April 2012
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FIELD NATURALISTS' ASSOCIATION OF CANBERRA INC. GPO BOX 249
CANBERRA ACT 2601

FIELD NATTER

OBJECT:To foster an interest in nature

MEETING THURSDAY APRIL 5th
7.30 pm Gould Wing, Building 116

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

Fungi - *a Mycologist's passion.*

Speaker: Heino Lepp

Heino is an Honorary Scientific Associate in the Australian National Herbarium (Program HC), Cryptogam Collections at the Australian National Botanic Gardens. He originally created the Australian Fungi website at the Gardens and regularly educates the public about fungi. Type his name into Google and about 4,610 results appear on the screen. While Heino specialises in the corticioid fungi which are found on the underside of dead wood lying on the ground he has a vast store of knowledge about other fungi.

Outing: Monday April 2nd Birrigai

As Easter follows this month's talk we are doing something completely different and will be visiting Birrigai for the official opening by Dr Chris Bourke, MLA Minister for Education and Training, of a 50 metre long mosaic representing the evolutionary history of the earth as imagined by children of the ACT at 1.30 pm. I will reserve a number of places for FNAC as the RSVP will have passed before you read this. Please ring Rosemary von Behrens on 6254 1763 if interested. Bring lunch and meet at Tidbinbilla Visitors Centre at 11 am. We can explore lunch sites for our visitors in October before moving over to Birrigai while keeping a look out for fungi in this area.

Access is via Point Hut Crossing or Tharwa Bridge. Cotter Road is **closed**.

ABC1 TV program Sunday 7.30 pm.
'Australia: The Time Travellers' Guide' - Dr Richard Smith zooms 4.6 billion years back in time to the Hadean Eon only to turn around and trace the development of Australia from the very beginning to the present time. Three more episodes to view but all are available on the web. http://www.abc.net.au/tv/timetravellers/#/Great_Bombardment

Other websites of interest.
http://www.anbg.gov.au/fungi/
http://www.anbg.gov.au/cpbr/program/hc/hc-cryptogam.html
http://www.rbg.vic.gov.au/fungimap/
tasmanian-fungi-festival-2012 [26 -29 April 2012]
Foundation of National Parks and Wildlife
http://www.backyardbuddies.net.au/bmail/Bmail_March_2012.html

Observations.
Please submit your observations to me at rosemaryvb@gmail.com and Chris Bunn chris_b@webone.com.au We are taking it in turns as editor as no-one has volunteered to fill the vacant position. Any takers?

Butterflies 4 February RvB
I observed clumps of Cabbage White Butterflies (*Pieris rapae*) 'puddling' at Coppins Crossing, ACT. I returned on March 18 hoping to find them again, but the site I photographed then is under water and the bank has washed away. The 'car park' is chock full of cleared tree trunks, branches and other wooden debris – a result of our recent rains. Slowly but surely the *Casuarina cunninghamiana* trees killed during the 2003 bush fires are succumbing to adverse water flows and storms. The landscape is in flux. The Molonglo is flowing swiftly and roughly over rocks below the bridge and is deceptively smooth above.

So why do butterflies 'puddle?' Water is not always visible when they engage in this activity, but the soil is wet.

"Butterflies get most of their nutrition from flower nectar. Though rich in sugar, nectar lacks some important nutrients the butterflies need for reproduction. By sipping moisture from mud puddles, butterflies take in salts and minerals from the soil. This behavior is called *puddling*, and is mostly seen in male butterflies because males incorporate those extra salts and minerals into their sperm. When butterflies mate, the nutrients are transferred to the female through the sperm. These extra salts and minerals improve the viability of the female's eggs, increasing the couple's chances of passing on their genes to another generation." http://insects.about.com/od/butterfliesmoths/f/why_butterflies_puddle.htm

Male Cabbage White's have one black spot on their forewing, females have two. The underneath of the forewing is white and the hindwing is yellow, or greenish-yellow on my photos.

Illuminated Musings a photographic exhibition by Margaret Kalms illustrating Bible verses that have a nature theme. Strathnairn Homestead Gallery, Stockdill Drive, Holt. The opening is Saturday 31 March at 3:00 pm. The exhibition is also open on 1st, 7, 8 April (Easter) and 13,14,15 April. Country gardens, Cafe and birds.

Legionella and Legionnaires' Disease.'
March 1st Talk by Clive Broadbent
notes by Rosemary Blemings

Legionella bacteria belong to the Legionella genus of microorganisms. Microbial ecologists have discovered, relatively recently, that Legionella bacteria are naturally present and widespread in the environment. The organisms are found in farm dams, artesian bores and, as was revealed, in most bodies of water that are likely to be warmed. The bacteria get nutrients from Algae. Legionella bacteria have been part of the planet's biota for 200 million years.

Legionnaires' disease is an atypical pneumonia. The bacteria cause Legionellosis. Symptoms are pneumonia-like but the whole system of the body is attacked. Pontiac fever is a more benign infection caused by the same bacteria. Those people with lung disease, cancer, diabetes and compromised immune systems are more likely to be susceptible to Legionnaires' disease. Older people, males and those who smoke are also predisposed to becoming infected.

In July 1976 there was a Conference of the American Legion (equivalent to the RSL) in Philadelphia to commemorate the 200th anniversary of the Signing of the Declaration of Independence. 221 attendees and locals came down with a mystery illness that killed 34 people.

Seeing pneumonia symptoms doctors try penicillin but Legionnaires' doesn't respond to penicillin. Testing of samples from blood bank donors lead to the discovery that 30% of the population have Legionella antibodies in their systems pointing to exposure to the bacteria being common. There have been no "authoritative records of Legionnaires' disease clinical cases arising from the natural world".

We were re-introduced to the word *aerosol.* "As colloidal particles dispersed in a gas" the presence of Legionnaires bacteria in the extremely fine vapour associated with steam, warm water and misting situations was the usual source of outbreaks. Supplies of water which

produce an inhaled aerosol suspension lead to outbreaks. It takes about a week for the symptoms to appear

Clive mentioned some sources of Legionnaires infection; shower and bathing water in hospitals, cooling towers, spas (when the pump is active), humidi-cribs. Others were added to the list; potting mix, snowmakers, sprays to freshen meat and vegetable displays, nebulisers and hydrotherapy and swimming pools overseas. In the latter case the chlorine counters the Legionnaires bacteria. The Melbourne Aquarium was the site of an outbreak. Where algae might be present keeping water in the dark prevented algal growth.

Australia has high microbial control standards and associated regulation. It was important to heed the warnings on, for example, potting mix bags. *Legionnella longbeachae* is common in our potting mixes. In other areas of potential infection it was vital to use respirators. There are about 40 species of Legionella bacteria with *L. longbeachae* being named in America not from our South Coast. It was some time before the danger of workers being constantly close to power stations' cooling towers emerged.

Legionnaires disease bacteria thrive in temperature up to 40 degrees. A slime-like biofilm develops on surfaces near the suspension. Whilst protozoa feed on the bacteria they also excrete infected material into the water adding to disease-sources. The body's antibodies can cope with individual Legionnaires cells but can't counter vesicles containing large numbers of bacteria cells.

Water at 44 degrees C slows down Legionnaires' disease bacteria. Heating to 63 degrees C kills the bacteria but the legal limit for hot water tanks is 50 C degrees, so the anti-scalding principles applied by law to hot water systems are counter-productive when related to the incidence of Legionnaires' disease.

Reservoirs and tanks which regularly contain water at temperatures ideal for Legionnaires bacteria, need to be regularly cleaned with chemicals lethal to the bacteria. With snow-making and other equipment in locations where chemicals were excluded, tanks needed to be emptied, scoured and dried daily before refilling. Evaporative coolers don't seem to provide problem conditions. There are 600 cooling towers in Canberra.

Outbreaks are more common in the tropics. The Legionnaires' bacteria are such adaptable and "unusual bugs" Clive felt there must be some that inhabit salt water. Animals such as horses and sheep can have the disease.

Clive's engineering background has provided a vital link in the understanding of this preventable disease. He has acted as a consultant to clients operating mining companies, power stations, paper-mills, refineries and to countless owners of commercial buildings with cooling towers controlling their interior climates. See the March Field Natter for further links.

Defying gravity

contributed by Chris Bunn

The next time you see an ant or a spider walking upside down, consider this: rope systems designed to hold rock climbers can support at least ten times the weight of an average adult, but the little animal clinging to your ceiling has vastly more protection than that.

weblightstudio.com.au Male Huntsman

The spider exoskeleton, like those of all other arthropods (spiders, insects and crustaceans), consists of an extremely non-adhesive material known as cuticle. To hold on, insects, including ants, rely on small claws or on sticky foot secretions. Spiders, however, have a different adhesive structure at the tip of each leg, formed from a dense aggregation of miniature hairs called setae. Each seta is covered with even smaller hairs whose tips are shaped like sails. The sails

can conform to every bump and cranny of a surface, acting as intimate contact elements between the wall and the foot. At each contact point, interactions between molecules set up a weak electrostatic attraction; collectively the many points creating a powerful adhesion. For a small spider this gives rise to a force 170 times stronger than what is needed to prevent dropping off the ceiling. This is even safer than for an ant, which is about 100 times stronger. To become unstuck the spider just pulls along a single edge of hairs, much as you do when you peel off a piece of tape.

Source Smart materials and Structures 13:512-18 (Summarised in Natural History 9/2004 page 20)

Observation March 10, 2012
by Rosemary von Behrens

A glorious day without rain, the trees and skies washed clear and bright, but the Springvale Track behind Hawker was virtually uninterrupted puddles and mud.

I escaped and wound my way across country in the Pinnacle Nature Park following a kangaroo path. A kafuffle of bird flurries caused me to retrace my steps. I spent the next 30 minutes entranced as one after another Red Wattlebirds and Rosellas took turns at a tree hollow. My first thought was 'How dare the Wattlebird take over the Rosella's hollow?" Wattlebirds, however, don't nest in hollows. I soon discovered that it had been flooded after days of rain, they were in fact drinking. When the Wattlebirds entered the hollow they emerged all fluffed and wet. It was bath time! One Red Wattlebird was more aggressive and had the most pleasure but many of the Rosellas did manage to drink during the "Wattlebird commercial breaks." They didn't bathe.

I observed three Red Wattlebirds, two Eastern Rosellas, two mature and two immature Crimson Rosellas, four Magpies which simply sat quietly or 'chatted' on the branches' extremities, a family of quarrelling Eastern Rosellas which flew through the tree, and various butterflies. The tree was a *Eucalyptus blakelyi* supporting seven or more various sized Mistletoe clumps. The trunk and branch forms allowed water to flow directly into the hollow.

"You go." "No no it's your turn." Occupied already?

Friends of Aranda Bushland
invites you to celebrate our new, extended walk to be opened by Dr Andrew Leigh, House of Representatives member for Fraser at 12.30 pm.
Saturday 31 March 2012
12.15 pm to 2.00 pm with a short walk to see the Aranda Snow Gums/Aranda Bushland and the new alternative return with the additional sign for the circle of regenerating Apple Box.

Renewing our self-guided walk.This has been a just-in-time project to renew our signs. We used a federal grant from Caring for Our Country, Communities in Landscapes, Box-Gum Woodland in the Murrumbidgee Catchment to replace our ten elegant signs for the ten eucalypt species and the four ecosystems. The grant also funded a new edition of our walk brochure.

All welcome. Meet at the start of the Frost Hollow to Forest Walk in Aranda Snow Gums off the eastbound lane of William Hovell Drive just before Black Mt carpark.

RSVP to bean@nfrac.org for catering. Contact: Jenny Andrews, secretary on 6251-2427.
www.FriendsOfArandaBushland.org.au

Valediction for two ex-members

Dr Richard Langdale Smith died 27 Feb, husband of Gill. Richard's interests included medicine, chemistry, birds, herps, chess.

Janet Twigg-Patterson died 4 March. Janet was FNAC secretary, painted native flora, fauna, taught Chinese brush painting.

Bird Mafia

contributed by Chris Bunn

Have you ever wondered why cuckoos are so successful. Why do many hosts accept costly avian brood parasitism even when parasitic eggs and nestlings differ dramatically in appearance from their own? Scientists argue that evolutionary lag or equilibrium can explain this evolutionary enigma. Few, however, consider the potential of parasitic birds to enforce acceptance by destroying eggs or nestlings of hosts that eject parasitic eggs and thereby reject parasitism.

Recent research in the United States have provided experimental evidence of mafia behaviour in the brown-headed cowbird (Molothrus ater), a widely distributed North American brood parasite (cuckoo).

The researchers wanted to investigate two possibilities — that cowbirds may 'farm' their hosts i.e. induce parasitism opportunities and that their warbler hosts may be intimidated into accepting parasitism by the consequences of not doing so i.e. punishing those warblers that ejected their eggs by returning to destroy their clutches.

To test their ideas, they established a nest-box breeding population of warblers in known cowbird territory. Some nests they allowed to develop naturally, but from some they removed the cowbird egg. For some of these manipulated nests the entrance hole was blocked to only allow warbler and not cowbird access.

Category	Treatment	% nest predation	Warbler offspring per nest
1	Cowbird eggs ejected, cowbirds allowed access	56%	1
2	Nonparasitised nest, cowbird access always allowed	20%	3
3	Cowbird egg accepted, cowbirds allowed access	6%	2.8
4	Cowbird egg ejected, cowbird access denied thereafter	0%	4
5	Cowbird access never allowed	0%	

Nest predation events all occurred during the incubation period and involved the damage or destruction of most or all warbler eggs When cowbird access was allowed, 56% of ''ejector'' nests (category 1) were plundered compared with only 6% of ''accepter'' nests (category 3). Nests that were not parasitised but still accessible to cowbirds (category 2) were plundered at an intermediate rate (20%) No nests were plundered when cowbird access to ejector nests was denied after incubation commenced (category 4) or when cowbird access was never allowed (category 5), suggesting that cowbirds were responsible for nest-predation events. These differences in rates of nest predation provide evidence that cowbirds employ both mafia and farming behaviours in this system.

The penalty to the warblers for ejecting parasitic eggs was the destruction of clutches, presumably by cowbirds. Mafia behaviour in brood parasites can hold hosts in an evolutionary state of acceptance only if hosts that accept parasitic eggs have higher reproductive output relative to hosts that reject parasitism and suffer the penalty The predatory tactics of cowbirds significantly reduced the mean number of warbler offspring produced per nest in ejectors (category 1) compared with accepters (category 3).

The results show that cowbirds often retaliated against the removal of their eggs by plundering the warbler nests from which cowbird eggs were ejected experimentally. To a lesser extent, additional opportunities for parasitism were created when some non-parasitised nests were also plundered.

How common or widespread these behaviours in other species are is still largely unknown.

Source J Hoover J and Robinson S: Retaliatory mafia behavior by a parasitic cowbird favors host acceptance of parasitic eggs www.pnas.org_cgi_doi_10.1073_pnas.0609710104

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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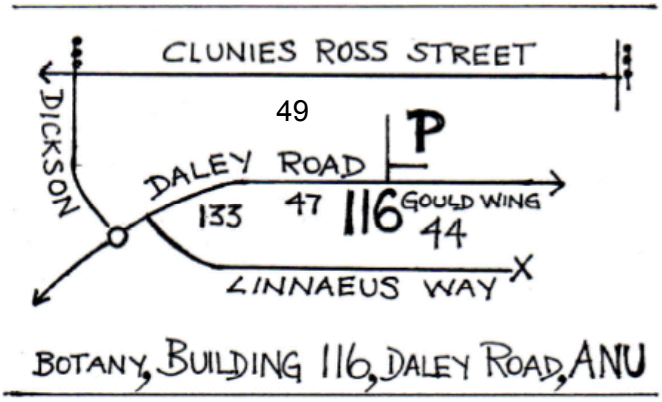
Member contributions welcome.
Distributed by Rosemary Blemings and Robert Lehman

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



Female Cowbird
Molothrus ater
http://en.wikipedia.org/wiki/File:Molothrus_ater1.jpg

Prothonotary Warbler
http://the-ethologist.blogspot.com.au/2010/06/brown-headed-cowbirds-exhibit-mafia.html

MEMBERSHIP APPLICATION OR RENEWAL

Family name: ..... First name: .....
If a family membership, please include the first names of other members of the family:

.....

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Email address: .....

Subscription enclosed: $..... (Single/Family $25) Donation: $.....

How did you hear about FNAC? Please circle: FRIEND? OTHER? Please specify: