

March 2012

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OBJECT: To foster an interest in nature

MEETING THURSDAY MARCH 1st 7.30 pm Gould Wing, Building 116

Daley Road Australian National University
map and Field Nats details back page

Legionella in the Natural and Built Environment.

Speaker: Clive Broadbent

Clive Broadbent is a Canberra-based consultant specialising in preventive measures for Legionnaires' disease hazards and other building microbial control issues. He is a Life Fellow of the Institution of Engineers, a Life Fellow of *ASHRAE and a Life Fellow of AIRAH. Recent clients have included paper mills, oil refineries, mining sites, and power stations as well as a plethora of commercial buildings having cooling water systems and air-handling plants that may potentially present hazards to health. (more information next page)

Legionnaires' disease is an atypical pneumonia caused by the Legionella genus of microorganisms. Presence of Legionella bacteria in the world is widespread, as discovered by microbial ecologists. There's no authoritative records of any Legionnaires' disease clinical cases arising from the natural world although antibody tests in Australian blood banks and even among aborigines in the Kimberley have shown that human contact, and silent non-clinical infection, is common.

This talk will briefly cover the background in science and application in engineering. It is surely so that engineering measures such as clean water supplies and hygienic conditions in cities have prevented disease even more effectively than have medical interventions.

Outing: Sunday March 4

Tidbinbilla and the Lyrebird Trail

This is a practice run for the Get-Together in October. Please time how long it takes to get there. Meet at 10 am at the Tidbinbilla Visitors Centre. Bring your lunch, water, appropriate clothing and footwear, binoculars etc. Let Rosemary von Behrens know if you intend going and/or need transport/car pooling.

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Odd Spot: 'Tables turned' by Rosemary Blemings

On Tuesday 31 January whilst I was standing at the Cohen Street bus stop in Belconnen, I noticed an insect "caught" in a dusty cobweb on the nearby wheelie-bin. The insect was dark grey as I saw it and just a bit larger than the populous soldier beetles of summer 2012. I took a step forward to look more closely and the spider emerged from under the lip of the bin, at speed. I was amazed when the insect appeared to grab the spider. It then flew off with the bulbous abdomen of the grey-brown spider in its "talons"!

FIELD NATURALISTS' ASSOCIATION OF CANBERRA INC. GPO BOX 249

CANBERRA ACT 2601

FIELD NATTER

Our speaker, Clive Broadbent cont..

Clive is regularly in touch with international authorities on issues to do with Legionella and has presented over 120 technical papers, many overseas. He chairs the committee that developed AS/NZS 3666. In 2000 he was presented with the award of Member of the Order of Australia (AM) for services to public health. In May 2003 he worked in Beijing, at the request of the WHO, as the only engineer in their team to stop the spread of SARS at hospitals and other public buildings.

For most of his career Clive was a mechanical engineer in the former Federal Department of Housing and Construction; he was its Chief Mechanical Engineer from 1983 to 1993 when he completed service and began his consulting practice. Over the period 1988 to 1993 he also managed a field research project into the ecology of Legionella in cooling towers and has published widely on the findings. This unique work, which had not been carried out prior to this initiative nor has it been replicated since, established, by statistical techniques, the key indicators to Legionella growth and potential for disease using a large number of cooling towers.

Clive has been involved as an engineering consultant at most of the Australian outbreaks of Legionnaires' disease, one in New Zealand and one in the USA. These included the Melbourne Aquarium outbreak in 2000, the Wollongong outbreak in 1987 and the Adelaide outbreak in 1986.

*ASHRAE - American Society of Heating, Refrigerating and Air-conditioning Engineers.

AIRAH – Australian Institute of Refrigeration, Airconditioning and Heating.

The following article has been placed on our website <http://www.fieldnatscanberra.com/Articles.html>

LEGIONELLA CONTROL AND CLIMATE CHANGE by Clive Broadbent AM, FIEAust, LAIRAH

[This article appeared in a NZ industry journal called IRHACE, Jan/Feb 2010 pp 26 and 27.] In this paper Broadbent discusses climate change and the potential for increases in surface water temperatures to encourage growth of those bacteria preferring warm water, including Legionella.

While on the topic of disease vectors:

Pigeon paramyxovirus 1 (PMV-1)

The Victorian Department of Primary Industries have confirmed detection of pigeon paramyxovirus 1 (PMV-1) in two additional species of birds in Melbourne. One sparrow hawk (*Accipiter cirrocephalus*) found dead and one spotted turtledove have been confirmed with the disease. It is assumed that these birds were infected through contact with feral pigeons.

The DPI Victoria website provides the following details - see <http://www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/animal-diseases/vetsource/vetwatch/vet-watch-february-2012>

The Sparrowhawk case: "PMV-1 was isolated from the tissues a sick sparrow hawk (*Accipiter cirrocephalus*). The bird was collected by a park ranger, who had been monitoring a family of sparrow hawks in a park in central Melbourne. Four birds died around or before 10 January with some displaying neurological signs before death. Paramyxovirus 1 infected feral pigeons had previously been confirmed in the immediate area and it is likely that infection in the sparrow hawk may be the result of high virus challenge associated with recent predation on diseased pigeons. Although this is the first time pigeon paramyxovirus 1 has been isolated in a native species in Australia, there are several reports of predatory and in-contact birds becoming infected in endemic countries overseas."

The Spotted turtle dove case: "PMV-1 was confirmed in a spotted turtle dove (*Streptopelia chinensis*). The bird had been in close contact with a group of semi-feral pigeons which have been previously diagnosed with paramyxovirus."

Mycologia, the secret life of fungi.

A fascinating art exhibition currently showing at the Belconnen Art Centre, 118 Emu Bank Belconnen, until 4 March.

The artist is Jenny Manning. Her drawings in black, white, grey and sepia are imaginative interpretations of magnified colourless electron microscopic images of fungi and slime moulds, where the filaments, capillaries and spore heads are explored for their decorative beauty; qualities which transcend the underlying toxicity of any of the subject organisms.

Be awed by the time and patience required for these wonderful drawings.

Molonglo Gorge

by Dierk von Behrens

An antecedent stream or antecedent drainage is a [stream](#) that follows a course that formed before the [tectonic uplift](#) of the surrounding [terrain](#) and maintained its course through continuous downcutting of its [valley](#). Also referred to as a "superposed stream."¹

Ordovician Geological History of Canberra

The known geological history of the Canberra area began about 460 million years ago, during the Middle Ordovician. At this time over a period of some 20 million years this area was part of an ocean basin several thousand metres deep, which covered much of eastern NSW and Victoria. The rocks of this age found in Canberra are called the Pitman Formation and consist of alternating sandstone and shale, best exposed in Molonglo Gorge and Gossan Hill – the latter along College Street opposite the University of Canberra. Periodic currents called turbidity currents deposited these rocks. The rocks so deposited are called turbidites or flysch.

These turbidity currents are, in effect, rather like giant landslides or snow avalanches, but occur under water. They begin at the edges of ocean basins when a large mass of water-saturated sand and mud becomes unstable and begins to flow downslope into the ocean basin. Modern examples have been shown to flow hundreds of kilometres along the ocean floor and deposit vast quantities of sand and mud there. They are the main mechanism for moving sediment into the deeper parts of the ocean.

These turbidite rocks show that the currents came from the south. Geologists think that Australia at its southern margin was joined to Antarctica at that time and that large mountain ranges in Antarctica provided the sediment that was ultimately deposited in our region.

Since the sediment-bearing turbidity currents only arrived intermittently in the local area there were often long intervals with little or no sedimentation taking place. During these intervals black mud

and siliceous oozes, often containing abundant graptolite fossils, very slowly accumulated on the sea floor. The most important of these formations called the Acton shale is about 60 m thick. It is best exposed on the East side of the Ginninderra Drive Extension, South of Belconnen Way.

About 2000 to 3000 metres of sediment accumulated in the 20 million years from 460 million years to 440 million years ago. At the end of this interval, however, near the close of the Ordovician, the region was uplifted by earth movements and sediments ceased to reach the local area. Whether the area became land or remained beneath the sea is uncertain. For some 10 million years no sediments were laid down, though elsewhere, in the Snowy Mountains, deepwater sediments continued to be deposited.²



MOLONGLO GORGE (Locality 1) outcrops of Ordovician sandstone, deposited by turbidity currents.

Molonglo Gorge outcrops of ordovician sandstone deposited by turbidity currents.³

The Gorge Walk

The Molonglo Gorge disgorges some 4.5 km ESE of Canberra Airport. Drive some 5 km past the Airport along Fairbairn Ave; turn left along Sutton Road; after 1 km turn right and follow the signs past the children's playground to the car park and picnic ground.

The first half kilometre is somewhat rugged, involving some rock scrambling. The remainder of the 2½ km to Blue Tiles – the end of the deeply incised gorge – is relatively easy, though undulating. Excellent exposures of Ordovician sandstone and shale turbidite beds can be seen for much of the walk. Particularly fine exposures can be found in the bed of the river. A wide range of folds and other structural features are present.⁴

For those interested in understanding the three basic categories of rocks: sedimentary, metamorphic and igneous, this walk forms an excellent introduction to sedimentary rocks – those deposited as particles, usually in water, but sometimes (loess) in air.

FNAC Evening Outing on Sunday 5 February 2012

Ten of us assembled around a picnic table at 1800 hrs of this balmy afternoon, Bob and Helen Lehman having already completed short walks. Five of us were visitors – potential new members!

The crash of a small branch of Apple Box (*Eucalyptus bridgesiana*) next to us drew our attention to several specimens of this lowland woodland species growing on deeper, heavy footslope soils around us. Its sinuous spreading multiple branches topping short trunks form rounded crowns typical of woodlands. (In these tree cover amounts to less than 40%). Its grey flakey bark is compressed into tessellated (tile-like) hard blocks near the base of the trunk.⁵ I had always been under the impression that its common name stemmed from the apple-shaped, rounded leaves of its grey juvenile foliage, but read now that the tree “is thought to have been given its name because of its resemblance to an old gnarled apple tree.” The adult leaves are stiff and often more than twenty cm long. Their veins become prominent as the leaf dries.⁶

Also growing around the picnic tables were tall, planted Blue Gums (*E. globulus*), not native to the ACT - as well as dusty-grey foliated Argyle Apple (*E. cinerea*) from which colour it gets its specific name. According to Nancy Burbidge and Max Grey its natural occurrence in the ACT is doubtful.⁷

Apart from Apple Box trees some 26 other species and/or subspecies of eucalypts are endemic to (occur naturally in) the ACT.⁸ Of these we saw Red Box (*E. polyanthemos*), a massive Yellow Box (*E. melliodora*) and the local Scribbly Gum (*E. rossii*) – with and without ‘scribbles’, but always with its characteristic ‘armpit wrinkles’.

The south-facing northern slope of the gorge, along which the track leads, was drenched in evening light from the West, one of the few times when this occurs. The normally shaded ground is covered in a thick layer of moss, in contrast to the opposite much drier, north-facing southern slope of the valley, on which such moss is absent. Here on the northern side, Red Stringy-bark eucalypts (*E. macrorhyncha*) predominate, in contrast to the bank opposite on which Brittle Gum (*E. mannifera*), with its white, powdery bloom on the trunk, and *E. rossii* flourish.

On the rocky slopes of both sides of the gorge the slim dark green Black Cypress-pine trees (*Callitris endlicheri*) stand out against the paler olive green of the eucalypts. Their ancestors evolved 350 million years ago and flourished when these conifers dominated the earth 100 million years ago, before flowering plants arose and began to compete with them.⁹ Contrasting with these was the more yellowish foliage of a Cherry Ballart (*Exocarpus cupressiformis*) - ‘cupressiformis meaning ‘cyprus-like’. This hemi-parasite takes in water and nutrients from the roots of other plants through its own root system, but then fixes its own energy through photosynthesis.

Among the taller shrubs one specimen of *Bursaria spinosa* – one of the Blackthorns known as Shepherd’s Purse - had one branch still flowering, the other bearing dried fruits. Their nectar is usually produced at a time when it provides enough energy for a small wasp which parasitizes Christmas Beetles (Anoplognathus species). The wasp lays eggs within the body of the beetles and thus helps to control their often virulent and defoliating outbreak. The Beetles feed on eucalypt leaves.



A healthy understory of *Bursaria spinosa* thus helps protect the overstory. The roots of this bush, however, are rich in starch. These roots attract feral pigs, who dig them up and feed on them. To maintain the health of eucalypts, therefore, not only should we keep a healthy understory of such bushes, but to do that, we must control the feral pigs – a fine example of the need for an ecological understanding to help maintain our environment.

A Swamp Wallaby (*Wallabia bicolor*) skipped ahead of us along the slope, while among the birds we heard and sighted the Grey Fantail, a flock of Yellow-rumped Thornbills, Superb Fairy-wrens and an Eastern Spinebill.

Grasses included Kangaroo Grass (*Themeda triandra*), River Tussock (*Poa labillardieri*) and one of the many Wallaby Grasses (*Austrodanthonia spp.*),

The weed, St John's Wort (*Hypericum perforatum*) is rife. The Christmas-tree like inflorescence of African Love-grass (*Eragrostis curvula*) was noted.

A delicious shared picnic rounded out the evening before the mosquitoes became somewhat troublesome.



Graptolite, *Pendeograptus fruticosus*, Early Ordovician (c. 482 my old), Castlemaine district, Victoria
Source: Museum Victoria ¹⁰

10. <http://museumvictoria.com.au/discoverycentre/infosheets/marine-fossils/graptolites/>



A Molonglo caterpillar taken by Cecilia Melano

1. http://en.wikipedia.org/wiki/Antecedent_drainage_stream
2. 'Our Heritage' Travel Times (Supplement of Canberra Times) No Date, Page 12
3. Ibid pg10
4. Ibid
5. Wild about Canberra by Ian Fraser and Margaret McJannet ACT Parks and Conservation Service 1993 pg 62.
6. Mountains Slopes and Plains – the Flora and Fauna of the ACT by NPA of ACT, 1971
7. Flora of the ACT, Halstead Press, Sydney 1970
8. http://www.tams.act.gov.au/_data/assets/pdf_file/0005/229694/Euc_Bro_low_res_for_web.pdf
9. Wild About Canberra, pg 72.



Dull or Eltham Copper Butterfly larvae with ants

<http://museum.victoria.com.au/bioinformatics/butter/images/lucilive4.jpg>

see page 7

Lure of the Lyrebird

Notes by Rosemary von Behrens

Don McGregor, ably assisted by his wife Gwen, gave a most fascinating talk on February illustrated by sound, image and video of various Superb Lyrebirds in the Moruya State Forest. There are two species in the family of Lyrebirds. "Superb Lyrebirds are found in forests east of the Great Dividing Range" and have a "spectacular tail of fanned feathers, which when spread out in display, looks like a lyre (a musical instrument of ancient Greece).¹ The two outside feathers are known as the lyrates, and are not found in Albert's Lyrebird. The Albert Lyrebird is confined "to a small area of sub-tropical rainforest near the Queensland/New South Wales border. Due to its specialised habitat, the Albert's lyrebird is an endangered species and the clearing of rainforest would probably lead to the bird's extinction."²

Don's dedicated on-ground research which involved building a 'pond' out of a bathtub, setting up cameras and hides over a 5 year period, sometimes sitting quietly for hours at a time, allowed him to discover that regional differences occur within Lyrebird populations. The Moruya birds do not always conform to discoveries made elsewhere.

The males, 80 – 100 cms long, occupy higher ground within the forest, the females, 70 – 80 cms long, occupy the lower areas. The male builds, with his powerful claws which are strong enough to move five centimeter diameter logs in two seconds, mounds up to 30 centimetres high. One male had seven mounds. There is always a twig or log nearby upon which the female can perch once attracted by his calls to watch his dancing, tail feathers expanded and extended over his head. One male, as he stamped his feet, made a 'clap or click' noise as each foot went down, almost like a drum beat. The best singer and dancer wins the heart of the female. He, however, can mate with several females.

The female takes two weeks to build her nest which has an outer nest of sticks, a platform or step, downy feathers for warmth (which also indicate that the young has fledged), and a disguising twig of Eucalypt leaves on top. The nests are generally on the north east side of slopes. She visits the male to mate but is responsible for incubating the egg (six weeks) and feeding the fledging (another six weeks). One egg, one chick. It takes five or six years for the chick to become an adult bird. The female develops a twist in her tail through sitting on the

nest. She is also somewhat smaller than the male. Motherhood duties take place over 15 weeks from April through to July. The male roosts in the same space or nearby.

The chick is trained to defecate on command. Or is it instinctive? The female lands on her platform and chirps four times, the chick defecates a hard pellet which she collects and takes away. Once the chick fledges it has normal defecation. Think of the nappies and nerves saved if human babies were so obliging. Once the chick is ready to fledge it is too large for the nest and as it stretches the 'roof' is raised and lowered and partially destroyed on departure.

Lyre birds are renown for their ability to imitate other bird calls and intersperse them among their own. Don played a recording which included fragments of 14 different birds. I have heard one imitate a chain saw. The early morning wake-up call recorded by Don has been recorded once before in Queensland, it was that of the Albert Lyrebird. The song had either 'migrated' south to Moruya Forest or it was common to both species.

Threats which affect the Lyrebird populations include logging, trail bikes, and apiarists who have permission to set up hives in the forest, but who can bulldoze 20 diameter trees before reaching their desired locations.

A fascinating talk, thoroughly enjoyed by all who attended.

1. <http://www.environment.nsw.gov.au/animals/Lyrebirds.htm>
2. *ibid*



Superb Lyrebird: "touristsattractions.us"

Listen to one imitate a camera shutter, car alarm, and chainsaw. David Attenborough on <http://www.youtube.com/watch?v=VjE0Kdfos4Y>

Bursaria spinosa

Information gleaned from www. R von Behrens

Bursaria spinosa is a small tree or shrub in the family Pittosporaceae. It is variously known as 'Sweet Bursaria', 'Christmas Bush', 'Blackthorn', 'Prickly Box', 'Boxwood', 'Native Box' and 'Shepherd's Purse' which refers to the shape of the seed capsules. "'Bursaria" derives from the Greek word bursa, meaning a sac, pouch or purse-like structure' and "spinosa" refers to the spiny/thorny nature of the" two sub-species.' [<http://www.apstas.com/bursaria.htm>] ie *B spinosa ssp spinosa* and *B spinosa ssp lasiophylla*.

"Subsp. spinosa—is common in open eucalypt woodlands and mallee habitats, on many soil types; occurring in all states and territories except Western Australia and Northern Territory, generally excluding more arid areas, grassy plains, and heavy clay soils at higher altitudes; Subsp. lasiophylla— is common in eucalypt woodlands on heavier clay soils at higher altitudes in tablelands and lower mountain ranges in south-eastern Australia. [http://www.florabank.org.au/lucid/key/species%20navigator/media/html/Bursaria_spinosa.htm]

Bursaria's are hardy, long-lived, colonise marginal and disturbed sites and regenerate from rhizomes after fire. "In Victoria, on an environmental continuum with no distinct entities, it has been observed that young plants and those from drier sites tend to be spinescent and small-leaved, while mature plants from well-watered areas (coasts, river valleys, fertile plains) tend to be large-leaved, virtually spineless and are often arborescent." [http://www.florabank.org.au/lucid/key/species%20navigator/media/html/Bursaria_spinosa.htm]

Bursaria flowers in late spring and summer. In the Pinnacle Nature Park, ACT, a few flowers remain in February on a western slope while seed pods in hues ranging from green, yellow, orange to rust and grey-brown adorn other plants scattered throughout the *Eucalyptus macrorhyncha* Woodland (Red Stringybark) section of the park.

Bursaria has many uses not only as a nectar supply for the bees, butterflies and

other insect pollinators, but also for nest protection and a source of spider webs for small birds.

The Victorian threatened butterfly species *Paralucia pyrodiscus lucida*, (The Eltham Copper Butterfly) belongs to the family Lycaenidae and "has a close association with a group of ants; in this case, ants from a genus called *Notoncus*.

The butterfly larvae live within the underground nests of *Notoncus*, and emerge at night to feed on their food plant, Sweet Bursaria (*Bursaria spinosa*). The ants protect the Eltham Copper larvae while they feed, and in return it is thought that the ants feed upon secretions from the butterfly larvae ... which feed only upon Sweet Bursaria. This is an example of a complex plant-butterfly-ant ecological interaction." [<http://museumvictoria.com.au/discoverycentre/infosheets/melbournes-butterflies/eltham-copper-butterfly/>]

The dried leaves contain a glycoside named Aesculin which can be extracted by hammer milling and solvent extraction. "Aesculin proved very important to the World War 2 military forces." Previously the "English "Horse Chestnut" trees (*Aesculus hippocastaneum*) had to be felled to obtain limited amounts from its bark... Aesculin provided the active ingredient for a sun screening lotion for ... allied turret gunners during their numerous bombing raids over Europe. It also proved a valuable bacteriological reagent in the testing for tropical diseases for Australian Forces in the tropics and was used for effective treatment of blood vessel disorders of Australian servicemen, including as an agent to manage haemorrhoids." [<http://www.apstas.com/bursaria.htm>]

I inspected the Pinnacle flowering *Bursaria spinosa ssp lasiophylla* and saw a butterfly that simply wouldn't oblige and open its wings. It appears to have orange shoulders but more than that I can't say and I couldn't see ants close by, but they were visible on a luxuriantly flowering *Eucalyptus macrorhyncha* along with bees and many other insects. How fortunate are we that the Canberra Nature Park is virtually on our doorstep. Step out and enjoy!

Field Naturalists' Association of Canberra Inc
 GPO Box 249 CANBERRA ACT 2601

Who are the Field Naturalists?

The Field Naturalists' Association of Canberra (FNAC) was formed in 19081. Our aim is to foster interest in natural history by means of meetings and regular field outings. Meetings are usually held on the first thursday of each month. Outings range from weekend rambles to long weekends away. Activities are advertised in our monthly newsletter. We emphasize informality and the enjoyment of nature. New members are always welcome. If you wish to join FNAC, please fill in the member application below and send it in with your subscription to the FNAC Treasurer at the address below.

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Member contributions welcome.

Distributed by Rosemary Blemings and Robert Lehman

Monthly meeting venue: Division of Botany and Zoology, Building 116, Daley Road, Australian National University. Park occasionally at the adjacent buildings 44 & 49. Meetings start at 7.30 pm and are followed by refreshments.

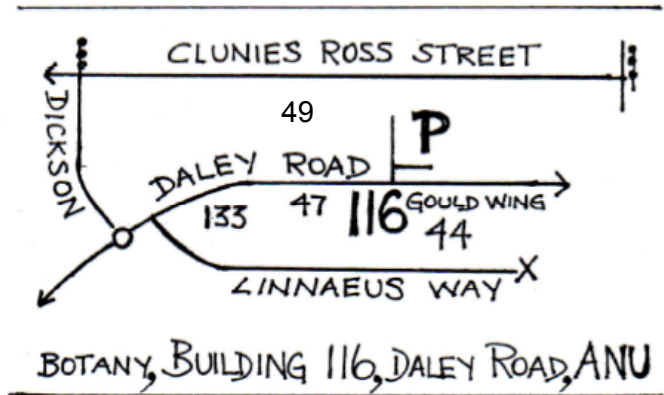


photo left: Pinnacle Nature Park butterfly on Bursaria. The top side appears to have short white dashes on wing perimeter, copper border, blue centre - based on poor photo and a glimpse of top wing. Identification? 19 February, 2012.



photo top: *Eucalyptus macrorhyncha* in flower, insects and heady scent of honey. Rosemary von Behrens

MEMBERSHIP APPLICATION OR RENEWAL

Family name: First name:

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