SEGments

Journal of the Scientific Expedition Group

Volume 24 Number 4

SEGments

Scientific Expedition Group

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Volume 24 Number 4, March 2009.

ISSN 0816 -6463

SEGments is the authorised journal publication of the Scientific Expedition Group INC., PO. Box 501, Unley SA 5061. It is published four times a year to promote articles about biodiversity, scientific exploration and ecological research.

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Cover photograph taken on Marqualpie Expedition 2008
By **Andrew Barr**

Editorial

Educating our children for the 21 Century

You can't avoid hearing or reading about the bleak future we are facing. The sceptics versus the optimists are doing battle for the minds of our children about their future on this planet. So a short examination into the meanings of some of the environmental concepts that we are hearing in the debate needs some examination.

The study of Ecology is all about interrelated factors within the environment. The plants and animals are the interwoven factors but the climate controls this biodiversity. Geological and historical evidence indicate that this planet has gone through many climate changes ie, ice ages and warm periods. This natural fluctuation will probably continue but what influence humans are having on the climate is the most topical question at the moment.

There are many gases in our atmosphere but some gases like carbon dioxide and methane trap the solar radiation and increase the temperature of the earth. Since the industrial revolution, humans and their domestic ruminant animals have been producing large amounts of these gases. Producing heat and electricity due to the burning of fossil fuels produces too much carbon dioxide. Cows and sheep produce large volumes of methane.

What we must do is give our children an education about the solutions to these environmental problems. The human contributions to climate change must be addressed by reducing our dependence on fossil fuels. Solar electricity, wind power and hydrogen fuel can help in this reduction of production of CO_2.

The recent upsurge in population has increased the consumption of the finite food resources of this planet to the extent that we are using more than we can sustain. My grandmother had a "Victory Garden" during WW2, my mother took me to a "community garden" in the city in the 70's and I have a small "veggie plot and chooks" in my suburban back yard. Our children must be taught that the consumption of food must be offset by production which also has many health benefits especially if you have an organic system.

The future will not be bleak if people and business learn to put back what they use from this finite planet on a sustainable basis.

The first article by Chris Wright documents 21 years of hydrology in the Gammon Ranges which should provide a good baseline to study the effects of Global warming on this area. GRaSP began in 1988 and is a continuing hydrological, ecological and water balance monitoring program located in the Northern Flinders Ranges.

The second article by Annette Vincent, who has combined the science and art of ants for the education of children is an important work as it encorages children to become involved in the natural world.

The third article by Conrad Denyer recounts his experiences on the 2008 SEG trip and use of the outdoors to educate junior primary school student teachers so they make science a dynamic part of the school curriculum.

The final article by Michelle Tretheway is an introduction to the plants and animals of the Arkaroola area. The SEG expedition is planning to go to the Arkaroola area from September 20th to October 3rd, this year.

We have started a book review section in this edition and we would appreicate SEG members submitting reviews of any interesting publications to the editors.

Further reading:

Vince, G.. (2009) Surviving in a warmer world, *New Scientist*, Vol 201, No 2697, p.29-33.

Goleman,D.(2009) *Ecological Intelligence: How Knowing the Hidden Impacts of What We Buy Can Change Everything*, Macmillian, New York.

Andrew Barr

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Water in the Vulkathunha Gammon Ranges

Chris Wright

Figure 1: Arcoona Creek at the Gauging Station, plenty of boulders and no water Photo: C.Wright

After more than 21 years collecting information on the hydrology of the Ranges, what have we learned? An improved understanding of the rainfall patterns and frequency, with variability as the key - variability in both time and space. Figure 2 shows winter and summer average rainfalls with elevation, suggesting that there is a definite indication of greater summer rainfall with altitude, and a weaker relationship for winter rainfalls. This is contrary to what we expected.

We have experienced many years of drought when surface water was hard to find, and we had to carry in any water that we needed, but there were other times when for a series of trips in all seasons, we found water each time and began to think that the supply was semi-permanent. The past 3 or 4 years have seen a return to drought conditions, even though further south, in the Hawker area in 2007, huge floods occurred. It seems to me that the random nature of summer rainfalls favours relatively small areas, and the rest remains in drought. In the rare years of major rainfalls, (1956, 1974 and 1989) there is water everywhere.

Our data shows that annual rainfalls in the mountainous areas are greater than the plains, but not greatly different.

We have learned that the rivers and streams in the ranges seldom flow over their whole length at one time, but probably flow reasonably frequently over short distances. The comparison of flow duration with rivers and creeks further south shows, not surprisingly that when Arcoona Creek flows, the flows persist for much shorter periods. The two figures (Figure 3) show the dramatic difference in flow duration between the Mt Lofty Ranges and Flinders Ranges. The North Para River continues to flow long after the rain has stopped, but Arcoona Creek by comparison flows for very short periods after rain. This suggests that surface water in the Gammons is absorbed very quickly.

In March 1989 heavy rain fell over the area between the northern Flinders Ranges and Lake Eyre. The Gammon plateau pluviometer recorded just under 200 mm in one day, and nearly 400 mm in 2 weeks

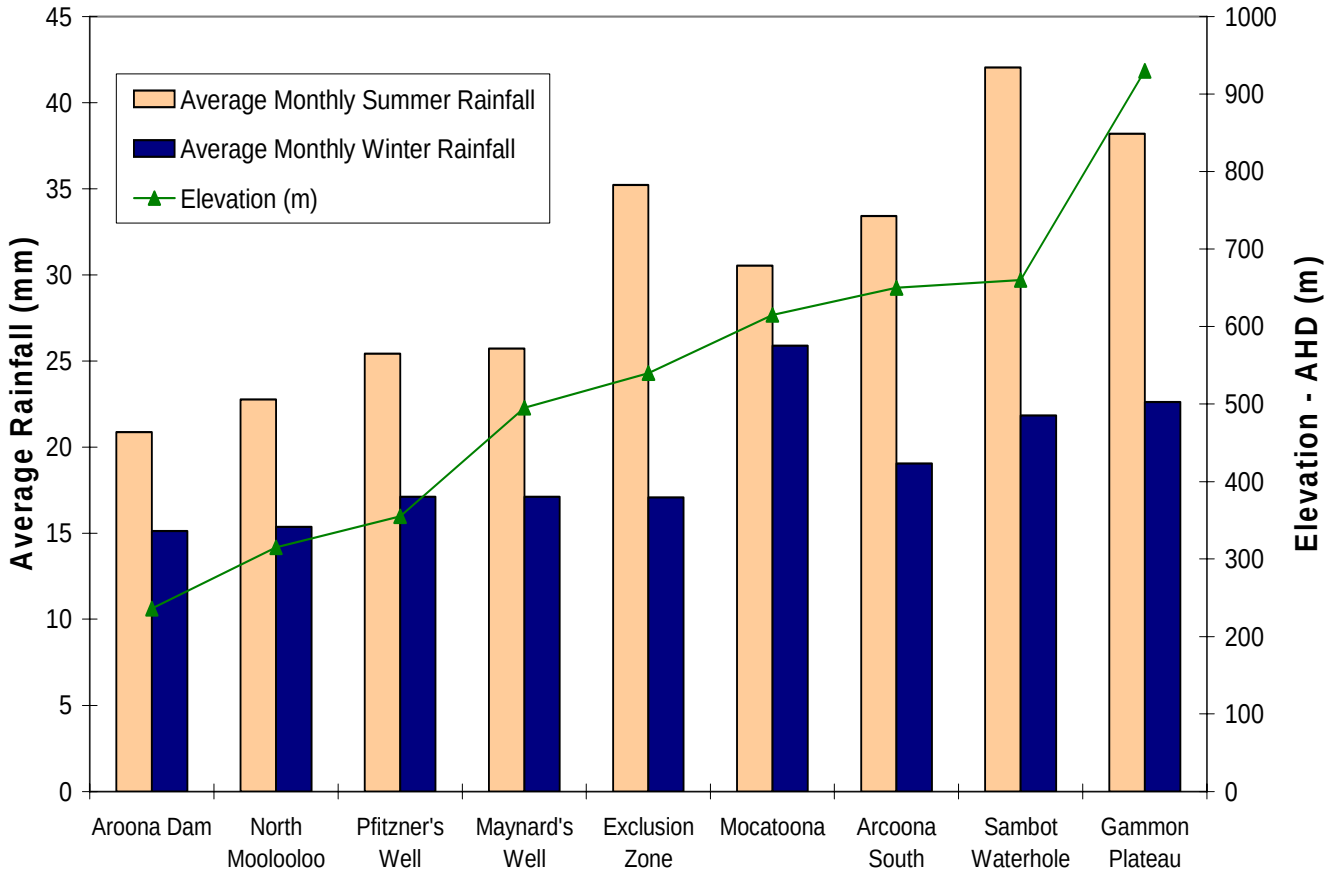

Figure 2: Variation in annual rainfall with elevation

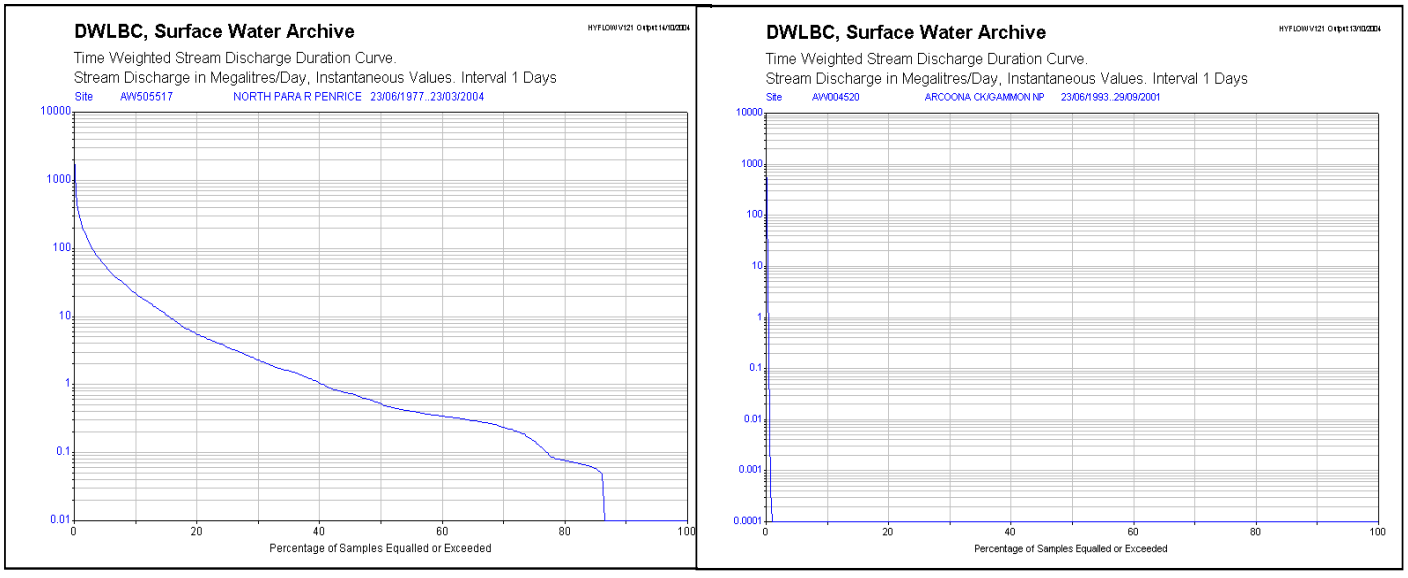

Figure 3: Flow-duration curve for the North Para River (left) and Arcoona Creek (right)

It is interesting to read that D H Lilliecrapp, owner of Yankaninna recorded that in 1971 "Arcoona Creek ran a fair flood for several weeks – we had to cross sheep a day or so before they were shorn to enable them to dry out" (Yankaninna Station Rain Register 1957-1973). The river beds, with their rounded stones and gravels, are very efficient catchers and storers of water. It would be interesting to dig a well in the creek bed and see if there is fresh water. Is there any evidence that demonstrates that the creek actually flows down its course below ground? Woodcutters Well, which is the only permanent source of water, is actually on the side of the valley, and several metres higher than the creek bed, apparently fed from a relatively saline aquifer. The seeps in the bed of Arcoona Creek, near Woodcutters Well, are probably permanent. They are

used regularly by animals during dry periods, and water is probably available by determined digging. It is fairly saline, indicating an intrusion of groundwater? It is interesting that after a summer storm, the creek gravels are dry on the surface within minutes, but the little rock crevices, chipped out of larger boulders and forming small containers, still hold water, much less than a litre. The local animals and birds know about them, and after a storm we have seen them taking a drink.

Over the years we have learned that surface water can be found, often in Grandfield waterhole, a rock pool on the tributary creek that flows on the west side of North Tusk Hill. Similar pools on the east-side tributary often hold water, but are not checked as regularly. The larger and better-known waterholes, Upper and Lower SAMBOT and Wild Ass Creek, are less reliable sources of water, but do hold larger volumes. There are many other occasional waterholes, scattered through the upper reaches of the small creeks that feed Arcoona.

Water from the waterholes is always drinkable, but during hot dry periods there can be a lot of algae, and the smell of goat. Wherever possible the water is boiled, although in hot summer weather it is difficult to boil and cool enough to supply a group of walkers. Water filters of various sorts have been used to produce small amounts of drinking water. Often the water looks very cloudy, but is good to drink. Very fine clay particles make it look muddy, but have little effect on the taste. Perhaps thirst improves the taste?

Water consumption varies between individuals, and with the day temperature. In winter time it is possible to manage with about 2 litres per person per day, while in summer the water demand may be 7 litres per person per day or greater. For a regular 3-day walking trip each person will need between 6 and 20 litres according to season.

If there is water in the regular water holes there is no problem, but in dry years, more is needed than can be carried. SEG leaders have, in recent years organised a water drop, a special trip in from the car park to Vandenberg and back to deposit 50 litres or so for the main walking group.

At the Arcoona Entrance to the park there is a Visitors Interpretive Centre where a small roof and rainwater tank, provide a reliable supply of fresh water. SEG has requested approval to build a small rainwater collector - just a 2m by 2m roof and some drums – further into the park to provide an emergency water supply. If this project goes ahead and we can work out how to carry in the components, the supply of water for SEG field trips will be very much easier.

Roof area	4	M^2
Annual Rianfall	300	mm
Annual yield	1200	litres
Visits per year	4	
Water per vist	300	litres

It remains a mystery to me, how in this arid environment, on the rare occasions when the creeks close to the plateau contain pools of water, that fish can find their way up there (April and July 1996). The pools are so remote from any permanent waterholes, and the creeks can only flow full length for such short periods.

Warren Bonython observed in 1967 that there is no surface water up on the higher parts of the ranges. Water is more commonly found 200 metres or so lower than the plateau, in rock pools and crevices. Our groups have crossed the ranges on various trips, and water supply is always a problem. The semi-permanent waterholes at Junction, Rover and Yacki are a good bet to find potable water, and usually the crossover route runs close to one or other. The scramble down from the plateau to a waterhole to collect an extra supply has been quite feasible on a number of occasions, and does not take very long.

The last 20 years working in this fascinating and beautiful place have taught us a lot. Not always what we expected. It will be interesting in the coming years to compare water flow in the Flinders with the hydrology of the flatter creeks and basins with their clays and sandy soils. We don't yet understand the variability, the extremes of wet and dry, nor the apparently random distribution of storms and major rain events. We don't know what effects global climate change will have. All this provides a great incentive to carry on finding out.

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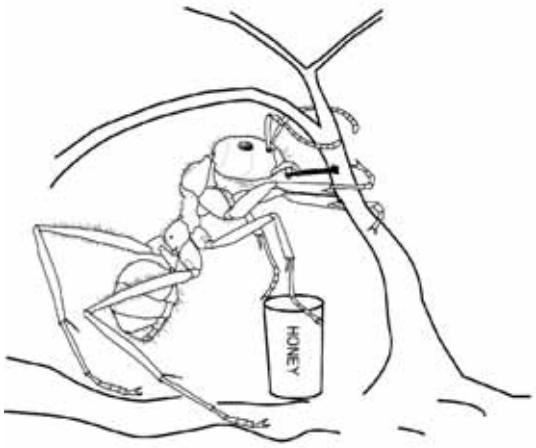
Ants and Art

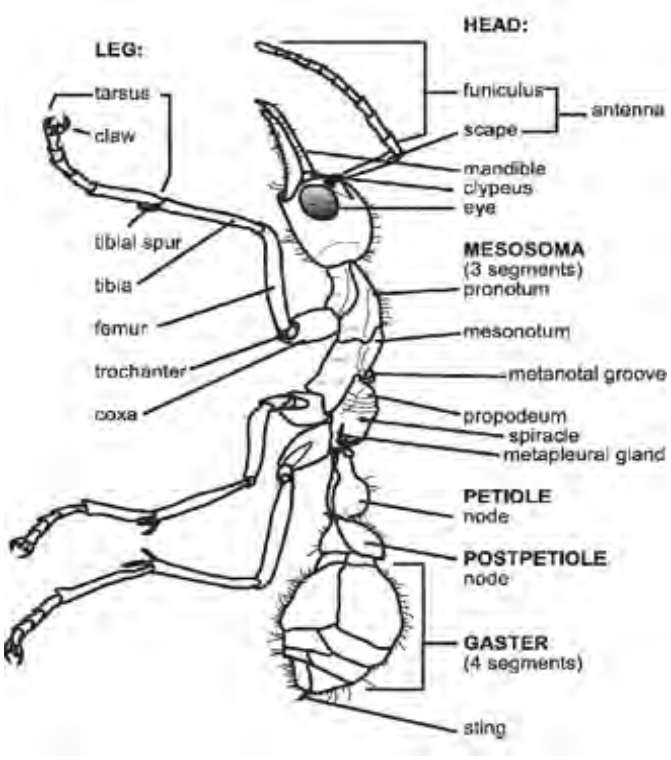
Annette Vincent

Ants have been around for a long time. One particular worker ant of the oldest and most primitive group of ants got caught in sequoia amber in New Jersey, dating to approximately 80 Million years. So they have had time to learn a few good tricks. Since I started drawing ants in 2000 for the SA Museum, (Entomology section at the Science Centre) the most common question, that I am asked is: ***How do I get rid of the ants?***



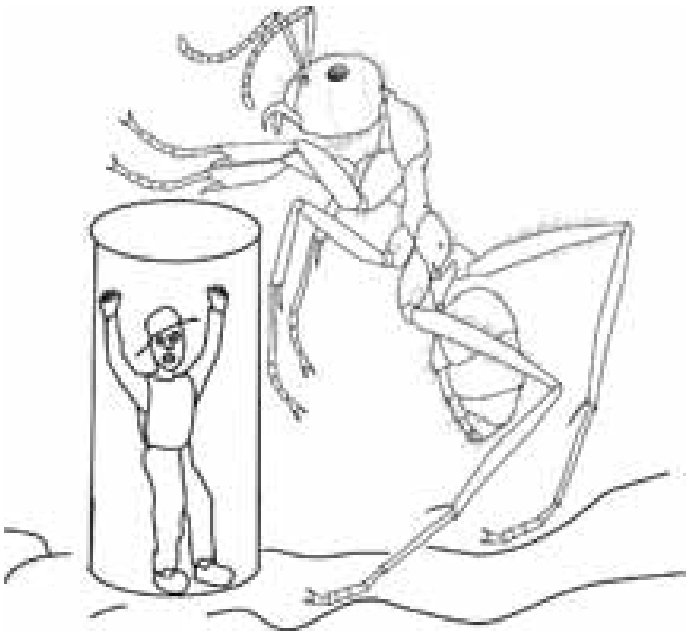
Just think about it, ants have been around much longer than dinosaurs and one of the most useful tricks they have learnt is to leave a chemical trail. Thus other members of the colony can follow to find the source of food or moisture. When you squash one obvious ant in your kitchen, the colony will still survive because that now dead ant has left its trail. But to your dismay, within five minutes, ugh, there is another one coming along the same pathway. This ant also leaves its trail. So it is this pathway that you have to follow and see where the ants are entering the kitchen, and you have to deter them. Ants are looking for food – crumbs of flour or bread; jars of jam with the lid not put on properly; or a regular supply of moisture around the plughole in the sink. From the point of entry into the kitchen, to the point where the food or moisture is, that is where you need to scrub with detergent and lots of elbow grease. Remove this trail and all the ants along it. Clear everything back from the trail because once you start cleaning the ants will run and try to hide. Remember, if you leave one ant on the bench, it will leave a trail and the others will smell it and start to follow it. After the first clean, come back within half an hour and repeat – you will catch the stragglers that are lost. You may have to do this three or four times before the ants have learnt that the food and moisture along this trail has been removed. Never leave a sweet cordial drink out on a hot night. That is like inviting the ants to a Champagne dinner. Ants are also thirsty and require moisture for their developing young. I've heard that white wine vinegar is good. What ever you use, most people forget the most important ingredient, elbow grease.

Ants are not cute or cuddly, and they have no glamour value. They live in an environment quite alien to humans. Individual ants are small and can enter crevices and microclimates like between the bark and the trunk, or between soil particles, or down the cracks in the wall. This allows ant colonies to exist on limited resources and to exploit the majority of the earths other organisms, which are also small. Ants eat other ants. They eat other insects they eat other dead invertebrates. If a large vertebrate is tethered, then the ants, by shear numbers can invade the orifices and can kill it too, thus they are the rubbish bins or the cleaners of the world. It's a pity they can't eat green house gasses! May be we should apply for a grant to train ants to eat CO_2 and Methane.



Subfamily: Myrmeciinae

Being small has a price to pay and having an exoskeleton restricts their size. Ants do not grow and split their exoskeleton. They have narrow tolerances and will respond quickly to temperature or humidity changes. Thus they are constrained to forage when it is warm enough but not too warm.



There is a temperature envelop in which ants forage, greater than 10º C and they will cease foraging above 40º C, with an average peak around 30º C. Low humidity may also constrain foraging. But even moisture is confronting in that standing drops of water are sticky and rain will wash away their chemical trails.

Ants have evolved from segmented invertebrates. Around ten segments form the body of an ant. Each segment has an opening to the outside called a spiracle, which allows air to pass freely in and out, providing oxygen. Ants have glands which secret chemical substances, called pheromones, which help keep the ant clean and free from bacteria and fungus. Ants are conspicuous parts of the environment and have many other animals feeding on them. Like bees and wasps, some ants defend themselves with a sting, which may inject or spray potential enemies and competitors. The pheromones allow ants to communicate with other ants in the colony. Each ant colony has it's own odour. Ant queens use pheromones to control the workers. Worker ants use pheromones to leave trails to profitable food resources as well as to mark the territories. Still other pheromones are released to alert the colony to danger. In general chemicals are the main ways of communication among ants.

Ants live in highly organised and socially structured colonies that can range from a few individuals to tens of thousands. They are organised into castes; *major workers*, often with big heads, are commonly called soldier ants, the *minor workers*, who perform the day to day running of the colony, protect the eggs, gather food, and feed the larvae, which develop into adults.

The queen, the biggest member of the colony) controls most thing with her pheromones. When the time is right, (often on a humid warm evening) some bigger winged ants –the *male* and *female alates* or *sexual ants* will appear and fly off to mate. The workers will vigorously protect these individuals because they are the future generations of the colony. The Queen's chief role is to lay eggs. She is the only ant to lay eggs in her colony. The workers will protect the eggs and the larvae. The workers continue to feed the larvae until it pupates and eventually hatches into a full sized ant. Why should the worker cast forgo reproduction? Workers cooperate and appear to sacrifice themselves for the good of the colony.

The genetic system common to many social insects is *haplodiploidy*. There are no sex chromosomes as in humans. Queens, female *alates*, and workers have two pairs of each chromosome (ie they are diploid). Males have only one set and are haploid. Females and workers receive two sets of chromosomes through conjoining of egg and sperm, while the males are produced from unfertilised eggs and as a result only have one set of chromosomes.

Why bother to study ants?

There are seven functional groups of ants.

1. **Dominant** *Dolichoderinae,* which include the genus Iridomyrmex (the meat ants).
2. **Subordinate** *Camponotini –Camponotus* species, which are ecologically separated for the dominant group by their large size and often nocturnal foraging.
3. **Climate specialists.** These are arid zone (hot climate specialists), humid tropics (tropical climate specialist) and temperate regions (cold climate specialists).
4. **Cryptic** Species are small to minute species of *Myrmicinae and Ponerines* that nest and forage mainly in the soil, litter and rotting logs.
5. **Opportunists.** These are unspecialized, poorly competitive, often with a wide habitat range.

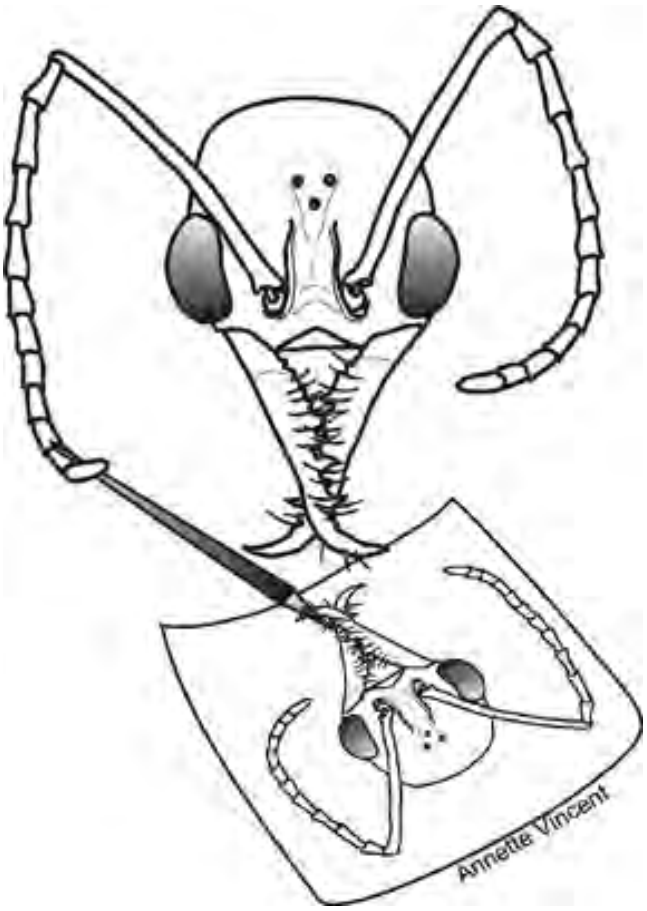
6. **Generalized Myrmicinae.** Species of *Crematogaster, Monomorium,* and *Pheidole* are through out the warmer regions of the world, and often among the most abundant ants.
7. **Specialist predators.** These are medium to large sized species that specialise on predators of other arthropods.

The accurate assessment of the biological resources presented at a given time and place forms the basis of most conservation decisions.

Myrmecology (the study of ants**)** is important because they are amongst the most abundant and easily collected of all animals in almost every terrestrial environment in the world. They have high diversity ecologically. The standard methods of collecting make it easy to count them for comparisons:

- The *richness of an area* is the number of genera and species present.
- The *abundance of an area* is the number of ants in each genus and species.

The study of the distribution and abundance of species forms the core of the biological sciences, encompassing systematics, biogeography, ecology and evolutionary theory. This sort of study provides a wealth of information about the state of particular environments. The relative ease with which ants can be surveyed makes them ideal taxons for the assessment of areas for which virtually no biodiversity data exists.



Ants clean up our rubbish. Ants have the largest brains of all the insects and can carry 10 – 20 times their own body weight. They are the dominant scavengers of small terrestrial animals of all kinds. They turn and enrich more soil than earthworms. In Australia there is a fairly good taxonomic knowledge base. Some 103 genera and approximately 1350 described species. Ground dwelling ants are fairly easy to collect, and having stationary nesting habits, which allow us to sample them over time. Their moderate diversity and sensitivity to environmental microclimate change is an important function in monitoring the ecosystems. Ants living in vegetation and tree canopies are more difficult for standardising methods, to sample effectively.

How did I become involved in the "Art of the Ant"

Ant Art has also been standardised. Drawing the face or anterior view, and the side or lateral view with the head facing to the left of the page. The exoskeleton is easy to preserve in 75% alcohol and there are standard methods of pinning an ant. Ants are easy to post around the world – the first ant found of any new species is called the *type*. This specimen is very important and kept in a Museum for other myrmecologists to view. The *type* specimen is described in great detail to distinguish it from other species.

Students Exploring small creatures

In 2000 I started to draw ants on a scientific basis as a volunteer in the Entomology Section of the South Australian Museum. The S.A. Museum and Craftsouth set a project *Inside SAM's Place* during 2004, which enabled me to try out an idea that would encourage children to be more observant and to draw what they see. One encouraging Mum from Mt Gambier brought her enthusiastic son up to see me and I tried my ideas out on him. As a consequence of this trial run I was invited to take classes at his Glennburnie primary school and the SA Museum Education Centre invited me to run a series of classes during Science week. The publicity dept. of SA Museum asked me if I could do something for children along the lines of ants as they had been around long before dinosaurs and they were getting tired of dinosaurs and invited me during Palaeontology and Science week to take workshops. The invitations spread and Duncan McKenzie invited me to start workshops up at Bird's Australia, Gluepot Reserve, in 2007. Thus my beginners book "The Art of the Ant: the ants of Gluepot Reserve" came into being. This book is available from me or from the S.A. Museum Book shop or Gluepot Reserve.

It is hoped that this book will encourage children to

1. become fascinated with the world of small creatures around them.
2. develop their powers of observation of the natural world;
3. develop their imagination and concentration; and
4. to draw what they see and not what they think they see.

Out on SEG expeditions I try to sketch each of the sites. While doing so I collect ants - called opportunistic collecting. When I sit sketching, out of the corner of my eye I see a little movement. Is it an "Ant?" Has it got six legs or eight? Six legs – then quickly the empty film container drops over the moving object. When I'm by myself, it's quiet and with no one walking around, there are no earth vibrations.

Student using binocular microscope at Glennburnie Primary School

Biography and contact details:

Annette Vincent was born and educated in Christchurch, New Zealand. She learned to draw while studying for her Science Degree in biology. Moving to Australia in 1970 Annette worked initially as a researcher, but in the early 1980's she turned to her talent for drawing into a Fine Arts degree, which she completed in 1986 with a major in printmaking. Annette's great love is pen and ink drawing; she carries her sketchbook at all times, ready to capture the unexpected.

Her first exhibition was in Lincoln, Boston, USA, in 1987 and she has had many solo exhibitions since. Her works are found in state and private collections.She was the only printmaker selected as a finalist in the first National Fleurieu Competition. In 2005 she won the River Murray Art Prize and in 2006 she was a finalist in the Fleurieu water Prize. In 2007 she was a finalist in the Heysen drawing art competition. Annette Vincent has an open studio, exhibition and demonstration during the SALA Festival, since 1999.

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Science and Expeditions

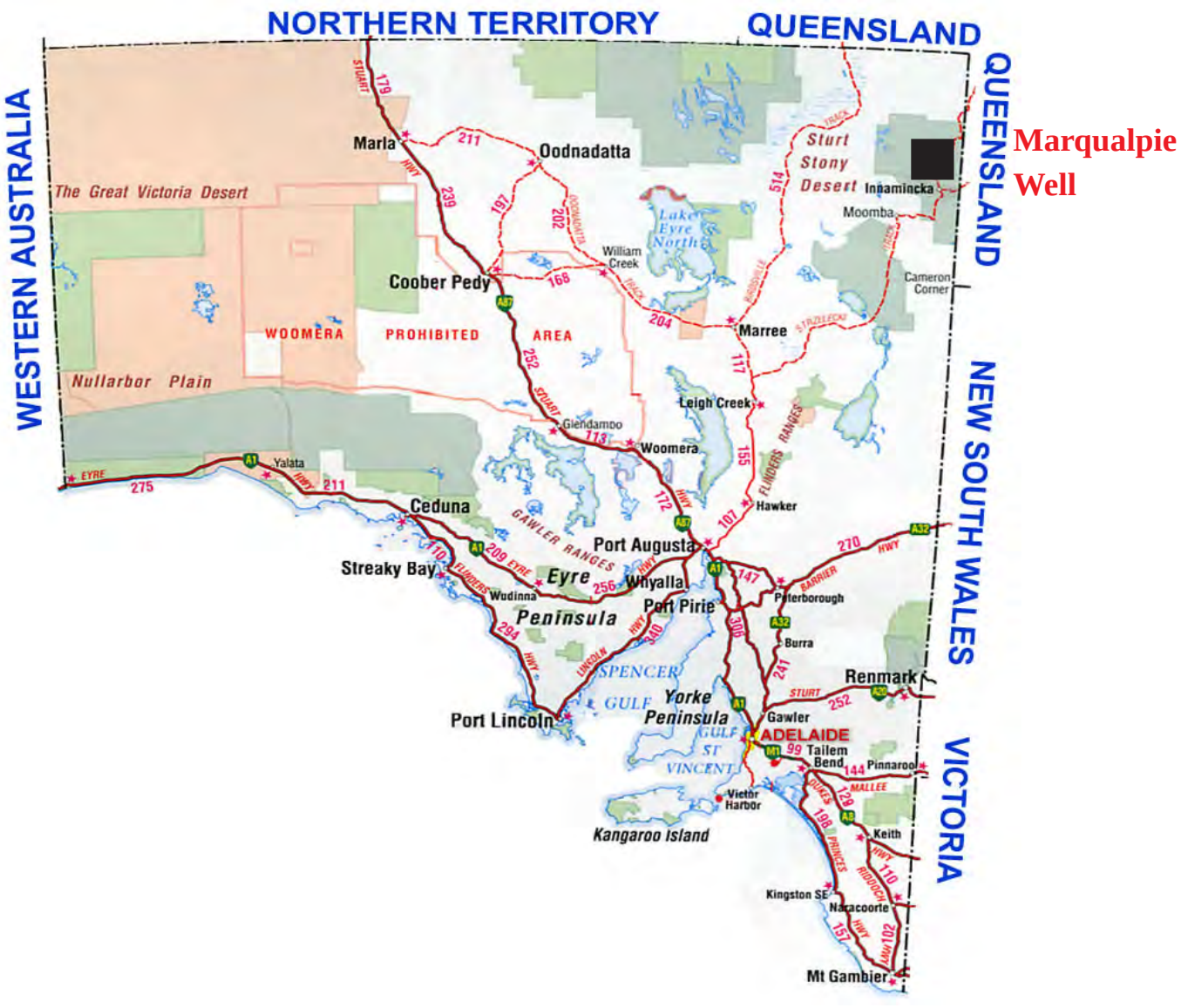
Conrad Denyer

The outdoor classroom represents a wonderful resource for teachers who wish to present a vibrant and informative science program for their students. In seeking to stimulate students, teachers simply need to step out of the classroom to find a multitude of activities that will engage students in science. Engaging all the senses will increase the value of the experience for students. These experiences can then be used to illuminate the theoretical and practical lessons in the science classroom and compliment the science curriculum.

The experiences may be as simple as examining the fauna and flora of the playground, visiting a local creek or wetland, a visit to a zoo or national park or a fully blown scientific expedition as detailed in this report. They may involve individual student projects, joint or class survey work, or teacher focussed development.

Science is a dynamic and exciting part of the school curriculum that has suffered from stereotypes which are sometimes negative. In developing an approach with a content rich in experiences away from the classroom the teacher is attempting to break these notions of test tubes and lab coats as the basis of the science curriculum and replacing them with streams, nests, trees, ecosystems, insects and the weather in situ.

To this end it is important that teachers experience, on a regular basis, the effect of being in a science rich outdoor environments where they can establish and refine their understanding of the value of outdoor science education. This expedition was an opportunity for me to visit an area of desert I had not previously seen and examine the fauna, flora and weather while considering the benefits and new ideas I could take back into the classroom.



This report details my trip with the Scientific Expedition Group (SEG) to the Strezlecki Desert to examine the biodiversity of an isolated and harsh environment in north-eastern South Australia. It was conducted in September 2008.

Marqualpie Well is situated in the Innaminka Regional Reserve which is approximately 1200kms north-east of Adelaide in the top north-east corner of South Australia. It is surrounded by the Strezlecki and Sturt Stony Deserts. It is an often hostile and isolated environment which receives an average annual rainfall of 172mm per annum.

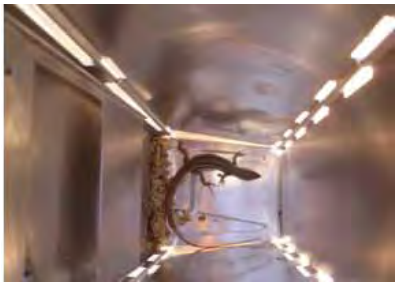
The reserve covers approximately 1.3 million hectares which include sand dunes, sandy planes, gibber rises and wetlands. It is an ideal area for a biodiversity study where little work of this type has been attempted for some decades

A successful expedition was conducted by the SEG to the Innaminka Regional Reserve during September 2008. Over 35 scientists and volunteers, including teachers and students, set off from the Botanic Gardens, Adelaide on Saturday 13 September for the 2 day trek up to the base camp near Marqualpie Well.

After a stopover at the shearers quarters at Mt. Lyndhurst Station and a meal at the Lyndhurst pub the expedition proceeded up the Strezlecki Track to Innaminka. The expedition arrived at base camp, 80 km north of Innaminka, on the afternoon of Sunday 14 September and began to set up camp.

The following Monday morning a routine was quickly established as the camp got organised for a two week stay in the Strezlecki Desert. Rosters were established for allocating jobs, toilets were dug, science equipment was prepared and expeditioners set up their "digs". The primary focus of the science was to assist the state Department of Environment and Heritage biodiversity survey of the area. Two other teams from the Department were in the field at the same time as the SEG team. SEG established 16 survey sites over 2 regions, representing a variety of landforms. Each site comprised of 2 pit fall trap lines. Also a series of Elliot traps ran parallel to the trap line and cage traps were positioned at each end. Bait was used in the Elliots - consisting of a mixture of peanut butter and rolled oats. There were also a set of micro pits established at every site to collect insect specimens.

Pit trap in sand



Reptile in Elloit trap

There were daily botanical and bird surveys and bat traps were established on a number of sites. Initial efforts went into the deployment of the trap lines at sites that had been identified as part of some reconnoitring.

Setting bat trap over water

The science specialists on the trip included Nick Birks (Birds and Spiders), Annette Vincent (Ants), Brian Blaycock (Birds), Jarrod Eaton (Reptiles) and Lorraine Jensen (Mammals and Bats). Each one of these experts provided insight and knowledge about the biodiversity of the region being explored to those students who had travelled with the group.

Setting up Micro pits for ants

At the completion of each days work the scientists got stuck into the analysis of all the specimens collected during the 2 visits to each trap each day.

This area is of some historical significance as it was traversed by Robert O'Hara Bourke and William John Wills on their ill fated expedition of 1860-61. Both Bourke and Wills died around the Innaminka area while travelling through the summer of 1861 on their way back from the Gulf of Carpenteria.

Annette Vincent examines ants in Science tent

Some group members spent a day traversing the track around Innaminka designed to cater for those people interested in retracing some of the early European exploration of the area. This included King's Lookout, Wills's grave site, Bourke's gravesite, Cooper Creek and the Dig Tree.

The major scientific outcomes of the trip included confirmation of range increase for some mammals and reptiles and identification of 5 separate species of bat.

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BIOGRAPHY and CONTACT

I have been a teacher for the last decade and have taught in primary schools in Australia and the UK. As a specialist in Early Childhood Studies my focus has been on teaching children in the time before they start school and their first years of school. Science is a subject area that has greatly interested me and has been a focus of the curriculums I have developed over the years. One area that stands out in science teaching is the impact of the outdoor classroom in effectively communicating science topics and themes in a manner that students really enjoy. Expeditions like this one allow me to grow professionally and develop new ideas about how to teach science.

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Plants and Animals near Arkaroola

Michelle Trethewey

Arkaroola is a private nature reserve in the Flinders Ranges of South Australia. Covering over 587.9 square kilometres the reserve is located in a semi-arid region about 600 km north of Adelaide. The dramatic landscapes of the Flinders ranges are home to a wide range of plants, animals and birds. I have gathered a small amount of information on what we are likely to see on the next expedition, so that we can hone up before we go. Some of the information is gathered "From the Ark" and has been reproduced with permission. More information about Arkaroola can be found at http://www.arkaroola.com.au/documents/ARK_Newsletter_010.pdf

PLANTS

THE IGA ORANGE TREE *(capparis mitchelli)*

The Wild Orange or Iga tree is a small distinctive looking tree, with a dense canopy of dark green shining foliage. Spectacular cream-coloured flowers appear soon after rain, especially during the summer months. As they ripen the large orange-like fruits produce a heavy scent. Despite its name, the Wild Orange is not a member of the citrus family. The leaves of the Wild Orange are eaten by wild goats. The Wild Orange is the preferred larval food plant of the Caper White butterfly *Belonis java*. Small white butterflies are often seen flitting through the canopy.

Iga Orange Flower photograph by Lorraine Edmunds

Iga Orange Tree photograph by Lorraine Edmunds

Iga Orange Fruit photograph by Lorraine Edmunds

PLANTS

QUANDONG *(Santalum acuminatum)*

Not only can its flesh be turned into nice jellies, jams and pies, the Quandong is packed with Vitamin C and a number of valuable minerals. The kernel contains proteins and is rich in oil. The plant itself is not very fussy about different soil conditions and climates, nor about water quality. Quandongs are partial parasites. In order to gain all the nutrients they need they grow sucker-like attachments onto the roots of other plants and simply take what they can get. Quandong trees typically grow 2 to 3 metres in height, with a dense leathery crown of leaves perhaps 2 metres wide.

Quandong Tree photograph by Horst Weber

Quandong Seed photograph by Paul Rogers

Quandong Fruit Photograph by Garry Trethewey

JUMPING CHOLLA *(Cyclindropuntia prolifera)*

Probably introduced to gardens at Arkaroola Village about 35 years ago, Jumping Jolla , pronounced Choy-ar, now occupies a 3 km² area around Arkaroola Village. With no natural cactus-feeding insects to control it, this native of coastal California is fast spreading. Jumping Cholla branchlets are easily dislodged and the long spines attach to fur, feet and walking boots. Rock-wallabies and euros are the main dispersal agents for a highly invasive and particularly nasty plant that has rapidly extended its range. Lorraine Edmunds and Brendan Lay have recently embarked on a comprehensive eradication program.

Jumping Cholla photograph by Brendan Ley

PLANTS

SPIDERY WATTLE *(acacia araneosa)*

The spidery wattle is listed as endangered under the National Parks and Wildlife Act 1972. It only grows in a 20-square-kilometre pocket near the Arkaroola Wilderness Sanctuary and Gammon Ranges National Park. The spidery wattle grows in calcareous soil on hills and ridges associated with Eucalyptus gillii and/or Triodia irritans. It is a open wispy tree believed to be in decline, with grazing by goats and rabbits the main threat to the species. DEH is working in partnership with the Arkaroola Wilderness Sanctuary to control feral goats and rabbits in the area, and to monitor spidery wattle populations

Spidery Wattle photograph by Lorraine Edmunds

ANIMALS

YELLOWFOOT ROCK WALLABIES *(Petrogale xanthopus)*

Rock Wallabies can be seen the length of the Arkaroola Creek system, from Bolla Bollana spring to Arkaroola Springs on the edge of the plains. YFRW are herbivorous animals and browsers rather than grazers, ie they eat shrubs and herbs rather than grasses. May also eat invertebrates such as insects and beetle larvae. They have the ability to drink up to about 11% of their body weight in approximately seven minutes. Deeply granulated soles provide rock-wallabies with the grip they need to move across steep and broken rock faces. They can jump vertically about 2½ times their own height, but achieve much greater heights by 'cannoning' off upright surfaces. Once it lands it opens its short arms and holds them at a right angle to the body until it can balance itself. When the wallaby is disturbed it stands rigidly, and beats its feet once or twice on the ground to warn other wallabies and to show its unease.

Yellow Footed Rock Wallaby photograph by Bob McDougall

STRIPED-FACED DUNNART *(Sminthopsis macroura)*

The striped faced dunnart is pale grey-brown with a distinct head stripe between the ears on top of the snout to the nose. Dunnarts are mainly insectivorous. This dunnart's diet consists mainly of termites. They have an average body length of 155-198 mm, snout to anus distance of 75-98 mm, a tail measuring 80-100 mm. The tail is a little fat at the base but becomes slender at the end. They belong to the same family as the phascogales and planigales.

Striped faced Dunnart photograph by Duncan Mackenzie

FAT TAILED DUNNART *(Sminthopsis crassicaudata)*

The fat-tailed dunnart is a tiny marsupial with large ears and a fat tail. They have a large appetite for grasshoppers, beetles, termites, grubs and lizards and have been known to eat more than their own weight in one night. Fat-tailed dunnarts are nocturnal. They build their nests in holes in the ground among rocks and in the hollows of logs. In a good season the female can have up to 10 young in a litter. As the mother has no real pouch the young spend most of their time in the nest. When they move around, the young cling onto the mother's teats.

Fat Tailed Dunnart photograph by Andrew Barr

BATS

Arkaroola has a diverse array of bat species. Nine species of bats have been recorded on the property. All of Arkaroola's bats are classified as microchiroptera or insectivorous bats. These species are known for their ability to navigate using a series of high-pitched sounds called echolocation. This means that the animal emits sounds and then waits for the echo to rebound off of a target (food). The time the echo takes to get back to the bat allows it to calculate it's exact distance from the intended target. Bats are plentiful at Bolla Bollana Spring.

Ghost Bat Photograph by Duncan Mackenzie

GAMMON RANGES CARPET PYTHON (Morelia spilota)

By far the most difficult to find of the South Australian Carpet forms is the Flinders Ranges Carpet and in particular animals from the Gammon Ranges. They were quite commonly encountered 30 to 40 years ago. Now extremely rare, the large Carpet Python rests in tree hollows or on rock ledges, moving on the ground to hunt at night. Although nocturnal, most will bask during the day, particularly while digesting their prey. Pythons are powerful, non-venomous snakes that subdue their prey by constriction. Mammals are the preferred diet of most pythons.

Carpet Python photograph by Duncan Mackenzie

PAINTED DRAGON *(Ctenophorus pictus)*

During the peak of its breeding season the male displays a vivid array of blues, yellows and reds, while the female is much less colourful. At the end of its reproduction cycle nearly all breeding adults will die. This means that most Painted Dragons will only live for one year but three year life cycles have been recorded. Painted Dragons feed extensively on ants but they also consume some vegetation. The Painted Dragon perches on fallen timber or rocks or in low shrubs and retreats to its burrow when threatened. It can generally be seen as it forages in semi-open areas where it emerges from a short burrow at the base of spinifex clumps or chenopod shrubs.

Painted Dragon Photograph by Heidrun Haffner

BIRDS

YELLOW RUMPED THORNBILL (Acanthiza chrysorrhoa)

This Thornbill usually forages on the ground, often in small flocks. They have an unusual double nest, a rough open cup false nest on top with a true nest chamber beneath. Entry is by a well hidden, narrow funnel-hood. The nest comprising grass and fibres and bound with webs is built in a trees drooping lower foliage or under a raptor's nest.

Yellow Rumped Thornbill photograph by Deane P Lewis (http://dl.id.au/)

RAINBOW BEE-EATER ***(Merops ornatus)***

Rainbow bee-eaters are brilliantly coloured birds that grow to be 7 to 8 inches in length, including the elongated tail feathers. The upper back and wings are green in colour, and the lower back and under-tail covers are bright blue. The undersides of the wings and primary flight feathers are red and tipped with black, and the tail is black to deep violet. The crown of the head, the stomach and breast, and the throat are pale yellowish in colour, and the rainbow bee-eater has a black bib and a black stripe through its red eye. Bee eaters tunnel into flat or slightly sloping ground. The female is the principal excavator.

Rainbow Bee-Eater photograph by Duncan Mackenzie

STRIATED PARDALOTE ***(Pardalotus striatus)***

All birds have white eyebrows with a yellow spot in front of the eye, olive-grey backs and a white stripe in the wing. This Pardalote feeds in the foliage in the tops of trees, although occasionally coming close to the ground in low shrubs. It eats a wide variety of insects and their larvae, which are usually captured by picking them from the surfaces of leaves. The nest is constructed close to the ground, usually in a tree hollow or tunnel, excavated in an earthen bank - small openings in human-made objects are frequently used.

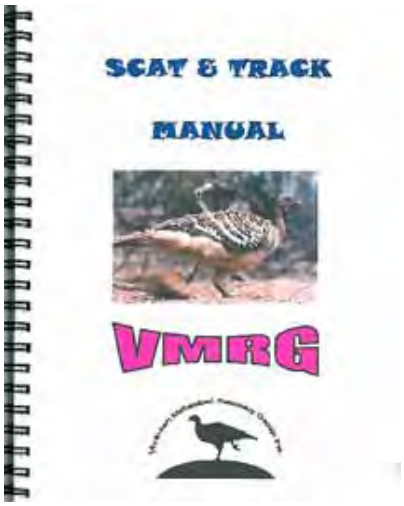
Striated Pardalote photograph by Duncan Mackenzie

RED-BACKED KINGFISHER ***(Todiramphus pyrrhopygia)***

The Red-backed kingfisher hunts from a perch in the open, drops to the ground to take small reptiles, up to mouse sized mammals and large insects. Its nest is a tunnel in an any available earthen bank – the side of a watercourse or inside the shaft of an abandoned mine. It as a black eyestrip, an olive green stripe down its back and all white underparts and collar.

Red-backed Kingfisher photograph by Duncan Mackenzie

Book Review



A group of us from SEG went on a Mallee Fowl monitoring weekend late last year and spotted this book in the leaders kit. Of course we all had to have one, so Bruce Gotch organised the order.

Now that I've had more time to look through the manual there are a lot of things that I like about it, but also a few things that I hadn't really noticed when we were out in the field, having only snatched a brief flick through. An example would be that a few of the tracks photographs taken in sand and in bright light are a bit hard to make out. The book, I believe is an evolving project and has been trialled over a few seasons, with this latest edition printed in 2007. I guess that when there are better photographs collected, the faint ones will be superseded in newer editions.

I didn't really want to review this book in a comparative way to the Tracks, Scats and Other Traces field guide by Barbara Triggs. It is, however, inevitable that people who have the first book would be wanting to know what the differences are and why they would purchase the second book by the VMRG.

First of all, it isn't as comprehensive as Triggs field guide, but it wasn't intended to be. It is written to be useful for mallee fowl work. It focuses on the tracks and scats that could be seen on and closely around a mallee fowl mound site.

The very first thing that I really liked was the layout of the book. The fact that it is a simple guide allows it to be set out in a far more user friendly way than the Tracks, Scats and Other Traces field guide. With Triggs book the index is at the back of the book (which is usual) but is quite complex eg if you look up "Fox" in Triggs book you will find "Fox, Red: distribution *92*; feeding signs 237-8, *237;* feet 69, *69*; gaits 70; lower jaw 290, *291*; scats *94*, 172, *173;* shelters *231*, 237; skull 264, *265*; tracks 71, *71" (where italics are the pictures).* In the VMRG Scat and Track Manual there is no index, just a Table of Contents at the front of the book which is produced as a table with three headings at the top titled Tracks, Scats, Photos. To look up "Fox", you simply find "Fox" on the left hand side of the table and read across. So "Fox" reads across the table as tracks p13, scats p37 and photos p54. Very simple as a quick check on a Mallee Fowl walk. The depth of content in Index vs Table of Contents highlights the fact that they are field guides for specific users offering different levels of information.

The first three sections of the book contain useful comments and information about size of the track or scat. These comments are done in a nice and simple text box. I liked the scats part of the book the best because I didn't have to get on the floor and pretend to be a fox or cat walking, bounding or running just to be sure that I agreed with the pictures. (Could be boy thing / girl thing just like turning the map around in the direction you are walking). Scats photograph better as they aren't damaged or removed as quickly and easily as tracks, so there are some good photographs in the manual. That said, a poo can look so different from the same animal depending on how much they have been drinking, what they have been eating etc so I don't think that a scat is necessarily always an easy thing to pick, but there are some useful tips in this book.

Overall I am pleased to have have purchased this manual and I am glad that I also have Triggs field guide. The manual cost $27.50 which included postage and can be ordered through Ralph Patford of the Victorian Mallee Fowl Recovery Group (r_patford@hotmail.com) and further information about Mallee Fowl can be found on the VMRG website at (http://home.vicnet.net.au/~vmrg/).

Michelle Trethewey

Radio Tracking in Billiatt

Project background: There are three major habitat types in the mallee of the South Australian Murray darling Basin: large dunes, smaller dunes, and the flat 'swales' between these dunes. Each habitat type has its own characteristic bird guild. Surveys indicate that the small dune birds (e.g. Mallee Emu-wrens) are extinct in mallee fragments, whereas the swale birds are relatively stable, and the birds of the dune tops are declining. Scrub robins belong to the dune-top guild. They have been isolated as the species with the most specialized habitat requirements, and therefore the species most likely to 'drop out of' the system next. This PhD project aims to determine ecological information on their ideal habitat in order to inform revegetation and habitat restoration programs planned for the region. Currently over four-fifths of all mallee habitat has been removed. The information collected from tracking birds with radio transmitters and GPS coordinates will determine habitat 'hotspots' (high use areas) which typically contain the preferred habitat. Applicants should have a reasonable level of fitness, love the bush and have a desire to do something positive for declining fauna!

- **When**: March-November 2009. Exact dates to be finalised, depending on weather.
- **Duration:** 1 week or more
- **Accommodation:** Camping (equipment provided)
- **Food:** Provided
- **Transport from and to Adelaide:** Provided
- **Registers of interest contact:**
  Andrew Barker andrew.j.barker@adelaide.edu.au (08) 83037269

Volunteers are required to help with radio tracking Southern Scrub-robins in Billiatt Conservation Park (above). At 592.56 km ^{2}, Billiatt is one of SA's largest expanses of pristine mallee habitat.

Coming Events

Gammon Ranges Scientific Project (GRaSP) is 21 this year and to celebrate SEG is calling for

Expression of Interest for the

Crossing the Gammons Walk

Following the approx. route by C. Warren Bonython AO from Mt. Serle to Arkroola in 1968

Departing Adelaide 22nd September and returning 3rd October

This trip is for experienced walkers only. Applicants will need to be self sufficient in long distant walking. Costs yet to be determined – but up to $200.00

If you are interested and require more information please contact

Graeme Oats 8278 3179 or
Email gdoats@bigpond.net.au

WHAT LIVES IN THE MINNAWARA SCRUB?

Want something interesting to do in the school holidays? See how bush grows again after the sheep and cows are fenced out? Help trap and weigh bush rats? Sort out the skinks? Record bats? Catch insects? Identify plants in the scrub? See what birds are around? See kangaroos and echidnas? Then try the Biodiversity Survey held at "Minnawarra", near Myponga each Autumn and Spring. Come to the Autumn survey of Heritage Scrub at "Minnawarra" near Myponga. Join other volunteers in this expedition, which is happening right at the end of the school holidays - an interesting short break for the family. Traps are opened on **Wednesday 22nd April 2009**. The first round of the traps to check on animal captures is on **Wednesday night**. The survey continues through to Sunday **26th April** when the traps are closed. Traps are checked each morning and afternoon, and birds and bats counted at other times. Check the dates now! Come for one to four days, or come up daily. Accommodation is camping near a large weatherproof shed with electricity, cooking facilities, barbeque, refrigerator and oil heater. Bring your own food and camping gear. Toilet facilities are at nearby farmhouse. Registration is now compulsory to cover insurance. The cost is a small donation to SEG to help cover costs (suggested $10 per adult, children $5). So – pack your sleeping bag, food, tent, car or caravan and head this way. Further information and registration from

Janet: 8379 8907; mobile: 0419 842 667; email: furlers@optusnet.com.au

SEGments

SCIENTIFIC EXPEDITION GROUP

The Scientific Expedition Group (SEG) came into being at a public meeting on 21st August 1984. Members receive regular information on SEG activities and expeditions. Membership is open to any persons, family or organisation interested in the following aims:

* The promotion and running of expeditions of a scientific, cultural and adventurous nature.

* The furthering of knowledge, understanding and appreciation of the natural environment.

* Promotion of the values and philosophy of wilderness.

* Enabling people to learn the skills required for planning and running expeditions, and to develop sound field techniques.

APPLICATION FOR MEMBERSHIP AND MEMBERSHIP RENEWAL

SUBSCRIPTIONS

Adult member - - - - - - - - - - - - - - - - - $25.00

Concession cards/ unemployed - - - - - -$12.00

Family membership - - - - - - - - - - - - - $30.00

Organisation membership - - - - - - - - - $30.00

Name. . . . . .

Address . . . . . .

. . . . . .

Telephone (H) . . . . . (W) . . . . . .

E-mail . . . . . .

Details of scientific, cultural, and adventuring or other relevant skill or interests you may be prepared to share

with the group:

. . . . . .

Send a cheque (Scientific Expedition Group Inc.) with a Photocopy of this page to

The Secretary

Scientific Expedition Group Inc.

P.O. Box 501

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