouldn't have been able to achieve without the help of our Volunteers alongside members of Oxford University Conservation Society. The results look promising so we plan to continue this thinning work over the next two years with the Volunteers' generous support.

A challenging area of Palmer's Leys is the ash tree section. Unfortunately last year it was confirmed that Ash Die Back has infected our young ash trees. Investigations continue and the full extent

of the impact has yet to be identified. Regrettably there is little to be done to rescue these trees, save leaving them in the hope that they develop a tolerance to the disease. Over the next two years the impact of the disease will be fully understood and we may then look to planting these sections with alternative tree species.

Taken together, the restoration and development of Palmer's Leys is a true success story for the Arboretum. The meadow has significant conservation and visitor experience value and the tree plantings have much to promise in future decades.



The Serpentine Ride



Rhododendrons at the Arboretum

Harcourt Arboretum Spring Fair 2017

By Tegan Bennett

Following the success of Apple Day and the Autumn Fair last October, Harcourt Arboretum held its first Spring Fair on 9th April. We couldn't have asked for better weather as the Spring Fair fell on one of the hottest days of the year to date. The hub of the event was located at the front of the Arboretum with a picturesque backdrop of the wild flower meadow and pond which provided an excellent setting for visitors to enjoy the food, drink and entertainment. The Arboretum looked beautiful with the bluebells beginning to appear in Bluebell Wood and the rhododendrons starting to flower along the main ride.

The event started with a performance from the Oxford City and University Morris Men and there was music to entertain visitors throughout the day with an energetic performance from Horns of Plenty, the traditional sounds of the Hurdy Gurdy and local folk band Magpie Lane, who ended the event.

Visitors were treated to an eclectic mix of stalls from a range of local organisations and individuals. Farms2Ewe was a hit with children and adults alike who were able to meet and stroke some of the animals from Cherrybank Farm including rabbits,

ducklings, a miniature pony, a calf and pygmy goats and kids. The RSPB ran a 'bug hotel' activity for children, the Wildlife Trust spoke to our visitors about the work they are doing locally and what people can do to help, and Mo from the Oxfordshire Beekeepers dispensed bee-related information and Arboretum honey.

Farmability is a charity that works with adults with autism and learning difficulties as co-farmers, enabling them to gain skills in animal husbandry and horticulture and build independence in living and work skills. Farmability ran an egg-packing activity for families and sold free-range eggs from their Wytham farm. Another stall promoting the inspiring work they do in the community was People in Action, Charterville Care who run the garden centre and nursery based in Cutteslowe Park and provide horticultural therapy. They brought along plants to sell and home-made bird boxes.

There were also stalls run by local craftspeople, showcasing their skills. These included Linn Rees who brought along some of her willow weaving, Little White Rabbit Publishing who sold a range of prints and Turnpike Forge who brought along a mobile blacksmith's forge.

There was beer from the Shotover Brewing Company and the warm day meant that the frozen yogurt and milkshakes from Yo2Go were in great demand. The Souvlaki Brothers had proved such a hit at the Autumn Fair that we were pleased to welcome them back. Mark Cooper from Coopers of Oxford provided a pig roast using his Oxford Sandy and Black Pigs, some of which were in residence at the Arboretum on the day. Throughout the event there was a queue at the Friends' tea and coffee stall and it is not surprising that the cake sold on the stall received high praise in our visitor feedback.

In total nearly 2,000 visitors visited the Arboretum for the Spring Fair and we made nearly £4,000 in revenue from the event. Feedback from our visitors was universally positive, with people keen to return to the Arboretum. We would like to say a huge thank you to all the volunteers who came along on the day to run the children's activities and welcome desk, provided help on the stalls and marshalled the car parking. We are also extremely grateful to the Friends who provide the funding that enables these events to take place.



Spring Fair animals

How we use the Botanic Garden as an Education Resource

By Kate
Castleden

Our Top 5 Plants and Places Outside

If you have ever attended a school session or Family Friendly event at the Botanic Garden, you may be familiar with some of the Education Team's favourite parts of the collection. These are the plants and places that have special stories to tell, which we enjoy sharing with our different public audiences. So, let us reveal some of our secrets, and perhaps you'll see the collection in a new light...

With summer in full swing, we spend less time in the Glasshouses, so here are our top five plants and places in the Hardy Collection in reverse order:

5. *Gunnera manicata*, Water Garden

Commonly referred to as 'giant rhubarb', *Gunnera manicata* is one of the biggest and most spectacular architectural plants we have. Residing in the middle of the Water Garden, it looks intriguing at all times of year, from the winter when its tender buds are covered wigwam-like with previous years' leaves, to the spring when the first shoots appear, and summer when the giant leaves unfurl in all their glory. We always incorporate *G. manicata* into our sessions with trainee teachers from Oxford Brookes University. These students visit the Garden to learn more about teaching in a non-

classroom environment, and to explore how to use natural spaces to enhance their teaching. The *G. manicata* conjures up all sorts of other-worldly imaginings, and evokes thoughts of when Gulliver visits the land of giants (Brobdingnag) in *Gulliver's Travels*. Imagine finding yourself shrunk to miniature size and surviving amongst the towering forests of *G. manicata*. How would you feel? What would you do? How would you survive? Discussions such as these encourage the students to be creative, and open up a whole host of cross-curricular opportunities to explore with their pupils.

4. Plants that Changed the World, Lower Garden

Plants that Changed the World (PCW) is one of the newly developed areas in the Garden, and looks quite different from the Vegetable Beds that preceded it just 18 months ago. It tells a fascinating story of how plants have influenced our lives through history, and how important they've been in world exploration, trade and agricultural developments. This area is an example of how quickly and effectively we can reinvent core parts of the garden to display the plants and their stories at their best. Some of our regular groups (such as Memory Lane) visit only once every year or two, but we enjoy re-connecting each time and updating them on the latest changes. Memory Lane is the monthly reminiscence group based



The Merton Borders this spring

at The Museum of Oxford, which has visited us on several occasions over recent years, each time experiencing a different season. They will be returning in August for their summer party, and we are looking forward to hosting the celebration of their reminiscence year. As part of the visit we'll provide a tour of the Garden, which will include PCW and the new woodland walk and literary trail. Of course, being able to experience the Garden in all its summer glory whilst enjoying tea and cake will be the other highlight of the visit!

3. Merton Borders, Lower Garden

The Merton Borders are an example of sustainable development that celebrates plant diversity. They are ornamentally inspiring, whilst having minimal impact on the environment. The story of the Merton Borders is integral to our commitment to champion biodiversity, conservation and sustainability. This message may seem complex, but can still be communicated to our youngest audiences. Our 'Mini Explorers' session for 3 to 5 year olds includes a visit to the Merton Borders, where we challenge ourselves to find as many colours as possible. This leads nicely into the song 'I can sing a rainbow', complete with arm actions of pointing to each colour in turn. Exploring the riot of colour in this part of the Garden is an effective and memorable way to introduce the concept of biodiversity to even the smallest of visitors.



Gunnera in the Garden



2. Japan hotspot, Walled Garden

Around the edge of the Walled Garden we have Geographic Borders, which highlight a number of different biodiversity hotspots from around the world. One of the most significant of these is the Japan hotspot border. Our curators have been regularly visiting Japan in recent years to collect seed from endangered species for the purposes of *ex situ* conservation. Some of these seeds have been propagated here in Oxford, and the seedlings transplanted and incorporated into our collection. This is an exciting story of modern-day plant collecting in the name of conservation. As this project illustrates some of the key aims of our department, such as supporting the Global Strategy for Plant Conservation, it was a favoured choice of inspiration to develop a new 'family backpack'. The Education Team worked with Year 6 pupils (aged 10 and 11) from a local primary school, to develop this resource to help

families explore the garden and learn more about our work. It was great fun hearing about the pupils' ideas, and helping to develop them into the final backpack. This resource demonstrates how we can draw different threads of our work together to produce something truly unique to this special site.

1. *Taxus baccata*, Walled Garden

In 1645 Jacob Bobart planted a yew tree (*Taxus baccata*), which is still growing in the Garden today, and is our oldest living specimen. It was part of the landscape design of the original Walled Garden, planted alongside others in a regular arrangement for ornamental purposes. In recent times, it has been discovered that yew tree leaves contain an important anti-cancer drug. So our longest surviving specimen is now known to be a medicinal plant like the others planted when the Garden was first established as a physic garden. This story highlights the conservation value of what might be deemed a rather ordinary tree, and demonstrates that plants and trees may have hidden properties that we have yet to discover. As an established Education Team, we are often visited by other educators from across the UK and around the world. We enjoy sharing the story of the yew tree with our visitors, as it captures both our unique historical past, and the challenges we face in the future.



The yew tree (*Taxus baccata*) which was planted in 1645 by Jacob Bobart and is the Garden's oldest living specimen.

Plant science masterclasses for schools

By Sarah Lloyd

Plant science has become steadily less visible in schools, overwhelmed in many courses by human and molecular biology. During the spring term I worked on a special project to work towards addressing this imbalance to bring plants to the fore, funded by the Gatsby Charitable Foundation.

Local schools were invited to nominate enthusiastic A level biologists who would benefit from opportunities to find out more about plant science to take part in a masterclass series. Over the course of three evenings, fifty three students listened to inspiring talks given by researchers from the University Department of Plant Sciences, discussed the issues with DPhil students, and ate pizza!

The theme for each talk was linked to the overarching theme of the 'Future of Food'. Professor Phil Poole posed the question: 'How does the availability of nitrogen impact global population growth?' Professor Lee Sweetlove asked students to compare genetic modification and traditional crop breeding methods. Professor Gail Preston asked how nutritious, high-yielding crops with durable disease resistance might be developed.

Students were surprised to find out about the range of challenges that plant scientists are working on and the diversity of approaches they were taking to address them. Students enjoyed the opportunity to develop their understanding, discuss their opinions and meet new people in a relaxed and engaging environment. 71% of students who attended said that the masterclass series had positively affected or reinforced their plans to study biology after leaving school. We plan to run another series in November on the theme of Biodiversity and Evolution. This will provide an opportunity to showcase more of the work carried out here at the Botanic Garden.



Ant plants and their importance at Oxford Botanic Garden

By Chris Thorogood

Ants and flowering plants' evolutionary histories have been crossing paths for at least 100 million years. The natural history of interactions between ants and plants, in particular ant-plant mutualism, has fascinated Western scientists for centuries. Recently some astounding and very exciting discoveries have been made. Here is a brief snapshot of the extraordinary biology of the so-called 'ant plants', and why they are especially important to Oxford Botanic Garden.

Complex relationships between ants and plants are thought to have evolved when flowering plants diversified and rose to dominance. The rise of flowering plants provided ants with an increase in herbivorous insects to feed on, as well as the opportunity to shift their diet towards plant-derived resources such as nectar and carbohydrate-rich honeydew produced by sap-feeding insects. This new abundance of food resources on plants attracted ever greater numbers of ants onto plants, increasing opportunities for the evolution of ant-plant interactions. The most spectacular examples of such interactions are seen in the 'ant plants', known as *myrmecophytes*. These interactions represent mutualisms in which the ants protect the plants from damage by herbivores and in return are fed and housed by the plants. Many of these interactions are obligate, meaning that both ant and plant are completely interdependent and cannot survive on their own. These plants are often drastically modified and produce highly specialised, hollow nesting structures called *domatia*, which are specifically adapted for habitation by ants. Domatia may be derived from hollow thorns, leaf stalks (petioles), stems, rhizomes, tubers or even leaves depending on the plant family, and are often highly elaborate. These structures are produced independently of the ants' presence, however once the ants 'move in' they are known to further enlarge their nesting spaces by excavating pith tissue in stems and branches creating specialised galleries, or chambers. A unique example of an ant plant is the fanged pitcher plant from Borneo (*Nepenthes bicalcarata*), which has evolved domatia in the form of hollow tendrils. The

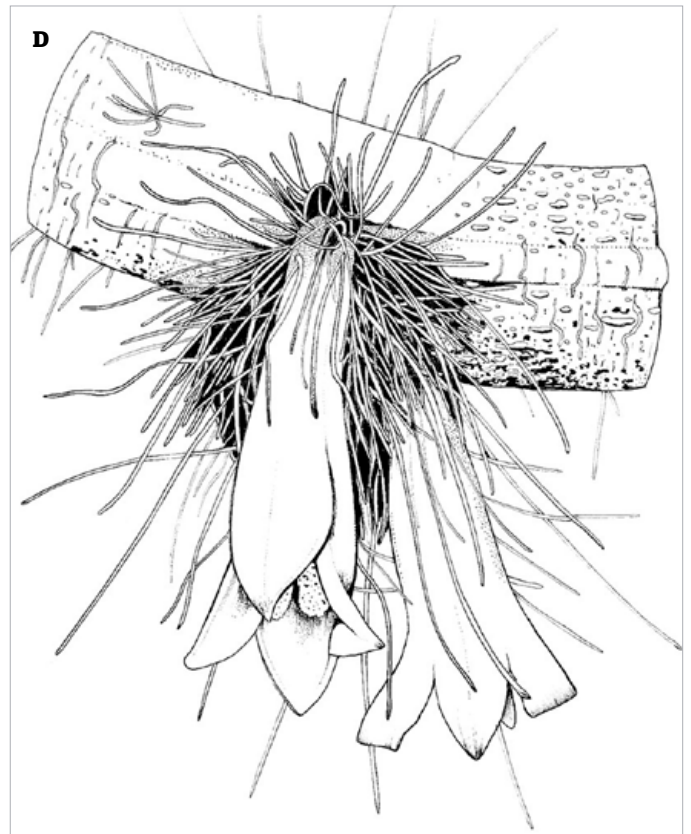
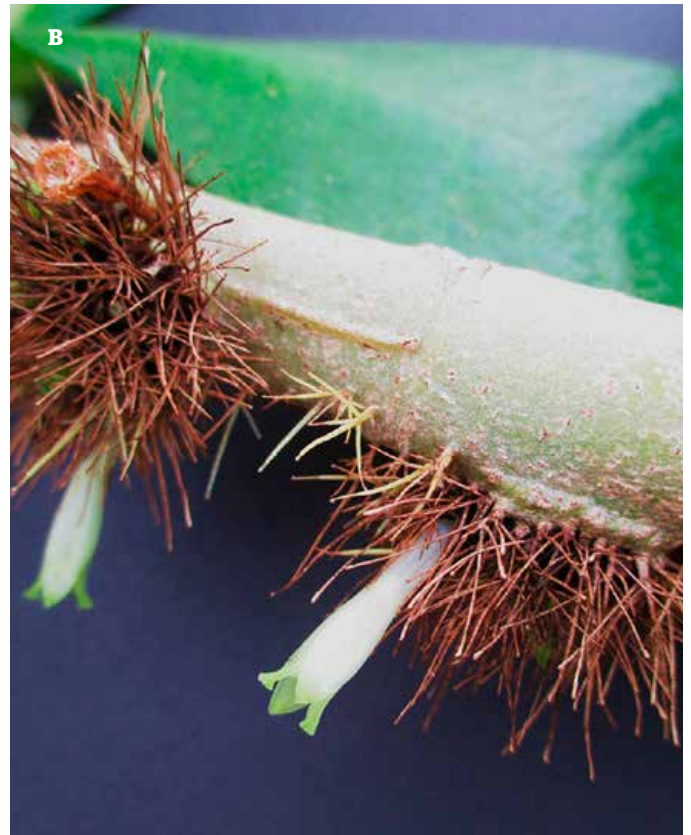
plant is both carnivorous and an ant plant simultaneously, and has unique modifications such as giant nectar glands to feed its resident ant colonies. In return for food and nesting sites the ants patrol the plant and attack would-be herbivores, and are able to dive in and out of the pitcher fluid (deadly to other insects), with impunity.

Among the most elaborate domatia are those produced by Southeast Asian species in the family Rubiaceae. These plants produce particularly complex domatia that contain a network of chambers derived from volumes of tissue which die during the plant's development to leave cavities, which are connected to the exterior by entrance holes. Smooth-walled chambers are used by the ants for nesting whilst rough, warty walled cavities serve specifically as waste chambers, in which ants may provide nutrients by depositing debris and faeces. These ant plants are epiphytic, meaning they grow perched high on the branches of trees. These environments are subject to very limited water and nutrient availability - selection pressures which appear to have contributed to the evolution of such complex and costly structures.

In addition to domatia, many ant plants also offer the ants food rewards such as nectar and specialised nutrient-rich food bodies. Some species of ant even tend 'gardens' of sap-feeding insects (similar to aphids) on the plants, which yield honeydew on which they feed. Another example of 'agriculture by ants' is the encouragement of the growth of fungi within the domatia. These 'fungal farming' ants provide nutrients for the fungi and use them as a food source for their larvae in return. It has been suggested that these fungi may also enhance the transfer of nutrients to the plant. Ant-tended fungal farms have evolved independently among the ant plants several times across the continents. However further work is required to understand the intricacies of these interesting and complex relationships. Very recent research shows that the ant-plant evolutionary relationships are often stabilised by extraordinary and often surprising means. For example work published just last autumn shows that an epiphytic ant plant in Fiji has evolved a complex mechanism to prevent exploitation of its resources by other, opportunist ants. Using a series of field experiments and micro-CT scanning

techniques, scientists demonstrated that the plant conceals a unique sugary sap within a specialised floral structure 10 days after the receptive flowers have withered. Only its resident ants are able to access the concealed sap by biting through the thick protective coating of the structure which other ants are unable to pierce. This interesting discovery is believed to forestall exploitation by other opportunist ants, and therefore stabilise the close relationship between the plant and its specific symbiotic ant partner. Another recent study, also carried out in Fiji, has revealed that ants may also facilitate their host plants' dispersal through complex farming-based behaviour. The ants proactively plant the seeds of their host plant into cracks and crevices in tree bark and then actively patrol their planting sites. Incredibly, the ants then shuttle in and out of their newly farmed seedlings to fertilise them, by defecating inside the plants' tiny domatia!

Importantly, a very rich legacy of research into these fascinating plants exists at Oxford. Research into ant plants was pioneered here by Dr Camilla R. Huxley in the 1970s, '80s and '90s. Professor Huxley described for the first time the morphology and ant-associations of a sub-tribe of five genera in the family Rubiaceae: *Hydnophytum* Jack, *Myrmecodia* Jack, *Anthorrhiza* Huxley & Jebb, *Squamellaria* Becc. and *Myrmephytum* Becc. One of the plants discovered by, and named after Dr Camilla Huxley in this sub-tribe is the exceptionally rare *Anthorrhiza echinella* Huxley & Jebb which is an epiphytic ant plant endemic to a small region of eastern Papua New Guinea. In 2014 the identity of the plant was confirmed using a combination of morphological and molecular techniques, by Guillaume Chomicki as a PhD student, who will be returning to Oxford as a Gladstone Fellow at the Department of Plant Sciences. The conservation status of this plant in the wild is completely unknown, making this a very special plant indeed. Recently the plant has come into flower, as shown in the photograph and illustration. Our rich legacy of ant plant research will be continued in due course through strong collaborative links between Oxford Botanic Garden and the Department of Plant Sciences.



Ant plants: (A) painting by Chris Thorogood of the fanged pitcher plant (*Nepenthes bicalcarata*) showing its swollen tendril in which ants brood; (B) the flower of *Anthorrhiza echinella*; (C) the swollen tuber (domatium) of *Anthorrhiza echinella* showing the entrance hole ants would use in the wild (arrow); (D) illustration by Chris Thorogood of *Anthorrhiza echinella* in flower.

Friends' Section News

Chairman of the Friends

After 20 years of involvement with the Friends, it is a great honour to be asked to take over as Chairman at such an exciting time, in the run up to the 400th anniversary and with the visionary plans of our new Director and his team. This is all the more so because I have a very hard act to follow: Richard Mayou, my predecessor, transformed the Friends during his tenure from a large but low key charity to a well organised professional group with proper financial structures and an extraordinarily talented and vibrant Board and Forum. Amongst other things, he initiated and oversaw the successful appeal for £150,000 to enable the purchase of Palmer's Leys at the Harcourt Arboretum and then oversaw the financing of the enlarged car park at the Arboretum. He provided continuity and reassurance at a difficult time for the Garden in the interregnum between Directors. The Friends and indeed the Garden must for ever be in his debt.

Richard's parting act was to launch an appeal to replace the curved wooden benches by the fountain in the Garden. Typically, this has been a huge success and a total of over £50,000 has been raised: the four benches have been fully funded by Robin and Jeanne Stainer and Dr and Mrs Ward have offered to pay for a further two seats to go by the East Gate. Thank you.

Additional donors have committed a total of £25,000 for various projects within the Walled Garden, which hopefully will include a bench in the Literary Garden as well as another sculpture to complement the Cheshire Cat; a contribution towards the development of the Herbarium Room in the Daubeny Building; new furniture for the Conservatory; and interpretation boards by Pia Ostlund for the Walled Garden Historical Beds.

We are extremely fortunate to have such a generous and committed group of supporters and I am hugely grateful to each and every one of them. It gives me great confidence in our future and bodes well for the projects ahead! More on that anon.

Sarah Taylor



Sarah Taylor



The Friends say farewell to Richard Mayou as Chairman of the Friends

Don't forget your membership card

when you come to visit the Garden and Arboretum. Our ticket office staff do not have access to the membership database (for data protection reasons) and can't let you in free of charge if you don't have your membership card!

Message to all email users

If you are not receiving regular e-bulletins with news of Friends' events by email, it will be because, for some reason, we do not have your current email address. Please send an email with your name, to the Friends' Administrator at friends.administrator@obg.ox.ac.uk.

Special message to all gmail users

Gmail has a disconcerting way of filtering messages into different categories. You may miss emails from us because they have been filtered into the Promotions or Update categories. It is advisable to apply a filter to move any emails from Friends' Administrator to force them into your Personal or Primary Inbox. In particular you may not receive your emailed copy of the newsletter magazine that is published three times a year. The dates this is usually sent out are as follows:

Mid March / Early July / Early November

If you need any help with applying a filter to move our emails into your inbox then do contact Seonaid Danziger at seonaid.danziger@obg.ox.ac.uk

Please note

The Garden and Arboretum are closed Monday mornings until 12.00 noon (excluding June, July and August).

Events

Forthcoming Events

First Friday of the Month

Coffee Mornings

Friends' coffee mornings are on the first Friday of every month (except January and August) and are an opportunity for Friends to get together. All coffee mornings begin at 10.30am in the Garden's Conservatory followed by a tour at 11.00am. There is no fee and no booking is required, just turn up. The next dates are:

July 7th, September 1st, October 6th, November 3rd (note that there is no coffee morning in August).

Wednesday 12th July

The Friends' Opera The Barber of Seville By Giovanni Paisiello

At New College Oxford

Sung in English by New Chamber Opera and The Band of Instruments

5.00pm Performance talk by Prof. Michael Burden, Director of New Chamber Opera

6.30pm opera performance in the Warden's Garden (open from 6.00pm)

The comic opera the *Barber of Seville* was first performed in 1783, predating the Rossini version and was enormously popular all over Europe for many years. The entertaining story is of Count Almaviva who is in love with Rosina and his efforts to woo her from the clutches of her guardian Dr Bartolo.

The opera will be performed in the lovely surroundings of the Warden's Garden at New College or in the chapel if wet. There will be a 75 minute interval for picnicking in the cloisters.

- Tickets £44 to include a welcoming glass of sparkling wine in the cloister garden.
- £3 for the pre-performance talk.



Saturday 26th August
6.00 - 10.30pm

Soul in the Summer

Harcourt Arboretum

Picnic and dance to the soul music band 'Straight out the Crate' in the beautiful summer meadow at the Arboretum. Bring your own picnic and set up in our natural amphitheatre. Lots of parking and our scout valets will help you move your picnic and equipment.

- **Tickets: Advance Sales: Adult £20, children £12, family £50 (2 adults + 2 children), under 10 yrs free**
- **Gate price: Adult £25, children £14, family £60 (2 adults + 2 children), under 10 yrs free**
- <http://www.oxforduniversitystores.co.uk/product-catalogue/botanic-garden-harcourt-arboretum/botanic-garden-harcourt-arboretum/friends>
- Or by cheque and return post to: Maura Allen, 9 Bardwell Road, Oxford OX2 6SU
- Enquiries: 01865 311711

Saturday 23rd September
10.00am

A First for our Friends - 'The Arboretum to the Botanic Garden Walk'

Join us for this Friends' guided walk. 10.00am for 10.30am prompt depart.

Arrive at Harcourt Arboretum, Nuneham Courtenay by bus (X39& X40 <https://www.thames-travel.co.uk>) or car (10.00-6.00pm parking available) before setting out on this 10-mile walk, taking you along Oxfordshire footpaths (little bit of tarmac), with a sandwich lunch stop at the riverside King's Arms in Sandford-on-Thames, before following the Thames north to Oxford. The walk ends at the Botanic Garden for some welcome tea and cake. Sandwich lunch and tea/cake included in ticket price.

- **Walking time: approx. 4 hours + 45 mins lunch break.**
- **Regrettably, no dogs**
- **Friends: £20. Guests: £25. Max 30**
- **Tickets: Use the enclosed Garden Visits and Walk Event postal booking form**

Monday 25th September
7.30pm

12th Annual General Meeting

Jacqueline du Pré Music Building,
St Hilda's College, Oxford OX4 1DY

For more details, please see the enclosed flyer. After the formal business of the meeting, there will be a talk given by Dr Christopher Thorogood, Head of Science and Public Engagement. This will be followed by refreshments.



Members of *Straight out the Crate*

Garden Visits

By Jane Annett, Harriet Bretherton,
Pauline Coombes and Diana Naumann

Welcome to the 2017 autumn programme. Once again we would like to thank all of you who have supported the Friends' Garden Visits Programme during this year; also the garden owners who have generously welcomed the Friends. We hope that these autumn visits will tempt you to come along. We welcome your ideas for future gardens to visit so should you have any suggestions, please contact

Harriet Bretherton: Email:
harriet@brethertonfamily.com

Booking tickets for Garden Visits and the Arboretum to the Botanic Garden Walk Event: we are for the time being abandoning online ticketing. For technical reasons, it has proved to be too inflexible and misleading. All bookings, until further notice, for this Autumn period of bookings will therefore be

by post. The tickets themselves will be sent by email if we are given an email address. Visits tend to get booked up quickly so to avoid disappointment please make your booking as soon as possible, via the enclosed Garden Visits and The Walk Event booking form. If you have any queries, contact the Friends' Administrator, friends.administrator@obg.ox.ac.uk or 01865 610303.



The Sylva Foundation

Friday 8th September

A double visit to two environmental charities, The Sylva Foundation followed by The Earth Trust

10.30am

Sylva Wood Centre, Little Wittenham Road, Long Wittenham, Oxfordshire OX14 4QT

By kind permission of The Sylva Foundation

A morning visit to the Sylva Wood Centre run by the environmental charity, The Sylva Foundation, will be led by its Chief Executive, Gabriel Hemery. We will have a tour of the centre which supports wood craftspeople, including start-up facilities for young businesses, making wonderful items from local and exotic wood. The surrounding landscape has been transformed over the last year with the planting of a demonstration 'Future Forest' with 40 native and exotic species, and a community orchard complete with an apiary. Refreshments on arrival. For

lunch, bring a picnic or use one of the two pubs in Long Wittenham.

2.00pm

The Earth Trust, Long Wittenham, Oxfordshire OX14 4QT

By kind permission of The Earth Trust

The Earth Trust is an environmental learning charity which encourages people to explore the natural world. Our afternoon visit starts with a short presentation about the charity's diverse range of work, followed by a 1½ hour (approx) guided walk with the Head of Land Management, Chris Parker. Take in the stunning panoramic views of South Oxfordshire, walk through the newly created wildflower meadow, discover local wildlife and ancient archaeological features. Then head back to the Earth Trust Centre for refreshments. Bring walking boots and waterproofs as both visits involve country walks.

- Friends £20, guest £25
Maximum 50

Thursday 14th September,
2.30pm

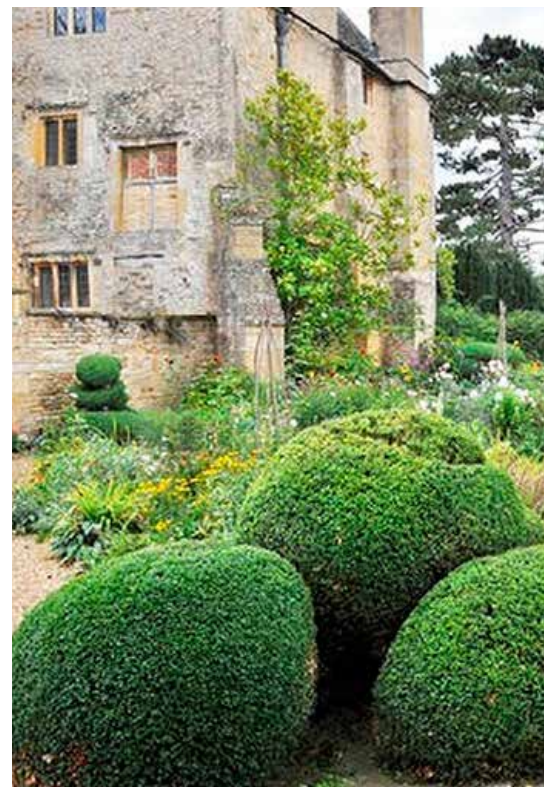
Private visit to Little Compton Manor

The Manor, Little Compton, nr Moreton-in-Marsh, Glos GL56 ORZ

By kind permission of Professor Sir Alec Reed

The C16 historic manor house (not open) is surrounded by four acres of stunning gardens set in a beautiful location in the village of Little Compton. Enjoy the many garden rooms, long herbaceous border, deer walk, Japanese garden, flower garden, arboretum and specimen trees. Teatime refreshments will be served in the Village Hall.

- Friends £15, guest £20
- Maximum 40



Little Compton Manor

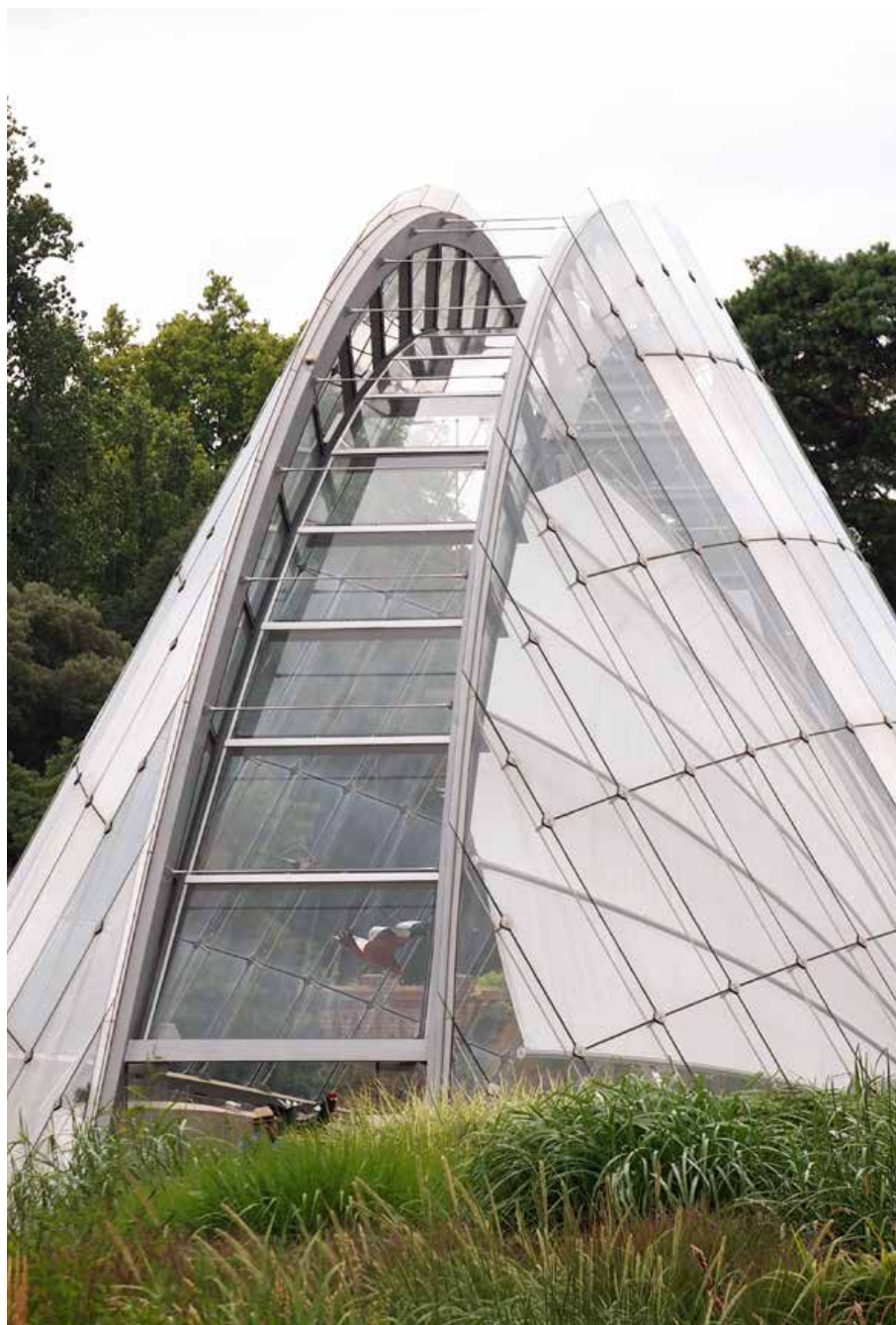
Sunday 15th October, 11.00am

**Coach visit to Kew Gardens
with private guided tours of
The Shirley Sherwood Gallery of
Botanical Art and The Marianne
North Gallery**

Coach departs Oxford Redbridge Park & Ride
at 9.30am; back in Oxford approx. 6.30pm.
Lewknor pick-up possible. Royal Botanic
Gardens, Kew, Richmond, Surrey TW9 3AE

This coach visit to Kew Gardens gives you
time to explore the garden's varied autumnal
delights. Because Kew holds one of the
world's greatest collections of botanical
art, the visit includes a guided tour of both
The Shirley Sherwood Gallery of Botanical
Art - an exhibition by floral installation
artist, Rebecca Louise Law, along with
a series of 'Abundance: Seeds, Pods and
Autumn Fruits' from The Shirley Sherwood
Collection, followed by the Marianne North
Gallery - North's extraordinary pictorial
record (855 paintings) of tropical and exotic
plants. Binoculars recommended! NOTE:
Refreshments and lunch not included.

- **Friends £25. NOTE: Friends,**
please bring your FOBGHA
membership card with you.
- **Guest £45**
- **Maximum 50**



The Alpine House, Royal Botanic Gardens, Kew

Friday 20th October, 2.30pm

**University of Oxford Botanic
Garden: 'Climate Change and
Trees for the Future' with
Walter Sawyer**

University of Oxford Botanic Garden,
Rose Lane, Oxford OX1 4AZ

By kind permission of Professor Simon Hiscock, Director,
Oxford Botanic Garden and Harcourt Arboretum

Walter Sawyer, Superintendent of
University Parks, has generously agreed to
speak to us about climate change and its

consequences for the trees we currently
grow in this country. Not only is Mr
Sawyer one of the leading experts in the
country on climate change and trees, he is
also a most entertaining speaker. The visit
will begin with a PowerPoint presentation
in the Botanic Gardens Conservatory after
which Walter will accompany Friends to
see what is currently happening and look
at trees for the future. Tea will be served
after the tour.

- **Friends £20, guest £25**
- **Maximum 40**

The Bobarts Patron Group

By Helen Potts
and Jennie Turner

For over 12 years the commitment of the Bobarts Group has provided extra financial support to the Garden and Harcourt Arboretum. Our members enjoy all the benefits of the Friends plus a programme of small group visits to the University collections and to some of the best gardens and estates in the area.

We aim to visit the widest possible range of gardens in terms of style, size and location and are helped in this by the generosity of the garden owners and those who work in the institutions whose gardens we visit. We are grateful too for their time and for the knowledge they share with us.

We have already had three amazing visits this year. Firstly in March The Oxford Centre for Islamic Studies, which aims to provide a meeting point between the Islamic and Western worlds of learning. The highlight was walking through the newly planted garden with Professor Hugh Dickinson, who had designed the garden with valuable contributions from the Centre's Patron, HRH Prince Charles. Then in April a visit to two gardens in Horton-cum-Studley beginning with a delightful informal garden with many unusual shrubs and herbaceous plants followed by a splendid mature half-acre garden belonging to Bobarts members.

In May we visited Upton Wold which combines a magnificent location, a firm structure of hedges and skilled and knowledgeable planting. The woodland was overflowing with species magnolias, deutzias, wild flowers and a davidia in full flower leading to a walk through Ian Bond's national collection of walnuts. As we write we are looking forward to our full day visit with lunch to The Old Rectory and West Woodhay House, West Woodhay, nr Newbury. The Old Rectory has deep herbaceous borders providing year-round interest, unusual trees and fabulous downland views. After lunch we shall go next door to West Woodhay House with wide lawns reaching down to enchanting waterways, rose gardens and an arboretum. A

productive walled kitchen garden is also home to some unusual shrubs and flowering plants.

The Bobarts Day will return to Oxford Botanic Garden in 2017, but earlier in the season. Professor Simon Hiscock, Director, Dr Chris Thorogood, Head of Science and Public Engagement and Kate Pritchard, Glasshouse Curator, will welcome us for a reception and tour of the Garden. It will be interesting to see the 'Plants that Changed the World' in its second year, as well as the newly planted walled garden and glasshouses.

Later in the year we shall visit a wide range of garden styles and settings with visits to private homes near Marlow Common and Chinnor and to Rycote Park. In September members of the Bobarts Group will travel to Herefordshire for our second two-day trip to visit four beautiful gardens near Hereford, also taking in the gardens, the Mappa Mundi and chained books at Hereford Cathedral. Finally in October, there will be a visit to All Souls College to see works from their library, the chapel and gardens.



Perrycroft just outside Malvern

To find out more about coming a Bobarts Member please visit <https://www.botanic-garden.ox.ac.uk/membership>

Calendar

July

Thursday 6th July, 2.00pm

Visit to Longstock Park Water Garden

Friday 7th July, 10.30am

Coffee Morning

Wednesday 12th July, 6.30pm

New Chamber Opera

Sunday 23rd July, 2.30pm

Visit to Upper Slaughter Manor
SOLD OUT

August

Saturday 26th August, 6.00pm

Soul in the Summer

September

Friday 1st September, 10.30am

Coffee Morning

Friday 8th September, 10.30am

Visits to Sylva Foundation and Earth Trust

Thursday 14th September, 2.30pm

Visit to Little Compton Manor

Saturday 23rd September, 10.00am

Arboretum to Botanic Garden Walk

Monday 25th September, 7.30pm

Annual General Meeting, St Hilda's College, Oxford

October

Friday 6th October, 10.30am

Coffee Morning

Sunday 15th October, 11.00am

Coach visit to Kew Gardens

Friday 20th October, 2.30pm

'Climate change and trees for the future' - Walter Sawyer, Oxford Botanic Garden

Saturday 21st October, 11.30am-4.00pm

Autumn Fair and Apple Day

November

Friday 3rd November, 10.30am

Coffee Morning

December

Saturday 2nd and Sunday 3rd December

Christmas Fair

The Friends of Oxford Botanic Garden and Harcourt Arboretum

Rose Lane, Oxford OX1 4AZ.

All Friends' enquiries, including those about Friends' events, should be made to the Friends' Administrator.



Tel: 01865 610303

E-mail: friends.administrator@obg.ox.ac.uk

Web: www.botanic-garden.ox.ac.uk

The Friends Office is staffed on weekdays.

This Newsletter was edited by Chris Thorogood and Carol Maxwell with help from Diana Naumann, Sue Oldfield and Jean Gurr.

The views expressed do not necessarily reflect the policies of the Board of the Friends or the Visitors of Oxford Botanic Garden.