AUSTRALASIAN PLANT SOCIETY
NEWSLETTER

PENTACHONDRA

ISSUE 45 DECEMBER 2010



Olearia chathamica

AUSTRALASIAN PLANT SOCIETY

Newsletter Number 45

DECEMBER 2010

CONTENTS

Editorial, Judy Clark	1
Australasian Plants in the Spotlight, Jeremy Spon	3
APS News	3
Some Olearias, Gary Dunlop	5
Gardens to visit, Jeremy Spon	23
Germination of APS seed, Jeff Layman	24
The worst winter for 30 years, Sue Kohler	25
New Zealand Burrs, Brian Halliwell	27
How the bottlebrush got its brush, Jeff Irons	27
Bottlebrush pollination, Judy Clark	28
AGM report: Bristol Botanic Gardens, Steven Wood	30
Southern meeting: Lullingstone Castle World Garden, Jeremy Spon	33
Grevillea barklyana, Jeff Irons	35
New eucalyptus nursery, Jeff Layman	35
Melaleuca diosmifolia, Sue Kohler	35
Tresco Abbey Gardens, Tony Entwistle	36
More internet sources of information, Judy Clark	36
Letter from Melbourne, Nicky Zanen	37
Minutes of the APS Annual General Meeting 2010	38

©AUSTRALASIAN PLANT SOCIETY 2010

CONTACTS

President	Jeff Irons 74 Brimstage Road Heswall Wirral CH60 1XG Tel : 0151 342 1703 president@anzplantsoc.org.uk
Chairman & Webmaster	Keith Larkin Chadshunt House 5a Lillington Road Leamington Spa Warks CV32 5YS Tel : 01926 422596 webmaster@anzplantsoc.org.uk
Secretary	Jeremy Spon 1 Iffin Cottages Iffin Lane Canterbury Kent CT4 7BB Tel : 01227 780038 secretary@anzplantsoc.org.uk
Treasurer	Aubrey Wood Fairfield Main Road Baxterley CV9 2LN Tel : 01827 875887 treasurer@anzplantsoc.org.uk
Newsletter Editor	Judy Clark 36 Collier Road Hastings East Sussex TN34 3JR Tel : 01424 720369 editor@anzplantsoc.org.uk
Seed Manager	Richard Christmas Osborne House Wrexham Road Pen-y-ffordd Chester CH4 0HT seeds@anzplantsoc.org.uk



Correa backhouseana

EDITORIAL

Judy Clark

When I began writing this editorial in late November I could wander round the garden and find various Australasian species in flower. Many correas flower in the winter months (though not only in those months) and three of mine were blooming: *Correa backhouseana*, quite vigorous and with lots of beautiful creamy-with-a-hint-of-green tubular bell like flowers (photo back cover); *Correa* 'Mannii' with showy reddish bells; and the less showy and low growing C. *decumbens* (photo page 9) which nonetheless makes good ground cover. Then there was a white flowered *Bauera rubioides* (Wiry Bauera) with its single blooms looking rather like miniature roses; it flowers on and off throughout the year. *Melaleuca thymifolia* (Thyme-leaved Honey Myrtle) was admittedly nearly over but there were still a few deep pink flowers resembling bundles of tangled lace. Evergreen *Asterotrichion discolor* (Currajong) always flowers well but I grew mine from seed and it turned out to be a female so the flowers themselves are a bit of a disappointment; the male ones are showier (photo page 9). Silver Banksia, *Banksia marginata* (photo page 10) also flowers reliably at this time of year. Other species – grevilleas and acacias – showed buds in abundance, portending well for displays in winter and early spring.

Now I can no longer see whether anything is flowering or not, let alone any buds. Even my 4 m tall banksia has been rendered barely visible by the snow, the earliest heavy snow that I have experienced in over 30 years of living on the south coast. Already I have already had temperatures lower than anything either of the two previous winters produced and from media reports I suspect many other (UK) members may have too. I don't protect any of my plants over winter, but this weather has made me wonder whether I ought to at least cover those experiencing their first winter in the ground.

However, by a strange twist of fortune, and despite having many seed-grown plants ready to go in the ground as well as having indulged myself on the purchasing front, I didn't plant much out during 2010. The reason is that I have been tormented by at least one badger not only making holes in the lawn (which I can cope with) and excavating latrines (which I can just about cope with) but also digging up almost everything I planted from late spring onwards. It (or maybe they) was getting in through a privet hedge and was deterred neither by attempts to block entry holes in the hedge nor by attempts to protect individual plants; wire and netting were contemptuously flung aside and anti-animal stuff ignored. Getting exasperated with continually finding upended what I'd carefully planted I suspended all new planting until badger proofing could be implemented. A fence now replaces the said hedge, a fence under or through which a badger cannot dig!

By the time the fence was done I decided not to risk planting out species that might be at all tender. So I contented myself with some essential potting up and my small greenhouse is currently chock full, but at least plants that might otherwise be struggling are protected from ice and snow and freezing temperatures. Not only that, I now have an extra metre of growing space along the garden's back boundary. Clouds and silver linings do come to mind.

Members' experiences of growing Australasian species in their own gardens always provide interesting reading. In this issue Sue Kohler (page 25) writes about the impact of the 2009-10 winter in her Sheffield garden; not just what survived and what succumbed but also what happened next. She notes that some species that survived flowered exceptionally well in the aftermath, as did Tony Entwistle in a footnote to the list he sent me about death and destruction during the last winter in his Cheshire garden. More silver linings? Or maybe not; a fantastic display of flowers can be a last-ditch attempt by a dying plant to ensure that its genes live on.

I have started to collate information from members about what Australasian plants have been able to cope with over the past two UK winters, though this project has proved more time-consuming than I had anticipated. Nonetheless I'd welcome more data, especially but not only if we have a third very cold winter, so please do keep sending in reports about how Australasian species do (or don't) in your garden over winter.

We had two very successful meetings during 2010 as shown by the reports on pages 30-34. There should have been three, but unfortunately the Northern meeting, due to be hosted by longstanding APS member Pat Anderson, had to be cancelled as Pat was suddenly taken ill. We much appreciate his organising a meeting and we hope he is now fully recovered.

Arrangements for the 2011 AGM are in hand (see page 3) but no regional meetings have yet been planned. Regional meetings provide an opportunity apart from the AGM to meet other members, share experiences and knowledge, and make new friends. Are there any members out there who would be willing to arrange a visit to a public garden or nursery in their part of world? Or host a meeting in their own garden? It's not a lot of work, committee members will be glad to provide assistance, and of course publicise the event in Pentachondra.

Another way of meeting other members is to invite them to drop in on you. Your willingness to receive visitors can be advertised in Pentachondra; just send me a note with relevant details. (And for any members visiting Hastings or thereabouts my contact details are inside the back cover.)

Otherwise this issue contains the usual eclectic mix. A major feature is the article by Gary Dunlop

(page 5) about olearias which had me wondering if I am missing out by not growing any of them but if you're not interested in daisy bushes then hopefully you'll enjoy the many other items.

❀❀❀❀❀❀❀❀❀❀❀❀❀

AUSTRALIAN PLANTS IN THE SPOTLIGHT

Jeremy Spon

Two exciting displays featuring Australian plants are being staged in London next year, and both should be well worth a detour to see. One is a garden at the Chelsea Flower Show, and the other is a landscaped collection of plants in the forecourt of the British Museum.

The garden at Chelsea, possibly the first show garden ever to feature exclusively Australian plants, is being created on behalf of the Royal Botanic Garden Melbourne. It is based on the Australian Garden at the Cranbourne outstation of RBG Melbourne with the theme of 'the journey of water', and has been designed by Jim Fogarty, a well-known Australian garden and landscape designer. The intention is that the garden will feature many plants never before exhibited at Chelsea, so members might want to consider a visit to the Show, which runs from 24th to 28th May 2011. (Tickets are on sale already!) More information about the Show can be found at www.rhs.org.uk, and about RBG Melbourne, and Cranbourne, at www.rbg.vic.gov.au.

The display at the British Museum is the fourth of a series of five created by RBG Kew to tell visitors to one of London's most popular tourist destinations about plants, and highlight threats to bio-diversity. The display in 2010 was called the South African Landscape, and featured some impressive individual plants, as well as dramatic mass plantings. The Australian version in 2011 should be just as spectacular. It will also be of particular interest to members, as many of the plants are being supplied by fellow member Graham Blunt, who runs Plantbase Nursery at Lamberhurst in Kent. Graham has let us have a sneak preview of part of the plant list, and among the rare plants he is providing are *Erythrina vesperitillio*, *Maireana georgei*, *Ptilotus exaltatus*, *Gahnia sieberiana*, *Acacia macradenia*, *Eucalyptus torquata*, *E. kruseana*, *E. erythrocorus* and *E. caesia* ssp *magna*. It should be very exciting; exact dates are yet to be confirmed, but the display in 2010 ran from mid-April to mid-October, and as the forecourt of the Museum is open to all there will be no charge to see it.

❀❀❀❀❀❀❀❀❀❀❀❀❀

APS NEWS

Annual general meeting 2011

Arrangements for the AGM in 2011 have not been finalised but we are planning to organise a

meeting in London in June or July, probably at Kew, where we hope to have the opportunity to find out more about the background to the planned display at the British Museum described in the previous article. Full details will be published in the next edition of Pentachondra, due out in May 2011, and members who have provided an email address will also be notified by email as soon as the date is known. If you want to be kept up to date with this and other events by email, **please make sure we have your current email address.** Any members who do not have access to email, and want to be notified of the AGM by post in advance of the May 2011 issue of Pentachondra should contact the Secretary (his contact details are inside the back cover).

2011 Seedlist

The 2011 seedlist and application form will be sent out with the May 2011 newsletter as usual. If you can't wait till then you can get it by email from 31st March 2011. As there have been some problems with the Seed Manager's email in the first instance please contact Judy Clark, Pentachondra editor, at editor@anzplantsoc.org.uk.

For 2011 the charge for seeds will be £4 for UK members, €5 for eurozone members and £5 for all other members. This is partly due to the rise in postage and other costs and partly due to changes in the exchange rate which mean that seeds cost more to purchase. But where else could you get 20 packets of seed for four or five pounds?

If preferred overseas members can pay for seeds together with their subscription, but please add a note to your subscription renewal form saying that you have included the seed charge.

New members

The APS would like to extend a warm welcome new members Andrew Parsons, Roger Winn, Marcia and Lawrence Warner, Vibeke Snorgaard, Jim and Sue Hall, Harriet Nicholson, Ann Brigand, Christopher Young and Rudi de Praetere.

Pentachondra contributions

The deadline for the next issue is **15th March 2010**, but you don't need to wait till then; any time will do.

You could write about your own garden, a public garden that you have visited, a good nursery, a favourite plant, an unusual plant, a book that other members might be interested in, a cultivation technique – in fact anything that bears at least a passing connection with Australasian plants will be welcome. The same goes for photographs and drawings whether to accompany articles or as stand-alone items (with a caption if the latter) . And if you have any doubts as to whether what you would like to write about would be suitable you can always contact the editor to ask.

Articles can be any length and can be submitted electronically or as hard copy; if the latter, typed copy is preferred as there is less chance of errors creeping in. For where to send your contributions see the editor's contact details inside the back cover.

Back issues

Newer members may be interested in back issues of Pentachondra. We have a small stock of recent back issues (40 to 44) and it may be possible to provide copies of earlier issues. Anyone interested should contact the editor (see contact details inside back cover).

❀❀❀❀❀❀❀❀❀❀❀❀❀

SOME OLEARIAS

© Gary Dunlop

Olearias are not one of my favourite genera, despite which I have somehow ended up growing a surprising number of them. Many have dark green glossy or semi-glossy leaves and clusters of small white or off white daisy flowers, which in some cases seem to be missing many of their petals. The larger leaved species do however have several merits; they form good evergreen background shrubs against which many other more attractive plants can show off their merits to good effect.

Many are reasonably hardy despite their reputation for being tender. Many of the ones I grow survived a couple of nights of –13ºC about 10 years ago, though I did then lose a few, inevitably mostly the

Subscriptions are due

All subscriptions are due on 1st January 2011. It makes our treasurer's life easier if you pay by standing order but if you don't please complete the enclosed renewal form and send it with your cheque (payable to Australasian Plant Society) to APS Treasurer Aubrey Wood. If you pay by standing order you don't need to complete the form **unless** your details have changed. Remember **we need your current email address** to keep you up do date with APS events and news.

The annual subscription for UK members remains at £10 but due to sharply increased postage and other costs we have reluctantly had to raise the subscription for overseas members as follows. From 2011 the subscription for members living in the eurozone will be €15 and for members living in the rest of the world it will be £15.

To facilitate secure payment for overseas members without UK bank accounts we have set up payment via PayPal. If you would like to pay by this method then please email APS Chairman, Keith Larkin,at chairman@anzplantsoc.org.uk for details. Overseas members can still send cash through the post but do so at their own risk.

For any queries apart from ones concerning PayPal please contact the treasurer.

more attractive ones. Writing in March 2010 at least I can report that all the ones currently growing in the garden have survived a month of freezing conditions, the exception being the night before New Year's Eve, when a thaw melted the snow and ice that had lain for almost a fortnight, but it was replaced with a further fall of snow at dusk that day. Most of the nightly frosts were only down to about -4°C, but several nights were rather colder about –8°C. For most of the month there was little thawing during the day, except where aided by the sun. (See Box 1 for more on olearia hardiness.)

Those olearias that are hardy in temperate climates are probably more suited to the cooler and more humid maritime climate and they have the advantage of being very wind resistant, and often salt tolerant, which make them ideal candidates for providing shelter to exposed seaside gardens. Wind tolerance is a quality which I do appreciate as I garden on a rather exposed and windy hill top. Despite being only 100 m above sea level , with a gentle slope towards the south, it is exposed to the wind in every direction, which seems to accelerate before reaching the garden. But I garden

Box 1: Olearia hardiness

As the winter of 2009-2010 (though not quite past) was on average the coldest in Scotland and Northern Ireland for 47 years, because of the very prolonged (and still continuing) cold weather, it seems worth listing the various species that have survived with me. Whilst much lower temperatures have been recorded in more recent winters, notably 1981-2 and several brief periods since, snow lay in my garden for just over a month from the week before Christmas, and again for about a week in late February after some milder temperatures in late January and early February. In general most nightly frosts were about –4°C with little melting of snow except where exposed to the sun, but there were several occurrences of at least –9°C, though not on consecutive nights. Ice in ponds built up to at least 100 mm thick before the thaw set in.

Of those discussed in the main text, a small, recently acquired, plant of *O.macrodonta* 'Minor' was killed outright. Only one olearia suffered badly; *O. lineata*, now *O. virgata* 'Dartonii' with thread like leaves was seriously frosted and may recover though it would not be missed, as it could not be described as being garden worthy. *O.*'Comber's Blue' and the impostor for 'Comber's Pink' (see page 13) appeared somewhat slightly weather beaten, but not seriously so, though the latter was sheltered by a taller overhanging shrub. All the others which are discussed in the main text were completely unaffected, as were *O. arborescens*, *avicennifolia*, *floribunda*, x *haastii*, *ilicifolia*, *lirata*, *paniculata* (2 clones), *phlogopappa*, x *scillioniensis*, *solandri*, *traversii*, *virgata* (3 clones including 'Dartonii') and 'Waikariensis', together with a number of undetermined hybrids. The majority of these olearias had previously survived a couple of consecutive nights of about –13°C about 10 years ago.

over one mile north of Strangford Lough, far enough inland that direct or even indirect salt spray is not a problem. Many of the reasonably dull olearias grow quite quickly and can become fairly large, and thus provide good shelter from the wind, but are tolerant of severe and regular pruning so they can easily be kept in check or. reinvigorated if they become too tall or straggly.

The genus *Olearia*

Olearia is a genus confined to Australasia, but not one that seems to be especially popular with APS members. Most of those that tend to be grown in the British Isles are from New Zealand and Tasmania, though the majority of species are actually from the Australian mainland and not likely to be hardy in the UK. They are members of the daisy plant family, long known as Compositae but now called Asteraceae. As with many other genera, there are ancient links to the flora of South America, which is most clearly evident with *Chiliotrichum diffusum*, which bears a close resemblance to *Olearia phlogopappa*, though with rather smaller leaves.

I suppose it is fitting therefore to discover that the genus was established with a mistake. It was established in 1802[1] by the German Conrad Moench, who was professor of Botany at Marberg University, by reclassifying *Aster dentata* (Andrews) as *Olearia dentata*. The International Plant Names Index identifies the plant he named as actually *Aster tomentosa* (Wendl.), though the current name for the plant is now apparently *Olearia tomentosa.* This was not just an isolated mistake, as subsequently there were a number of plants attributed to *Olearia* that were later transferred to the genus *Aster* and vice versa. A number of Olearias were also first placed in the genus *Eurybia*.

This initial changing of names created complications for the plant now named *O. macrodonta* (Baker). This plant was originally discovered and named *Eurybia dentata* by Joseph Dalton Hooker in 1853[2] and renamed by him as *O. dentata* in 1864[3]. However as the name was already being used, albeit inappropriately, it was not valid. The mistake was corrected by Baker in 1884[4] who renamed the plant *O. macrodonta.* Bean introduces further confusion by suggesting that the status of the species is uncertain, and that it is possibly a hybrid between *O. arborescens* and *O. ilicifolia*[5]. However H H Allan regards it as a valid species in the Flora of New Zealand[6]. Bean also lists two cultivars, 'Major' and 'Minor', which gives a strong indication of how variable the species is in the wild. I understand from Jeff Irons that botanists in New Zealand now support the hybrid theory.

The late Peter Clough, when he became head gardener of Inverewe, found himself responsible for the National Collection of *Olearia*. He subsequently researched the genus and wrote a brief article[7], aptly titled '*A journey through a beautiful minefield*', in which he

described some of the species in alphabetical order. He also mentioned that Jane Taylor provided a summary of the species in the Inverewe National Collection in her book on National Collections[8]. And it was he who suggested that many gardeners in New Zealand thought the name olearia was derived from the Latin ***olea*** for 'olive' and *aria* meaning 'like'. It was actually named after the German botanist Ölschläger whose father Latinised the name to become Olearius. This being so, it has an effect on the proper pronunciation of the genus name, being correctly pronounced O-le-aria and not, as one might expect O-lear-ia, particularly if you come from Ireland.

The earliest survey of the genus published for gardeners was by Arnold-Forster, whose peerless book should be on the shelves of anyone interested in half-hardy plants[9]. It has been republished so should now be easier to obtain.

A more detailed list, including many of the species in cultivation, was written by Lord Talbot de Malahide who was particularly interested in the genus. Usefully, he arranged the species that he described in groups with regard to their assessed hardiness. It was published in two parts in 1965[10,11]. An update on Talbot de Malahide's paper and collection was published by Anne James in 1998 in *Moorea*, the Journal of the Irish Garden Plant Society[12]. The Talbot Botanical Gardens hold a second National Collection of *Olearia*, perhaps rather surprisingly for plants from New Zealand and Tasmania, where the soils are usually acidic, whereas the soil at Malahide Castle is alkaline.

Bean, as usual, is probably the most readily available and comprehensive source of descriptions and background information on most of the species and many hybrids in cultivation[5]. However, Metcalf is perhaps the most detailed source of descriptions[13]. Cave and Paddison's book[14] provides some reasonable illustrations of most New Zealand species, arranged by size of plant, whereas Salmon arranges his less good photographs by the type of habitat[15].

Illustrations of the Tasmanian species are more difficult to come across in published works. They are generally small leaved with the exception of *O. argophylla* from wet forest areas which resembles *O. arborescens* from New Zealand. Two paper back books are the best source of illustrations, with **Tasmania's Natural Flora** being the most comprehensive and with fuller descriptions[16]. The second book, **A Guide to Flowers and Plants of Tasmania** (4th ed)[17] is also useful. The former of these two is, I understand from Jeff Irons, currently out of print and few copies reached the UK. In addition, quite a few good illustrations of olearias can be found on the Hebe Society website at www.hebesoc.org.

There are thus several reasonable sets of descriptions of various species in cultivation in the British Isles, though they tend to focus on



Correa decumbens

Banksia marginata





O. x mollis **'Zennorensis'**



***Olearia* x *phlogopappa* Comber's deep pink'**

the New Zealand species which are mostly larger leaved and with larger flowers. With several name changes and many hybrids, the identification of some plants is not as straightforward as one might hope. Even several of the known hybrids are of uncertain parentage.

Curiously, in my experience most hybridised seed tends to self sow. I have had a number of new hybrids though the parentage is difficult to determine. They have mostly arisen in unpromising locations; in a narrow shallow bed at the base of a dry stone retaining wall, though no doubt rooted into the deep soil behind it. However they have thrived and with better floral displays than the presumed parents, despite having to be regularly severely pruned back as they encroach on the access lane.

Not all hybrids are so free flowering; one of the earliest and best known one, *O. x mollis* 'Zennorensis' (photo page 10) , which occurred in the garden of Arnold-Forster, is notoriously shy flowering. It is a hybrid between *O. ilicifolia* and *O. lacunosa*, which is notoriously tender and also reputedly shy to flower. A similar natural hybrid had previously occurred in the wild in New Zealand and had been named *O.* x *mollis.* Despite the dark green narrow foliage with serrated edges it is quite attractive and hardy, and well suited to supporting sparse climbers such as *Mutisia oligidon* or perhaps *Eccromocarpus scaber*.

The coloured olearias

However I want to concentrate on those olearias which have coloured flowers rather than get sidetracked into some of the less attractive species and those that are problematical to identify with confidence. I have only grown one species from the Australian mainland, *O. frostii* (F Muller). It was originally discovered in 1889 by J H Willis on Mt Hotham in Victoria at an elevation of 6000ft (1830 m), and originally identified as an aster but transferred to *Olearia* in 1956. It was illustrated in the Botanical Magazine 40 years ago[18]. It is a compact but attractive prostrate sub shrub with soft grey leaves and quite large recognisably daisy flowers of pink or lilac, and well suited to a sunny rock garden. It is quite a few years since I grew it and I can't remember what caused its demise or even when. It is all too easy to overlook a small plant in a large garden, and not notice its disappearance. Drought, significant frost or simply starvation from a nutrient deficient soil, are all plausible reasons. It is quite rare in cultivation, though I would be tempted to grow it again if the opportunity arose.

A second species with tiny flowers of an attractive bright blue colour that I briefly grew is *O. ramulosa* 'Blue Stars'. It was certainly not very hardy but did survive for 2 or 3 years, long enough for it to reach about 60 cm tall, with very small leaves and an open growth habit, possibly due to being grown in light shade. It again might look well in a sunny sheltered rock garden but otherwise amongst other larger shrubs it looks rather insignificant. It is still available from Graham Hutchins of Country

Park Nursery, who grows an extraordinary range of plants from New Zealand and Tasmania. He obtained the rare blue form of the species from New Zealand and gave it its cultivar name. The species is normally white flowered.

Perhaps the two most well known coloured olearias are 'Comber's Blue' and 'Comber's Pink', which are now classified as *O. phlogopappa*, though they originally went by the earlier name of *O. gunniana* var. *splendens.* An interesting article in the privately produced magazine *My Garden* by James Comber[19], the father of Harold Comber and head gardener at Nymans, describes the origin of these plants. (The most relevant part of this article is reproduced in Box 2.). The original plants raised

Box 2: The New Coloured Olearia (*Olearia gunniana* var. *splendens*) by J.Comber

The introduction of this and other olearias from Tasmania by H.F.Comber in 1930, revolutionised our conception of the genus. Until the year 1929, the only coloured olearia known to gardens was *Olearia semidentata* (now known to be a hybrid. *O.* 'Henry Travers') with silvery leaves and starry mauve flowers, but too tender for cultivation.

The white flowered *O. gunniana* is well known; it is planted in shrub borders and on rockeries and generally comes through the winter successfully. It is a neat little bush of three to four feet in height and width, covered profusely with daisy-like flowers one inch across.

The origin of the coloured olearia in not known with certainty, but as there is a very slight trace of colouring in the inner florets of *O. stellulata*, a closely allied species, it is suggested that our present plant may be a hybrid, between it and *O. gunniana*.

The original plant bearing coloured flowers was discovered on Mount Sedgwick by a small farmer who raised seedlings from it and secured a good variety of colours. The existence of this strain was reported to my son, then collecting plants in Tasmania. He lost no time in viewing the olearias and in securing the season's crop of seed. At the same time, some seed of the previous year was sent to Kew by an interested amateur, Mr. A.V. Gibling.

A share of the seeds reached these gardens with injunctions from the collector to take "all possible care of them". His field note is as follows: "Comber 1530-36. *Olearia gunniana*, generally speaking this is a looser growing edition of the popular form of *O. gunniana*, but the flowers range from white to pale pink, deep pink, mauve, purple, to blue, and as the plants from which these seeds were collected are all these colours and are growing close together, a good variety of colours should result. Every plant should be saved, as I consider this to be quite the best find I have so far made in Tasmania."

from Comber's seed collected in Tasmania had a much larger colour range, but most were lost to cultivation as they are not fully hardy. Curiously no one seems to have tried crossing the two coloured survivors with each other or with the more common and typical white flowered species. From my experience *O. phlogopappa* 'Comber's Pink' is slightly more tender that *O. phlogopappa* 'Comber's Blue',and recent experience would suggest that –8ºC is close to their survival limit, thought the typical white form of the species is a little hardier. The coloured forms mostly tend to flower near the top of the stems whereas the white forms flower right up the stems which might support the original description of the origin as being possible hybrids with another species. It would seem that at least two pink coloured forms have survived. A replacement for the long lost *O.*'Comber's Pink' obtained several years ago has just started flowering with rich deep magenta coloured flowers (see photo page 10), rather than the normal bland mid pink colour. Unfortunately, I cannot remember the source of the unusual rich pink coloured flower.

When first exhibited at Chelsea many visitors to the stand dismissed this new coloured group of olearias as 'forced' asters, and inappropriate for a spring show. Whilst the individual flowers are not large they are plentiful, and make a good if brief show. There is one other named blue form, *O.* x *scillioniensis* 'Master Michael', a blue form of the hybrid which arose at Tresco and which is deemed to be a cross between *O. lirata* and *O. phlogopappa*, though the plant which I grew briefly did not seem to be noticeably different from 'Comber's Blue', and probably was not the correct plant.. The original hybrid *O. x scillionensis* is white flowered, and a recent acquisition could easily be mistaken for *O. phlogopappa*.

One olearia stands out from all the rest for attractiveness, in flower, foliage and growth habit. It was reputedly introduced into cultivation in 1909 by Dorrian Smith as *Olearia semidentata*, which he collected in the Chatham Islands and brought back to his garden at Tresco in the Scilly Isles[20]. However, as Charles Nelson relates, it had actually been introduced into cultivation the year before, with a consignment of plants sent to Glasnevin Botanical Garden by Henry Travers, which arrived in 1908[21]. He subsequently tracked down the original type specimen of *O. semidentata* [22] and concluded that both the plants in cultivation were in fact hybrids and so renamed the Glasnevin plant *Olearia* 'Henry Travers'. The parentage is *O. chathamica* x *O. semidentata*. Apparently the former species grows near the coast and the latter further inland and between the two groups of species there is a large hybrid swarm which are probably somewhat variable . It is therefore questionable whether the cultivar name is appropriate for plants probably propagated from more than one original hybrid, even if quite similar.

O. 'Henry Travers' (photo page 19) has a neat upright but spreading growth with fairly narrow leaves with serrated edges, dark glossy green above and silvery white beneath, with a similar covering on the young branches and stems. The pale lavender flowers with purple centres are full and neat and much larger than most of the genus, being more than 50 mm across. In or out of flower it is an attractive plant worthy of a prime position in any garden where it can survive. However, it is likely that relatively cool and humid conditions are necessary for it to flourish. It would certainly seem to be hardy to –8ºC, as the recent winter has proved, but from previous experience mortally wounded by –13ºC, though not initially killed outright.

Olearia chatamica (see front cover) is similar to its hybrid offspring, though with a more lax and straggly growth habit and broader and slightly coarser leaves. The flowers are if anything slightly larger but frequently of rather dishevelled appearance, with an often slightly irregular arrangement of the petals and occasional gaps between them. They can be pale lavender or almost white, fading as they mature. I first saw it in the garden of the late Mrs Reside in Rostrevor about 20 years ago. She kindly gave me a cutting of it, at a time when Charles Nelson was sure the true species was not in cultivation. Who made this particular collection and when it was introduced it to cultivation does not seem to be known, though it may have been Lord Talbot de Malahide who planted a specimen in his garden in 1959. It was lost in the bad winter of 1962-3[12], though he obviously had either cuttings or reserve plants inside which survived as he was still growing the plant at the end of the decade. However e may well have only collected the 8 Chatham Island endemics on his visit to the Chatham Isles; these are listed in a footnote in the article he wrote about his brief trip[23].

The species had also been growing at Mount Stewart for some years from cuttings obtained from Mrs Reside, and is sometimes propagated for sale at the local plant sales for the National Trust. Thus a couple of years ago I was able to get a replacement for my original plant which succumbed to severe frost of –13ºC about ten years ago.

Captain Arthur Dorian Smith, on visiting the Chatham Isles, also collected *O. chathamica*, and was first to introduce the species into cultivation in Britain, as illustrated and described in the Botanical Magazine in 1912[24]. It must have been subsequently lost as it was not included in the substantial list of *Olearias* grown on Tresco in 1985[25], and may still not be grown there. The Garden Cottage Nursery in Scotland lists this fairly rare species along with many other olearias. They are likely to be reliably correct to name as propagation material is likely to be obtained from the nearby National Collection at Inverewe. Henry Travers was responsible for supplying quite a

few other species to Glasnevin from where they entered cultivation in the British Isles. They were described by C.F. Ball in the **Gardeners' Chronicle** in 1911[26] and are listed in Box 3.

Box 3
The following newly introduced species were also sent to Glasnevin Botanic Garden by Henry Travers: *O. angustifolia*, *avicenniaefolia*, *lacunosa*, *lyallii*, *odorata*, *oleifolia* and *virgata*.

It is not certain whether the true *Olearia semidentata* is in cultivation, though it may now be grown at Inverewe, and if so must be of quite recent introduction. The true species is illustrated in Cave and Paddison on page 83[14]. This suggests that it has a fairly dense growth habit with quite large flowers that are similar to *O. chatamica* but opening a warm lavender colour before fading much paler. The leaves are of similar shape to those of *O.* 'Henry Travers' but appear to be a little less rigid and possibly a paler green on the upper surface, so it is not surprising that the plants originally introduced into cultivation as this species were wrongly identified.

A year ago I acquired another species with very similar foliage to *O.* 'Henry Travers'. Indeed I was initially convinced that the rooted cutting I received was the wrong plant by mistake, until I checked up on its description. *Olearia angustifolia* is found on Stewart Island and parts of the South Island, and has similar flowers but in groups of three and with white petals and purple centres. It too is likely to require fairly mild and humid conditions to grow well. It appears to have a fairly upright in growth habit and can apparently reach about 6 m tall. Another rare species with similar foliage and flowers from Fiordland (South Island) is *O. oporina* (Forst.); it also has white petals but with yellow centres. It is mentioned by Allan in the Flora of New Zealand[6] but not in any of the other references mentioned and is almost certainly not in cultivation.

One other olearia that is well worth growing has clusters of small white flowers and small silvery leaves with slightly serrated edges. I can't remember the name I first obtained it under, but it was probably *O. mollis*, as I grew it from cuttings from a friend. This name was apparently used by Kew, as it is the name under which Arnold-Forster describes the plant, which he obtained from Kew. However the name was already used for another hybrid which occurred in the wild, of the same cross as *O. x mollis* 'Zennorensis' mentioned above. Bean[5] describes the plant as *O. ilicifolia* x *moshata*, and more recently it was written up as *Olearia* x *matthewsii* of which two rare naturally occurring forms are known, the second form having longer and narrower leaves. The second form may not be in cultivation in New Zealand but the form similar to it that is in cultivation in the British Isles was given the cultivar name of 'Highland Mist'[27] (see photo page 19).

Some variegated olearias

Olearia is not a genus which is readily associated with variegated plants, but two cultivars of *O. traversii* are known in New Zealand, 'Tweedledum' and 'Tweedledee'. The former has a yellow marginal variegation, and the latter an irregular yellow splash in the centre of the leaf. The names may have been reversed in cultivation as the latter is 'new' in the 2009-10 Plant Finder. I have grown it for at least 10 years but never come across the former in cultivation, though, again according to the Plant Finder, quite a few nurseries list it. A third cultivar 'Variegata', obtained from Graham Hutchins of County Park Nursery, has a pronounced irregular cream variegation over the whole leaf. The species and the two variegated cultivars that I grow have proved reliably hardy despite the species being endemic to the Chatham Isles. It is clearly much hardier that the other more attractive species endemic there, and has grown to 5-6 m with me and is a useful wind break though becomes more open with age. I also grow a fastigate form or hybrid of *O. traversii*, which has upright growing saddle shaped leaves with a double curvature.

I also grow a variegated form of the large leafed form of *Olearia macrodonta* which Bean designated 'Major' based on a specimen growing at Rowallane Garden. I discovered the plant in a local garden centre with irregular yellow splashes on many of the leaves (see photo page 20), and thought it was a unique find. However, I later discovered that the expert young propagator at the now defunct Abercorn Nursery in County Tyrone had tried for several years to propagate this 'variegated' clone but it obstinately would only produce the variegation on about 10% of the leaves. He gave up and all the plants were sold to garden centres. Despite the partial variegation it is no less vigorous than the typical species.

A much more compact plant with central yellow blotches on the leaves, was obtained from friends in Scotland under the name *O. oleifolia*, though Metcalf notes that H H Allan regards the plants in cultivation under this name to be a hybrid *O. avicenniaefolia* x *O. odorata* and should thus be designated *O. x oleifolia* 'Oleifolia'. However, my plant is not a relation of this plant. The leaf most closely resembles that of *O. traversii*, being a thick dark glossy green, though it flowers later and remains a fairly compact plant. Its parentage is a complete mystery.

The last variegated olearia that I grow is also of uncertain identity. It may have arisen with Milo Talbot de Malahide as there is an enormous shrub of it in the grounds near the house, but in the open park rather than the enclosed garden. I rooted a cutting of what I assume is the same plant, obtained from the late Sally Walker whose attractive garden Fernhill, south of Dublin, contained many interesting and attractive plants. This plant has very strong irregular white or

cream variegations on the foliage, similar to those on the variegated *O. traversii* 'Variegata', but with a larger, broader and thinner leaf, dark glossy green where not variegated and a pale metallic buff below. It may be yet another hybrid, but I am so far at a loss to relate it to any species or hybrid with confidence. Possibly *O. furfuracea* is the closest by description but as this species is from the North Island it is unlikely to be as hardy as this plant has proved to be.

Two rare curiosities

For those who do not have much room, one small species from Tasmania might be worth growing for its curiosity value; it is *O. obcordata* (photo page 20). It has small leaves which grow in a rather congested manner, and are described as basically heart shaped though perhaps scallop shaped might be more appropriate as it is difficult to discern the shape without separating a leaf from the tight clusters around the stems. I was originally given a small seedling which took about 8 years to produce flowers which are typically small. It probably needs more sun than it received where I first planted it as it grew out over a path, most likely trying to obtain more light.

A second choice for this category is the usually doubtfully hardy *O. lacunosa* though many introductions may have been from the North Island or low elevation, whereas it also occurs in the South Island and in both islands the habitat ranges from lowland to sub-alpine forests. The plant is very distinct with silvery stems and long narrow and rigid sword shaped leaves. I first grew it briefly about 15 years ago, having been given a small plant, which I assumed to be a rooted cutting, by Barry Unwin, the head gardener at Logan. The parent plant at Logan was about 8ft (2.4 m) tall and half as wide. I can't remember if it was the first or second winter that caused its demise, or what the likely lowest temperature was, but the same winter caused the death of the parent plant at Logan as well.

Curiously Arnold-Forster noted that the species, or at least the plant he grew, was 'very hardy', and also difficult to propagate vegetatively. His plant came from Ludgvan, the garden of Cannon Boscowen, who introduced many New Zealand plants into cultivation from seed sent by his brother who was in the New Zealand forestry service. It requires moist soil but as Arnold Forster discovered is shy to flower in shade[9]. It is still not listed in the Plant Finder, and I had not seen a plant in cultivation since.

So last summer, I was very surprised to discover it for sale in a small local garden centre! They had bought in several well grown plants of it along with some more reliably hardy species of *Olearia*, from Mount Cosgrave, which is the most likely source for this rare plant as well. Fortuitously, I have learnt from previous experience, in that I have tended to buy and plant tender plants in years which were followed with colder than usual winters with the inevitable

consequences. So, I kept this rare new acquisition indoors, though not frost free during winter 2009-2010, and so far it has survived despite becoming rather dry, though the tips of the leaves have blackened. I can but hope I am not being unduly optimistic.

References:

1 Moench C. 1802. Supplementum ad Methodum Plantas, p 245
2 Hooker JD. 1853. Botany of the voyage of the Erebus Part 1
3 Hooker JD. 1864. Handbook of New Zealand Flora
4 Baker JG. 1884. *Olearia macrodonta*, Gardeners' Chronicle Vol.I p 604
5 Bean WJ. 1976. Trees and Shrubs Hardy in The British Isles Vol.3 pp 25-48. John Murray, London & St Martin's Press, New York
6 Allan HH. 1982. Flora of New Zealand Vol.1 pp 657-74. PD Hasselberg Government Printer, Wellington
7 Clough P. 1995. *Daisy Bushes-A journey through a beautiful minefield;* The Cornish Garden 38 (previously published ?)
8 Taylor J. 1988. Collecting Garden Plants. J Dent & Sons London
9 Arnold-Forster W. 1948. Shrubs for the Milder Counties. pp.261-8. Country Life London, Reprinted 2000 Alison Hodge
10 Talbot de Malahide. 1964. *The genus Olearia*, Royal Horticultural Society of Ireland Yearbook Irish
11 Talbot de Malahide. 1965. *The genus Olearia (a revised version)* RHS J vol 90 pp 207-17 & 245-50.
12 James, Anne. 1999. *The hardiness of the Genus Olearia at the Talbot Botanic Gardens, Malahide Castle*, Moorea 13 IGPS. Dublin
13 Metcalf LJ. 1972. The Cultivation of New Zealand Trees and Shrubs
14 Cave Y and Paddison V, 1999. The gardener's Encyclopaedia of New Zealand Native Plants. Godwit, Auckland
15 Salmon JT. 1967 (reprint 1982) New Zealand Flowers and Plants in Colour. Reed, Wellington.
16 Whiting J *et al*. 2004. Tasmania's Natural Flora. Tasmania's Natural Flora Editorial Committee Ulverstone.
17 Cameron M (ed.). 1996. A Guide to Flowers and Plants of Tasmania. Revised edition. Launceston Field Naturalists Club, Launceston.
18 Botanical Magazine 1968: Vol 176 tab. 521.
19 Comber J. 1934. *The New Coloured Olearia*. My Garden Vol 3 no.10 October pp166-69. Privately edited and published by Theo A Stephens London.
20 Curtis's Botanical Magazine, 1914, Tab.8550
21 Nelson C & Walsh W. 1987. An Irish Floriligium II Plate 22 pp102-4
22 Nelson C. 1988. *Holotype of Olearia semidentata (Decne).* New Zealand J. of Bot. vol 26 pp 465-6
23 Talbot de Malahide. 1970. *A long week-end in the Chathams*. RHS J Vol. 95 pp 370-3
24 Botanical magazine 1912: Olearia Chatamica tab. 8420
25 King R. 1985. Tresco England's Island of Flowers.Pp 153-4 Constable London
26 Ball CF. 1911. *Olearias in Ireland*. Gardeners' Chronicle vol. 49 Jan.28th pp 52-3

Olearia
'Henry Travers





***Olearia* x *matthewsii* 'Highland Mist'**



Olearia macrodonta, variegated



Olearia obcordata



***Hakea bucculenta* cultivar**



Grevillea bipinnatifida



Acaena buchanii



Eucalyptus Collection, Lullingstone Castle

27 Heenan P. 1991. *Olearia x mattewsii 'Highland Mist' – a New Interspecific and cultivar name.* Horticulture in New Zealand Vol 2 No.2.

Acknowledgements
I would like to thank Jeff Irons for his helpful comments on the draft, the library staff of both the Lindley library and the Botany Library of the Natural History Museum, and Murray Dawson for the copy of Peter Heenan's article.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀

GARDENS TO VISIT

Jeremy Spon

A Tribute To Sir Joseph Banks

Members who came to the 2009 AGM at Chester Zoo (see issue 43, page 28) will have seen the small display garden created there to commemorate Sir Joseph Banks, which featured a number of Australian plants. Another garden in memory of Banks has since been created in the Lincolnshire town of Horncastle, not far from Banks family home, Revesby Abbey. The garden is the brainchild of the Sir Joseph Banks Society, formed "*to stimulate interest in his life and achievements*" by a group of Lincolnshire residents. It is largely planted with plants associated with Banks - those thought to have been introduced either by Banks himself during his voyages on HMS Endeavour, or by other plant collectors sponsored by him. Although only planted in 2009 the hardiness of many of the plants used has already had quite a severe test during last winter, and most have survived well. Among these are *Callistemon* 'Havering Pink' (a selection originally from Graham Hutchins' County Park Nursery), *Cordyline australis*, *Correa alba*, *Olearia solandri*, *Sophora microphylla* and *S. tepraptera*, and several forms of *Pittosporum tenuifolium*. It sounds as though the garden would be well worth a visit if you are in that part of the world; members who want more information should contact the Sir Joseph Banks Society at Sir Joseph Banks Centre, Bridge Street, Horncastle, Lincolnshire LN9 5HZ, phone 01507 526065.

One To Watch

Members who live in the south-east, or who are visiting, might like to plan a trip to Marks Hall Gardens and Arboretum, near Coggeshall in Essex. This relatively new garden has been developed since the 1970s on land which was once part of a large estate, and subsequently became an airfield in World War II, and then Forestry Commission plantations. Now owned by a trust, it is intended eventually to be an arboretum of national significance, and there is already an impressive collection of trees.

For APS members, perhaps the most interesting area is one named 'Gondwanaland'. It is based on an extensive planting of eucalyptus trees, mostly familiar species such as *E. gunnii*, *E. niphophila*, *E. perriniana* and *E. dalrympleana*

(the last of which has made particularly fine tall straight specimens). The intention is to develop the plantings here to feature southern hemisphere trees and shrubs; the eucalyptus will provide a fine backdrop, and useful shelter. To date, the most striking feature is a grove of Wollemi pines (*Wollemia nobilis*) which with 80 young trees is the largest in Britain. There is also a group of young Monkey Puzzles (*Araucaria araucana*) to provide a South American counterpart to the Wollemi grove.

Marks Hall is already well worth visiting for the tree collection and ornamental gardens, but as 'Gondwanaland' continues to develop, it has the potential to become one of the largest and most interesting displays of Australasian plants anywhere in the country. More details on their website: www.markshall.org.uk.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀

GERMINATION OF APS SEED 2010

Jeff Layman

The table shows the approximate germination success of the APS seed I received this year. It was sown within a couple of days of receipt (May) in a mixture of Ericaceous John Innes compost and sand (about 1:4 by volume). Minimal heat, to about 22°C, was applied in a heated, covered propagator inside a partially shaded greenhouse for a week, but this was turned off when the

Germination of APS seeds, 2010

Seed	Approx. % germination
Anigozanthos viridis	>33
Banksia ericifolia v. ericifolia	>20
Banksia marginata	>33
Dryandra baxteri	0
Dryandra praemorsa	>70
Eucalyptus ficifolia	>50
Eucalyptus gardneri	>50
Eucalyptus johnstonii	0
Eucalyptus macrocarpa	>50
Eucalyptus nutans	0
Eucalyptus preissiana	>50
Eucalyptus risdonii	<10
Grevillea banksii	25
Grevillea bipinnatifida	80
Grevillea petrophiloides	80
Hakea bucculenta	>70
Hardenbergia comptoniana	25
Isopogon latifolius	>40
Kunzea parvifolia	<10
Kunzea recurva	<10

weather warmed up. The seed compost was checked daily and never allowed to dry out. The first seedlings (from *E.macrocarpa*) appeared after only 6 days. It is perhaps surprising that there was no germination from *E. johnstonii* and *E. nutans*.

Many seedlings have since died. One of the most annoying causes of this was seed coat retention with some of the Proteaceae (*Banksia*, *Grevillea*, *Hakea* and *Isopogon* species). The seeds germinated quickly and strongly, but the cotyledons failed to expand properly and push the seed coat out completely, slowly turning black within it. Sometimes it was possible to use forceps to carefully peel the coat away. This often damaged the cotyledons, but if this was minimal it appeared not to matter, and once the true leaves started to appear the seedling was safe, at least from that cause of death!

Editor's note:
Proteaceae may seem a bit difficult, though if I can grow *Banksia marginata* from seed then anyone can . As photos of some of the species that Jeff germinated show, they are well worth the effort: see pages 9 and 21 respectively for pictures of *B. marginata* , *Hakea bucculenta* and *Grevillea bipinntifida*. *The H. bucculenta* pictured is a cultivar so a seed sown plant is unlikely to be exactly the same. All the species are currently on the APS seedlist and you should be able to order them next spring (see page 4).

❀❀❀❀❀❀❀❀❀❀❀❀❀

THE WORST WINTER FOR 30 YEARS

Sue Kohler

Our garden in southwest Sheffield is on intractable clay although I do try to improve planting sites with sand, gravel and garden compost. The 2009-10 winter was a very good test of the hardiness of all borderline plants, not just those from Australasia, and a surprising number came through more or less unscathed. In addition many have produced their best crop of flowers for years. The only protection offered is that from neighbouring plants, location and microclimate. The following lists summarise observations of Australasian species (and a few others) made up to about the end of July 2010.

Survived astonishingly well, with little or no damage

Grevillea 'Canberra Gem': Flowering delayed by up to two months , but wonderful once started. Still flowering in early July to the delight of local bees of many species.
Correa backhouseana: Few flowers.
Hakea nodosa: Young plant, no flowers yet.
Bursaria spinosa: Flowering towards the end of July.
Leptospermum lanigerum: Survived very well but is being overwhelmed by the half-hardy Chilean climber *Mutisia retusa* (covered in its large pink daisies for much of the summer).
Leptospermum nicholsii nanum[1]:Too young to flower.

Acradenia franklinii: No flowers yet.
Phormium cookianum 'Variegatum': No flowers this year but many spikes last year.
Olearia nummulariifolia: Masses of flowers.
Callistemon linearis and *C. sieberi* (syn. *C. pityoides*, see box): too young to flower.
Acacia pravissima: A young plant with few flowers, but a mature specimen growing locally was undamaged and an amazing cloud of yellow in early summer.
Laurus nobilis: In a very exposed corner – heavy flowering.
Crinodendron hookerianum: No damage and better flowering than any previous years.

Some damage but recovering

Callistemon rigidus: Branchlets killed, pruned out in summer. Started flowering in late July.
Callistemon pallidus (syn. *Melaleuca pallida*): Growing back well in early July.
Astelia chathamica 'Silver Spear': Leaves damaged but plant is growing quite well. Plants outside are nothing like the monster growing in the Pavilions at Sheffield Botanical Gardens. It has obviously had no check to its growth.
Myrtus communis and its forms: Suffered a lot of tip damage over winter. This has been pruned back and all plants are now growing strongly, especially the species, which will be in flower soon.

Heavy damage, or killed

Callistemon citrinus 'Splendens': All top growth killed though new growth is late developing.

Alpine bottlebrushes

The taxonomy of Alpine bottlebrushes bewildering is to say the least.
According to ANPSA **(**Australian Native Plants Society (Australia)) the species *C. pityoides* was commonly known as *C.sieberi* but now, following research, *C.pityoides* has been restored as the name because *C. sieberi* should be applied to the plant previously known as *C. paludosus*.
The APC (Australian Plant Census) gives *C. pityoides* as the currently (2010) accepted name in Australia for the plant named as this and described by Ferdinand von Mueller in 1883. It also gives C. *sieberi* var . *pityoides* and *Melaleuca pityoides* as nomenclatural synonyms ; the latter name is already used in the ACT and Queensland.
The APC has not yet reviewed the name *Callistemon sieberi.* Craven proposes *M paludicola* as the new name for *C. sieberi* as described by de Candolle (1828) (Novon 16, 2006: 468-75).
The RHS Plant Finder lists both *C. pityoides* and *C. sieberi*.

Prostanthera cuneata: A new plant, two thirds of which was killed.
Grevillea juniperina 'Sulphurea'[2]: Killed.
Melaleuca ericifolia: Killed to the base although strong new growth is now developing from below ground.
Correa pulchella: Killed. This was very experimental but a smaller plant had already survived in the open garden through the previous winter.

Euphorbia stygiana: Heavily damaged but is now growing strongly from the base.

Editor's note: We use the names of the plants we buy in good faith but in my experience Australasian plants are not always correctly named at the point of sale.
1 *L. scoparium* 'Nicholsii Nanum'(RHS Plant Finder).
2 *G. juniperina* subsp. *sulphurea* (ABRS Flora of Australia online) or f. (for form) *sulphurea* (RHS Plant Finder).



NEW ZEALAND BURRS

Brian Halliwell

Whilst reading about death and survival rates in the May Pentachondra (issue 44 page 15) I noted that *Acaena microphylla* was amongst the survivors. During the 1970s when winters were regularly as cold, and often more so, than that of 2009-10, *Acaena* species were regularly decimated. This genus is amongst the earliest of colonisers of screes on New Zealand mountains, in alpine zones, so these fatalities were a surprise.

In cultivation all New Zealand species were planted in soil pockets in the rock garden. All were quick to establish though *A. microphylla* was the least enthusiastic. Following rapid growth, horizontal rhizomes were soon encroaching into gravel paths and establishing there. Soon these paths were to become lawn-like but were kept under control by regular and often heavy foot traffic, which seemed undetrimental. Often following 1970s winters, plants growing at the edge of the path were killed but those that had established in the paths escaped cold damage entirely.

As many *Acaena* species colonise screes they would there have to tolerate the most acute drainage and a total absence of organic matter in the substrate. Perhaps this was the reason that in cultivation they seemed to prefer a gravel path rather than soil in the rock garden pockets. But I do remember *A. microphylla* as being a coloniser of river gravels in New Zealand at much lower altitudes than the alpine areas.

In my Halifax garden I have been unable to establish *A. microphylla* but *A. buchananii* (photo page 22) romps about, though only in small clumps. It is at its best established among broken rocks in dry stone walls used to make raised beds. All plants of this species have escaped winter damage.



HOW THE BOTTLEBRUSH GOT ITS BRUSH

Jeff Irons

Last summer one of my melaleucas flowered for the first time. Very unusually there was not a cluster of flowers arranged in the familiar 'brush' but just one

flower, some way back from a branch end and in a leaf axil. That aroused my curiosity, which had long lain dormant, about how the bottlebrush got its unusual flower head.

An enquiry produced the response that it is generally believed that the ancestral Myrtaceae (Myrtaceae did not originate in Australia) flower was a unit with 1, 2 or 3 flowers in a leaf axil. In the bottlebrushes this became a single flower, like that on my plant. Other changes occurred too. The leaf became reduced to a single bract, the distances between leaves (internodes) became very short and eventually we got the familiar flower spike. My plant was growing vigorously and things got out of kilter resulting in my single flower with a bract that looks like a normal leaf.

Other species too can display evidence of their ancestry. Next time you see a native tobacco plant take a close look at the leaves. You may see a lobe at the base. This is evidence of an ancestor with palmate (fingered) leaves.

❀❀❀❀❀❀❀❀❀❀❀❀❀❀

BOTTLEBRUSH POLLINATION

Judy Clark

In their native habitat one of the main pollinators of bottlebrushes are birds such as honeyeaters who transfer pollen as they seek out the energy rich nectar produced in abundance by bottlebrush flowers.

But there are no honeyeaters in Britain and according to Proctor and Yeo (1973) no bird pollinated flowers native to Europe. Yet I have collected fertile seeds of both melaleuca and callistemon from plants growing in the UK.

I have to confess that how pollination had been achieved did not preoccupy me over much but it's still satisfactory to come across an answer. This came from a somewhat surprising source: a recent article (Kirby, 2010) in **British Wildlife**, which bills itself as the magazine for the modern naturalist (a claim that it entirely lives up to) and so is hardly a place where one would expect to find information about Australasian species.

Michael Kirby grows *Callistemon citrinus* and *C. rigidus* in his garden in Suffolk. In 2009 he observed that their flowers were visited by, among other insects, honey bees, bumblebees and wasps, and that these creatures had discovered how to get at the nectar of the (to them) exotic bottlebrush flowers.

Each bottlebrush actually comprises many flowers tightly packed together. At the base of each flower is a nectary, below the mass of long conspicuous stamens which are what give the inflorescence its brush like appearance. As Kirby describes it (page 397), honey bees and wasps "*took to diving head first into the palisade of stamens*", to reach the nectar while the bumblebees "*walk*[ed] *about the inflorescence, parting the stamens and exposing*

the nectar at the base of the flowers".

Although Kirby doesn't include in his article observations of insects carrying pollen one would expect them to collect it as they inadvertently brush against the anthers at the top of the stamens. Come July I shall observe insects on my bottlebrushes with a new interest.

Kirby's article also reminded me of something that I have wondered about: what blue tits and other small garden birds find attractive about my *C. rigidus*, in or out of flower, apart from it providing a convenient launch pad for the bird bath. I have watched them apparently pecking at branches whilst moving along them, but I've yet to work out what they are pecking at. Has anyone else noticed come across any birds indulging in such activity? Or, for that matter, any other wildlife in your Australasian plants?

References:

Kirby, M. 2010. *A garden for all reasons*. British Wildlife, vol 21, no 6, pp 393-399.
Proctor M and Yeo P. 1973, p 318. The Pollination of Flowers. William Collins Sons & Co Ltd, Glasgow.

The HARDY PLANT SOCIETY

Inspiring the cultivation of hardy perennial garden plants

The Hardy Plant Society encourages interest in growing hardy perennial plants and provides members with information about familiar and less well known perennial plants that flourish in our gardens and how to grow them. This friendly society offers a range of activities locally and nationally, giving members plenty of opportunity to meet other keen gardeners to share ideas and information in a convivial atmosphere. The activities and work of the Society inform and encourage the novice gardener, stimulate and enlighten the more knowledgeable, and entertain and enthuse all gardeners bonded by a love for, and an interest in, hardy perennial plants.

- **Local Groups** - Over 40 Local Groups spread across the UK
- **Specialist Groups** - For those with interest in a particular plant family
- **Seed Distribution Scheme** - Including sometimes difficult to find varieties
- **Shows and Events** - Exhibits at Major shows plus many Local Group events
- **Conservation** - Conserving older, rarer and lesser-known plants
- **Publications** - Colour Journal, National Newsletter plus a series of quality booklets on selected plant families
- **Photo Library** - A wide range of images of hardy plants available for loan

If you are interested in joining us, please contact Pam Adams on Tel: 01386 710 317 or visit our web site at www.hardy-plant.org.uk

2010 MEETING REPORTS

AGM Report

Steven Wood

The AGM meeting was held on a sunny day at The Holmes, situated in a pleasant leafy suburb of Bristol around which many of us had an unexpected tour while wondering which jogger might be able to help with directions. After the AGM we were taken round the Bristol University Botanic Garden (www.bristol.ac.uk/Depts/BotanicGardens).by the curator Nicholas Wray. He had organised the recent transfer of the plant material from the original Botanic Garden to this new 1.77 hectare site, from which over 50 trees had had to be removed to allow the creation of paths between raised beds, and a large pool. The collections are organised around themes such as plant evolution, regional plants and useful plants, especially Chinese medicinal plants.

The first zone that we saw demonstrated various pollination strategies including dependence on low flying midges, beetles (Magnolia pollination), flies, bees, marsupials, bats and other mammals. It was interesting to see that a mature *Banksia marginata* had survived the cold of last winter under the shelter of a large cedar where it had been sited to receive the low winter sunlight.

One regional collection included some of the famous Cheddar Gorge *Sorbus* microspecies Hybrids of these are back crossing with their parents, and some of the progeny survive as new microspecies.

The medicinal plant area is a hollow bounded by a striking bamboo fence with circular openings. The plants are grouped together according to which ailment they are meant to help; for instance a cough. An impressive pergola was in the process of construction and another planting area had to be finished by mid-July when the area was to be formally opened by a Chinese official.

The next zone demonstrated the march of evolution combined with geological changes from the Ordovician associated with fossil algal spores through the Carboniferous with tree ferns and on to the Cretaceous. The different rock slabs were impressive as were the tall tree ferns *Dicksonia antarctica* which had had their fronds battered by the winter but which were regrowing. (During the last winter Bristol has suffered more cold than usual, with many days where the ground stayed frozen.) There were also some nice *Matteuccia orientalis*.

Finally we were taken to see *Amborella trichopoda,* a very rare plant which is found wild only on the remote South Pacific island of New Caledonia. It is thought to be the most primitive living angiosperm (flowering plant) and as such is significant to understanding their evolution. something that puzzled Charles Darwin and is still not well



Omeo Gum,
Eucalyptus neglecta
Lullingstone Castle
Eucalyptus Collection

Brittle Gum,
Eucalyptus mannifera
subsp. *elliptica*
Lullingstone Castle
World Garden







Australasian area, World Garden, Lullingstone Castle

understood. There are five plants at Bristol. Also in the greenhouses were splendid specimens of the Australian *Doryanthes palmeri* (Spear Lily) with its ten foot flower spike, *Protea cynaroides* (King Protea) from south Africa with several large buds, and a number of Banksias.

It was very interesting to see the re-sited Botanic Garden at this stage in its development and we had an excellent tour with Nicholas who was very generous with his time. We dispersed, some to enjoy the nightlife of Bristol, others to try and leave the city with as few circuits round Clifton as possible.

Editor's note: *Amborella trichopoda* flowered at Bristol in November 2010 and study of its flowers will contribute to understanding of the evolution of the angiosperm reproductive mechanism (see www.bris.ac.uk/news/2010/7321.html).

Southern meeting report

Jeremy Spon

In retrospect, a visit to Tom Hart-Dyke's World Garden at Lullingstone Castle (www.lullingstonecastle.co.uk) seems such an obvious idea that I'm not at all sure why we haven't done it before. As well as having one of the two National Collections of Eucalyptus, Tom is passionate about Australian plants generally, and the World Garden has an astonishing range of plants, many rare, and not just from Australasia but from all round the world. Certainly more than enough to satisfy the most plant-addicted of our members! And with Tom showing us round personally, displaying his well-known boundless enthusiasm, an enthralling and inspiring experience was had by all fifteen or so members who came along.

Our tour naturally concentrated on Australasian plants, starting with the *Eucalyptus* collection, much of which grows outside the World Garden itself on a rather wet area near the River Darenth (photo page 22). Tom explained that the conditions were rather challenging: in a valley bottom on a flood plain so very cold and prone to flooding, and with poor soil, too near to alkaline. Despite this, the collection was most impressive, with the majority of trees having survived the recent severe winter with little or no damage.

Tom picked out two species as particularly worthwhile. *Eucalyptus neglecta*, the Omeo Gum (photo page 31), has beautiful glaucous juvenile foliage, and tolerates some shade. (Amanda Kershaw reminded us that Jeff Irons recommended it as the only eucalypt worth growing in a normal sized garden.) Tom's specimen is probably the tallest in the UK, according to Owen Johnson, who amongst other activities records trees for the Tree Register, and was one of our group. (A later look at the Tree Register confirmed that at 14 m Tom's specimen of *E. neglecta* is the tallest in Britain and Ireland.)

E. camphora, the Mountain Swamp Gum from Tasmania has red growth in spring equivalent to anything that *Photinia* 'Red Robin' can do. There are several specimens in the Eucalyptus Field, one of which is the tallest in Britain and Ireland, at 12 m.

Tom was asked where he gets his plants from, and he told us that nearly all were grown from seed, often of known wild origin. He particularly recommended Milligan Seeds in New Zealand for eucalyptus seed.

We then moved on to the World Garden itself, where the beds are laid out in the shape of a map of the world. Our tour focused mainly on Australia and New Zealand , although we also saw many fascinating plants in other parts of the garden, including the new 'Cloud Garden' greenhouse (where the beautiful Hibiscus *Alyogyne hakeifolia* was in flower), and the very impressive succulent collection. It is not easy to plant Australasian species in a way that looks good and shows them off to advantage, but I think everyone in our group thought he had overcome this problem superbly, creating a very natural looking display (see photos page 32).

It was very instructive to see what had survived or succumbed last winter, with its record low for the World Garden of -12.3° C. Looking surprisingly healthy was *Eucalyptus mannifera* subsp. *elliptica*, the Brittle Gum (photo page 31), with it's very beautiful bark, but all the cordylines had died and most phormiums had proved unreliable. Tom commented that all large-leaved hebes, and all large-leaved Olearias, except *O. macrodonta*, were too tender for the World Garden, but that, as many members will have discovered, *Derwentia* (syn. *Parahebe*) *perfoliata* (Digger's Speedwell) is as tough as old boots. *Melaleuca pustulata* had also proved very hardy, needing to be cut back at intervals to keep it to a reasonable size, and *Lomatia tinctoria* (Guitar Bush) was in flower. Other noteworthy survivors included *Bulbinella hookeri* (Maori Lily) *Ozothamnus coralloides*, *Hakea teretifolia* (Dagger Hakea), *H. lissosperma* (Silky Hakea) and *Asterotrichion discolor* (Currajong).

There are so many interesting and unusual plants in the World Garden, that a full account would fill many pages. Suffice to say that everyone thoroughly enjoyed their visit, even though 10 July was one of the hottest days of the year, and most vowed to return regularly to see further developments. Our thanks go once again to Tom for his warm welcome and inspirational tour.

You are welcome to visit...

Amanda Kershaw and Dennis Blundells' garden in Wallasey,Merseyside. Phone (0151 639 7611) or email them (sandboxtree@talktalk.net) to make an arrangement, which might well include the provision of tea and cake!

BITS AND PIECES

Grevillea barklyana

Jeff Irons

Hybrids of *Grevillea barklyana* (Pentachondra issue 44 page 27) are sold in Australia as the species and there is no doubt in my mind that the plant mentioned is a hybrid. At one time Graham Hutchins offered it for sale and I recall telling him that his stock (from the Old Walled Garden) were hybrid plants.

The difference is easy to spot. Plants sold by The Old Walled Garden have leaves that are obviously lobed. The true plant is lobed only in the juvenile phase. Another indicator is that I believe the stock was bought from a nursery in New England, a cold area with summer rainfall. The true species, which comes from Gippsland, only flourishes in cool wet climates. Tim Darrington wrote that his specimen wanted to become quite tall. The species is a large shrub or small tree to 8m.

New eucalyptus nursery

Jeff Layman

Jeff Layman emailed to say he had by chance come across Kings Barn Trees, a West Sussex nursery stocking over 40 species of Eucalyptus. They grow from seed and state: *We only buy seed from reputable suppliers in Australia or New Zealand who are also able to certify the provenance, or source, of the seed*. Internet sales only, though orders can be collected in person. They can be contacted at www.kingsbarntrees.co.uk.

Do we have your current email address?

With Pentachondra issued only twice a year we use email to keep you up to date with news and events in between issues. Using the post to do this would be time consuming and costly but email lets us to do it quickly and cheaply. But it is very frustrating for us to have our emails to you bounce back because your address is no longer valid!.

So, do we have your current email address? If you think not please use the subscription renewal form to tell us.

Alternatively you can email webmaster@anzplantsoc.org.uk to tell us what your email address is. Queries about email communication should also be directed to the webmaster. However, if you are not receiving APS emails and think you should be first check your spam folder as even the most innocent of messages can get misidentified and put in there. If your spam filter is innocent let us know and we will investigate to see what the difficulty might be.

Melaleuca diosmifolia

Sue Kohler

Jeremy Spon wrote about *Melaleuca diosmifolia* in Pentachonodra issue 43 (page 12).

It first flowered for me in (I think) 2008 whilst living in severely cramped conditions in a small shaded greenhouse. The green bottlebrushes were very beautiful and I moved the plant to hopefully better living quarters in a sunny corner of the conservatory. This has not met with complete approval – no flowers since – although the plant is growing vigorously. It has been badly infested with soft scale which may account for the lack of flowers. I am treating the scale with Provado soil drench which seems to help and as I write the plant is now outside on its summer holidays where the rainfall is helping to clean it up. We shall see ……

Tresco Abbey Gardens

Tony Entwistle

In early June I paid a brief visit to Tresco Abbey Gardens. They had – remarkably- a frost-free winter and the gardens were in perfect condition, having by now been fully restored after the freak weather conditions of twenty or so years ago. It was too early for displays of South African ericas but there was an excellent display of proteas and, on the top terrace, of *Telopea* (Waratah).

My first visit to Tresco was in 1962 and times have changed. Then admission was 5 shillings (25 pence in new money) by a side gate and now it costs £10 and there is a large visitor centre with shops and a café. This is needed now as they have many parties in the summer from the cruise ships which regularly call at the Scillies and include a visit to the gardens. But it is still a wonderful place.

More internet sources of information

Judy Clark

In the May 2010 issue (page 37) Jeremy Spon drew attention to internet sources of information about New Zealand plants. Jeff Layman later emailed to say that he had found a website useful for identifying Tasmanian species: www.utas.edu.au/dicotkey/dicotkey/key.htm.

This contains a key for identifying plants native to Tasmania which is really easy to use. Either you can begin with the type of plant you want to identify (dicotyledon, monocotyledon, conifer etc) or if you know the genus (the first word of a plant's latin name) you can go straight to a list of genera.

There are also sites that can be used for identifying plants of NSW and of Western Australia, at www.plantnet.rbgsyd.nsw.gov and http://florabase.calm.wa.gov.au/ respectively. The WA site allows you to search for species information and photos if you know either the latin or the common name and also has interactive keys though I haven't used them. PlantNet (NSW) provides botanical descriptions and photos of species but doesn't have an interactive key.

These two sites only include species that are native to their respective states. Conversely, the Flora of Australia online

(www.anbg.gov.au./abrs/ online-resources/flora) covers the whole country but not all species. It draws on the **Flora of Australia** but this publication is not yet complete and in any case only 11 of the published volumes are currently available online. Those available do include Proteaceae (grevilleas, hakeas and the like) and Mimosaceae (including wattles), but unfortunately not Myrtaceae (eucalypts , bottlebrushes, tea trees etc) as this volume awaits publication.

In contrast to the more technical identification information sites the ANPSA (Australian Native Plants Society (Australia)) website (http://asgap.org.au/index.html) provides a wealth of reliable and easy to follow information about the cultivation, propagation and conservation of Australia's native flora, including guides to popular plant groups with lots of photos. There are links from this site to ANPSA regional groups (one for each state) and many other resources relating to Australian plants.

Finally a resource that Gary Dunlop (I believe) first alerted me to. This is Botanicus (www. botanicus.org), a site providing free access to historic botanical literature from the Missouri Botanical Garden Library. Publications can be accessed by author or title and you can find such gems as Joseph Banks and Daniel Solander's **Illustrations of Australian Plants collected in 1770 during Captain Cook's voyage round the world in HMS Endeavour** as well as runs of periodicals such as *Curtis's botanical magazine* and *Gardener's Chronicle*. Works can be downloaded too.

Letter from Melbourne

Nicky Zanen

This evening the sound of cicadas was deafening. A high pitched continuous loud vibration, and a warning that tomorrow may be hot. But we haven't yet seen many really hot days – a most unusual summer to date. Rain though, lots of it. 25 mm one day, 10 mm the next. The ground is saturated, many parts of Victoria and New South Wales are flooded, and trees are toppling over easily. The root balls stand no chance when they don't have the grip they normally have in drier conditions. However, it may be that this same saturation and flooding will suit the red river gum *Eucalyptus camaldulensis* and that much needed regeneration will occur.

Next year is notable for two major events. The XVIII International Botanical Congress (IBC) will be held in Melbourne from 23–30 July 2011. The IBC2011 website (www.IBC2011.com) contains information about the scientific program, field trips and congress venues. It will be interesting to see if the Aussies will lose the family 'Acacia' this time.

The second one is the biennial Australian APS conference, now renamed the ANPSA Conference, which will be held between 2 – 7 October 2011 in Adelaide. Pre and post conference tours are being

arranged to Kangaroo Island, the Flinders Ranges and the Coorong and south east of South Australia.

We have just heard that Dr Tim Entwisle has accepted the position of Director of Conservation, Living Collections and Estates, at the Royal Botanic Gardens in Kew. He moves to the UK in April 2011. Tim was a presenter at our ASGAP Conference in 1995 when he was working at the Royal Botanic Gardens in Melbourne, and left the year later to work in Sydney, first as head of science and then becoming Executive Director in 2003. He also presented a paper at our 2009 ASGAP Conference on 'Those Name Changes'. He will be part of the Executive Board at Kew, reporting to the chief executive Steve Hopper, who also hails from Australia. For the record, Tim was born in Nhill.

Illustration acknowledgements

Judy Clark: pages 9, 31, 32 (top picture) and back cover.
Gary Dunlop:front cover and pages 10 (lower picture), 19 and 20.
Jeff Irons: pages 10 (top picture), 21 and 22 (top picture)
David Ware: pages 22 (lower picture and 32 (lower picture)

The Australasian Plant Society

Minutes of the Annual General Meeting 2010 – Held at Bristol University Botanic Gardens on 1st May

Members Present:

Keith Larkin – Chairman
Aubrey Wood – Treasurer
Jeremy Spon – Secretary
Tony Entwistle
Amanda Kershaw
Dennis Blundell
Steven Wood
Jeff Layman

Apologies:

Jeff Irons, Judy Clark, Richard Christmas, Christine Yeo

The chairman welcomed those members attending. He expressed his thanks to the new Treasurer, and the other officers, for their contributions during the year.

1. **Minutes of the previous meeting** – were approved without amendment.

2. **Matters arising** – none which were not covered by agenda items.

3. **Secretary's report**
The Secretary reported that he had dealt with a few membership enquiries during the year, and a few miscellaneous enquiries about Australian plants.

4. Treasurer's report
The Treasurer presented a set of accounts for 2009, which showed a deficit on the year of £113. He anticipated that with similar levels of expenditure and income during 2010, we should expect another deficit at the end of this year. With the main items of expenditure, the seed list and newsletter, giving little scope for savings, the level of subscriptions was key in avoiding deficits in future. The current position as regards membership was that 97 members had paid their subscriptions for 2010, and 7 new members had joined. 5 standing order payments were still awaited, and 40 renewals were in doubt. A letter to these 40 would be included in the next Pentachondra, threatening that they would receive no further newsletters unless they paid their subscriptions immediately.

The Chairman noted that the cost of seed was rising, due to less favourable exchange rates; he also mentioned that the seed list had not been issued yet this year, even by email, due to a family bereavement suffered by the Seed List Manager.

The accounts were unanimously approved. Proposed Jeff Layman, seconded Tony Entwistle.

5. **Newsletter Editor's report**.
The Chairman relayed comments from the Newsletter Editor, who was unable to attend due to health problems. Judy said that there continued to be a good number of contributions for Pentachondra, and that she was still enjoying producing the Newsletter. She raised concerns about the cost of posting to overseas members. These were discussed further under item 8 (see below.) There was some discussion about the various complimentary copies sent to other societies, and it was agreed to stop sending to the Tasmanian and Victorian APS, as we received nothing worthwhile from them. It was also decided to let our membership of the New Zealand Alpine Garden Society lapse, as their main preoccupation seemed to be with non-New Zealand alpines. We would however continue to send a copy of Pentachondra to the RHS, as it was assumed they acted as an archive of gardening journals.

The question of what should be sent to new members when they joined was raised. Tony Entwistle said that when he was Treasurer anyone joining after October got three copies of Pentachondra for their year's subscription. It was also mentioned that for a while all new members had been sent a copy of Jeff Irons' seed germination notes. However it was felt that it would be better to look into the possibility of making the notes available electronically to those who wanted them. The exact procedure for welcoming new members, and what copies of Pentachondra they

received, would have to be the subject of further discussion among the committee.

Judy had indicated that she was willing to administer the distribution of back copies of Pentachondra to members who requested them, and the availability of these would be advertised in future Pentachondras. The question of altering the timing of Pentachondra to enable the seedlist to be sent out earlier was discussed, and it was agreed to look into the possibility of this for next year, subject to the views of both Judy, and Richard Christmas.

The Chairman concluded this item by thanking Judy for doing such a good job in producing our Newsletter.

6. **Seed-list Manager's report**

There was no formal report available; the Chairman said that it was hoped to improve the early availability of the seedlist via email next year. On the question of Botanic Gardens, many of whom had been approached by Keith about possible membership, Richard had told Keith that he was happy to send seed to overseas ones if requested.

7. **New Members - Welcome Pack Etc**

This item was discussed briefly under Newsletter Editor's Report, and there were no further comments.

8. **Overseas Member's Subscriptions and Method(s) of Payment**

It was agreed that there was a need to reflect the higher cost of posting Pentachondra to overseas members, and of sending them seeds if requested, but not at a level which would deter them from joining, as we were keen to recruit more members from overseas as well as in the UK. The problems of processing payments were also discussed, with the Chairman pointing out the advantages of PayPal where varying payment amounts were involved.

It was agreed that once payment via PayPal had been made possible, which the Chairman would progress, subscriptions for overseas members should be raised to £15, with a £5 charge for sending seeds. Proposed Jeremy Spon, seconded Amanda Kershaw, and approved unanimously.

9. **Election of officers**

All were willing to stand again, and the Chairman suggested that the officers be re-elected en bloc. Proposed Amanda Kershaw, seconded by Jeff Layman, and approved unanimously.

10. **Next Year's AGM and Any Other Business**.

As there was a limited amount of time left for a further look round the gardens and greenhouses, it was agreed to postpone any further discussions, and the Chairman declared the meeting closed.