THE BRODIE CLUB

ROYAL ONTARIO MUSEUM OF ZOOLOGY

THE 1,045th MEETING OF THE BRODIE CLUB

The 1,045th meeting of the Brodie Club was held at 7:30 pm on Tuesday, February 15, 2011 in Room 432 of the Ramsay Wright Laboratories of the University of Toronto.

Chair: Mary Boswell
Secretary: Rosemary Addison

The meeting was attended by 28: 25 members and 3 guests.

Roll Call:

Present: E. Addison, R. Addison, Bertin, Bodsworth, Boswell, Currie, Curry, Dunn, Eadie, A. Falls, B. Falls, D. Hussell, J. Hussell, Iron, A. Juhola, H. Juhola, Larsen, Lumsden, Machin, McAndrews, Pittaway, Reading, Slessor, Tasker, Tomlinson.

Regrets: Abraham, J. Bendell, Y. Bendell, Bousfield, Crins, Gray, Norm Martin, Norma Martin, J. Rising, T. Rising, Seymour, Strickland, Sutherland

Guests: Peggy Haist, guest of Oliver Bertin,
Sharon Hick, guest of Jock McAndrews, and
Eric Davies, U of T graduate student, guest of Hugh Currie.

Minutes:

There were no changes or amendments to the January minutes.

Announcements and New Business:

- B. Falls announced that the speaker for the March meeting will be John Fryxell, Department of Integrative Biology, University of Guelph. His topic is Studies in Serengeti National Park (Tanzania): Big Game Ecosystem.
- Jock McAndrews recalled that about 20 years ago the BRODIE Club had a picnic at Crawford Lake on the Niagara Escarpment. Some of Jock's recent research on core samples from the lake has been published as "*Fungal spores record Iroquoian and Canadian agriculture in the 2nd millennium A. D. of Crawford Lake, Ontario, Canada* in Beget Hist Archaeobot Feb. 2010. Jock distributed copies to club members. It is published on line at http://labs.eeb.utoronto.ca/mcandrews/PDFs/Crawford%20fungal%20spores.pdf
- Jean Iron reported that the Outing Committee organizing the annual Field Trip and Picnic, is proposing a departure from the traditional June date to Saturday, **Sept. 10, 2011**. A morning hike at the Torrance Barrens on Saturday and a half-day outing to

nearby Hardy Lake on Sunday will be led by George Bryant. The Bryants invite all members to dinner at their cottage on Pine Lake. Risings have some space for overnight accommodation. The Barrens have been designated as a Dark Sky Reserve and there may be opportunity for night sky viewing. The September meeting would remain as the traditional members' night. Motion moved by Larsen, seconded by Dunn and approved enthusiastically.

The committee hopes that this will be an exciting adventure and that by giving lots of advance notice there will be a good turn out. Suggestions for hotels, motels and campgrounds for those wanting to stay over will follow in May and June.

SPEAKER

The speaker was BRODIE Club member Ed Addison. When Ed spoke to the BRODIE at meeting 1028 in March 2009, about the Landforms and Fauna of Australia he concluded "*The Stirling Range is one of the richest areas for flora in the world with representatives of 90 families, 384 genera and more than 1500 plant species, 87 of which are found nowhere else in the world. This list includes more species of wildflowers than in the entire British Isles. All of West Australia, but particularly The Stirlings, is definitely a pot of gold at the end of the rainbow and a subject worthy of future discussion."*

This talk, by Ed, a parasitologist, is that discussion and is titled…

Unique and Diverse Flora
The Antithesis in the Antipodes

There are more than 5500 plant species in West Australia. Of those, over eighty percent are endemic, found nowhere else in the world. One of the world's 30 identified Biodiversity hotspots (defined as an area of 1500 plus species of vascular plants with 70% habitat loss) is in SW Australia. That diversity and impacts on it were the focus of the talk.

Factors contributing to Species Richness

1. Old: West Australia [WA] is Precambrian like our own shield and has been above the sea for a long time.
2. Continuous separation: Antarctica and Australia separated from the rest of Gondwana about 220 million years ago. Australia and Antarctica separated from one another about 45 million years ago.
3. Ecological and geographical isolation: West Australia is isolated by deserts on the north and east and by ocean on the west and south. Perth is 2700 km from the nearest large city, Adelaide.
4. Relatively stable climates: In Ontario our winter temperatures are below freezing for a period of time; in Perth, WA the winter temperature range is 8 to18C. Snow is only occasionally seen at one location in WA. This creates an extended growing season resulting in greater growth/year as compared to Ontario
5. No glaciers or volcanoes: Soils are impoverished as they have not been replenished via mineralization of rock to soil by glaciers and by ash from volcanoes.
6. Arid: There are long periods of very dry weather both at seasonal and geological time scales. Twenty-five million years ago there was an extended period of strong winds and cold weather. One million years ago the drying intensified and the forest

areas became greatly reduced by desertification. The most recent 25,000 years has been a period of yet further drying and desertification.

Photos of several species of vascular plants growing and flowering profusely in obviously arid sites illustrated adaptation to the unique set of conditions in WA. In the *Verticordia sp.* illustrated, flowers change from yellow to red very quickly following pollination. It is thought this colour change assists the pollinators in identifying which flowers have been pollinated. With the perfusion of bloom in this and many other vascular plants in WA, this could be an important adaptive strategy in getting the pollinators to visit and pollinate more flowers.

Verticordia sp. on bank of Murchison River

Red centres indicate pollination has occurred

Unique Floral Structures

Mangle's Kangaroo Paw is the floral emblem of WA. There are eleven species and several subspecies of kangaroo paws in Australia.

The plant grows from short, underground, horizontal rhizomes that vary among the species: some are fleshy, others are fragile. The sap in the root system allows the plants to survive extreme dry spells. In summer, a number of species die back to the rhizome, growing back in autumn. The rhizomes are also resistant to some fires and above ground parts can sprout from surviving rhizomes.

Anigozanthos manglesii

Flowers have little or no fragrance. All species of kangaroo paws are pollinated by birds, hence the particularly sturdy stem. It is suspected that mammals may also play a role as pollinators and some of the smaller species can be pollinated by honey bees.

Lechenaultia macrantha, the Wreath flower, has a restricted range. It grows from a central root and flowers on the ends of the stems. The arid site with impoverished soils beside a road was noted.

Lechenaultia macrantha

Grass trees, *Xanthorrhoea spp.,* are quintessential plants of southwest WA. There are 24 species. A young grass tree looks much like a clump of grass. Plants grow slowly, perhaps 1 m/100 years. Some plants may be 600 years old. The 'trunk' of a mature grass tree is hollow and the walls are comprised of the dead bases of leaves from prior seasons. Aerial roots run through the 'trunk' to transport nutrients and water up to the living leaves.

Xanthorrhoea sp.

A mature grass tree can flower every two years if stimulated by fire, but more routinely, flowers approximately every seventh year. The nectar of the flowers is collected by marsupials and birds. The Green Carpenter Bee, *Xylocopa sp.,* bores nest holes in the dry seed head.
The aboriginals made use of the plant as well: the scape was used as a "compass flower" because the flowers open on the cooler south side later than on the north (similar to using moss on the North side of a tree trunk to give direction here). The hard dry scape was used as a spear handle for fishing. Resin, found at the base of the leaves within the 'trunk', was used to attach spear heads to the scapes and also patch water vessels (similar to the use of spruce gum here).

Diversity within Taxa
Half of the species of ***Drosera*** in the world are found in WA. Among the 46 WA species is structural variation from the prostrate Plate Drosera to sturdy stemmed species to others which are vinelike.

Photos were shown of flowers of *Adenanthos, Isopogon, Grevillea, Dryandra, Petrophile, Conospermum and Banksia*, all genera within the family **Proteaceae**. It was hard to imagine such diverse flower structures being from species within the same family, hence Linnaeus' choice of family name. Proteus was a Greek sea god who could change his shape at will.
Species of *Grevillea* are almost totally restricted to Australia with a few species found in Malaysia. Perhaps as Australia continues its long drift north away from Antarctica and towards the islands to the N, there will be increased sharing of flora and fauna. The most commonly shared taxa at present are some birds and some bats.
Species of Proteaceae are known from Australia, Africa and southern South America. They are evidence of the continents having been connected and also of this family of plants being perhaps hundreds of millions years old. Ed speculated about the possibility of seeds of Proteacids being present beneath the Antarctic icecap.

Banksia coccinea

The genus ***Banksia***, was named in honour of Joseph Banks' contributions to botany. Joseph Banks collected some species of *Banksia* while accompanying Captain James Cook on his 1770 exploration of eastern Australia.
While some banksias are prostrate and others small trees, the majority are shrub-like. All but one of the living *Banksia* species are endemic to Australia. Over 90% of all *Banksia* species occur only in WA. *Banksia* spp. are easily recognized by their characteristic flower spikes (inflorescences) and fruiting "cones". A single inflorescence contains hundreds or even thousands of flowers; the most recorded is around 6000 flowers on inflorescences of *B. grandis*. The pollen is located on the ends of "pollen presenters" and is an important food source for a diversity of

nectariferous animals, including birds, bats, rats, possums, stingless bees and a host of invertebrates. The Australian aborigines used the flower nectar as part of their diet.
Banskia spp. are well suited to surviving fire and bounce back quickly because they have lignotubers at or below ground level that provide energy for post-fire regeneration. Fire is required to open the seeds although some birds can crack their way in.

Diversity Within Sites
As an example of diversity within sites, Ed showed pictures of several orchids all a part of the flora in an "**urban woodlot**" comprising perhaps an acre. There are approximately 300 species of orchids in WA, and all but one are terrestrial. Only one species retains its leaf or leaves throughout the year. They are generally less than 30 cm. in height and are often seen in groups as they multiply by underground tubers. Most are pollinated by insects. Approximately thirty percent of WA orchid species practice sexual deception [structure and/or pheromone mimicry] to attract pollinators.




The greatest density of plant species in WA is found within **Lesueur National Park** with up to 80 species per 10 sq m area. Lesueur is N of Perth, near the west coast and contains an 18 km long one way road. Over time, wind and weather have worn away softer rock, leaving the areas with harder tops like genetic islands, isolated from each other. Sixty percent of the species on top of Mount Lesueur are not on the next hill 1.5 km away.

Stirling Range National Park is 65 km long with an area of 115,000 hectares. 1500 plant species grow in the Stirlings, and of those, 87 are found only there. The "Stirlings" rose about 100 million years ago when less resistant rock and soil eroded away leaving the harder areas as mountain peaks. The highest peak is Bluff Knoll at 1095 m about sea level and the only location in WA that occasionally receives a dusting of snow. Some species of plants have highly restricted ranges, at times a single mountain peak with related species evolving on other peaks. The mountain bells, *Darwinia* spp. being an example within the Stirlings with their ranges being almost exclusively above 300 m above sea level.

Trees and Human-Flora Interaction
The large hardwoods of SW Australia have been sought as furniture wood and for the building industry.
Red tingles (*Eucalyptus jacksonii*) are long-lived (400-500 years) hardwoods growing up to 4 1/2 m in diameter and 70 m in height. They have a buttressed base and a shallow wide root system in contrast to most WA eucalypts. The wide shallow root system was able to evolve due to a consistent and highly localized area of wet climate over millions of years. The range of the red and yellow tingles is now no more than 6000 ha and is restricted to two river valleys within the Mediterranean climate of the SW coast. It rains approximately half of the days of the year in this focused microclimate. The range of the tingles is

diminishing with climate change. Most other species of *Eucalyptus* trees in WA have extensive tap roots as an adaptation to their arid ecosites and frequency of fires.
The Karri (*Eucalyptus diversicolor)* is the tallest hardwood and third tallest tree in the world (up to 90 m). 'Diversicolor' refers to the differing colours on the top and underside of the leaves. Karri flowers are fertilized by purple-crowned lorikeets and it takes 2000 flowers to result in a single successful seedling. Karri shed their complete bark every two years, contributing to the 3-4 tonnes/ha/yr of biomass in a karri forest. The resulting deep duff layer is perhaps one reason for forest fires being so extensive. In the late 1800s, karri timbers were being exported to Britain where they were used as below ground bases for roads still in use today.
Jarrah trees, *Eucalyptus marginata,* have very long lignotuber tap roots (up to 40 m deep) which allows them to live in very dry areas and regenerate rapidly after fire. In the 1800s jarrah, like karri, was exported to England and used for road and bridge construction. Today jarrah is most prized for the colour of its wood. It is similar in appearance to Honduran mahogany. Over 90% of jarrah forests from the 19th century are gone. In 2001, pressure from the "greenies" brought about a change in harvest and use of jarrah, karri and other eucalypt species sought after for timber. There has been a reduction from 100 sawmills to 10 in SW WA and all timber must be used to make specific products [e.g. furniture] before qualifying for export. The tale of the karri and jarrah and export of their timbers seems similar to the history of white pine lumbering in Ontario.

In addition to lumbering as a stressor of flora in WA, *Phytophthora cinnamomi*, a soil inhabiting fungal-like pathogen is killing many species of plants. It is estimated that about 2300 of the approximately 5700 species of native plants in WA are susceptible to *Phytophthora*. *Phytophthora* is spread readily on tires, soles of shoes, etc. Many of the Stirling Range peaks are infected, probably by spores on the boots of hikers. Access is denied to uninfected areas in the Stirlings. The majority of SW Australia is infected.

Many species of *Gastrolobium* accumulate monofluoroacetic acid which kills non-native mammals but is tolerated by native mammals. The distribution of stock framing in WA is limited by the range of G*astrolobium* spp.. The Stirlings have an abundance of G*astrolobium* and that is one reason parts of the current Stirling National Park had not been cultivated. A commercial bait based on monofluoroacetic acid and known as 1080, is used to kill exotic wildlife e.g. cats, foxes.

Ed concluded with a quote by Tim Flannery, an Australian environmentalist:

"It's one of nature's great paradoxes,
that the poorest ground supports the greatest bio-diversity"

QUESTIONS:

Q. K. Reading: Were the ovoid features on the satellite map ponds?.... I'm thinking about fairy shrimps.

A. Yes, Bluff Knoll is on that edge of the Stirling Range. The mountains catch more precipitation and create a unique climate. Water will run off the slopes.

Q. R.Dunn: The definition of a Diversity Hotspot was 70% of the species lost… can you not have a diversity hotspot if not that much lost?

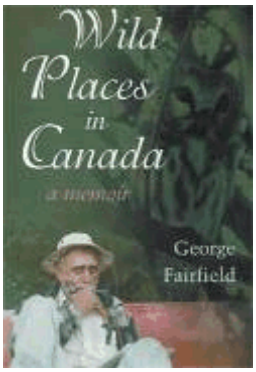
A. Apparently not. Conservation International and the UN are funding much of the work. The purpose of biodiversity hotspots is not simply to identify regions that are of high biodiversity value, but to prioritize conservation spending.
Q. B.Falls: In the aerial photograph there is a striking demarcation of the Stirlings which appear to be unfarmed and the surrounding farming area.
A. Yes, the area of the Stirlings was made a park in 1913 and is very much undisturbed. The slopes were covered with a lot of *Gastrolobium*, which made it unsuitable for farming. The surrounding area has many vinyards and sheep farms.
Q. B. Falls: When in Australia many years ago I got the impression that the climate has become drier. It was quite tropical at one time and as it has dried up relics are in SW Australia with counterparts in SE Australia. I wonder how much that has had to do with the development of endemic flora.
A. It must have changed a lot. And as it continues to change some plants may not be there as is the case in the great Nullarbor desert in South central Australia.
Q. *D. Tomlinson: The roadsides seem so "pure"... what about alien plants?*
A. I did not get into exotics. There are some. The well named Patterson's Curse is an example in farm country, but generally, the flora along the roads are endemic species.
Q. *R. Tasker: Is the Jack pine "banksia" named after the same Banks?*
A. Yes, I think so.
Q. *S.Eadie; In South Africa the Fynbos is a completely separate kingdom… are they as different on the tree of life?*
A. The Fynbos has a much greater diversity than W. Australia. A brother has photographed proteaceids in Africa and South America as counterparts to the Australian plants which suggests this is a very old family.
S.Eadie: I thought Proteacea were Fynbos.. D.Tomlinson… same family
Q. *O. Bertin: Are rabbits a problem in S.W. Australia?*
A. Twelve rabbits were brought in by a British sportsman who wanted to hunt. The rabbit proof fence was built in the early 1900s to stop rabbits from moving into WA. I don't know the extent of the rabbit problem in WA.
Q. *S. Eadie…don't they shoot every house sparrow?*
A. I don't know. The locals are certainly less tolerant of exotics than appears the case here.
Q. A. Falls: What time of year were you there?
A. Last week of September through the middle of October- their Spring following a wet winter which resulted in a good amount of bloom.

Jean Iron thanked Ed on behalf of the club for his excellent photos and interesting presentation.

NOTES & OBSERVATIONS

Ken Reading noted the first-ever sighting of a Barred Owl at his Thornhill property today.
Jock McAndrews commented that the greatest diversity observed (i.e. number of species/ unit area) was on the chalk grasslands in England where 50 species were identified in one sq.m. *Bruce Falls* added that it takes rabbits to keep it that way. The rabbits keep the faster growing species from overshadowing the slower growing plants.
David Hussel drove from Simcoe to Port Rowan on Friday, February 11, and noted lots of Horned Larks along the road. These returning migrants are a first sign of Spring.

Ellie Larsen had a Brown Creeper a few weeks ago. *Ricky Dunn* said there has been one at their Simcoe property all winter. *Sandra Eadie* added there was one on the Christmas bird count.
Helen Juhola reports that House Finches are back in downtown Toronto and are singing. *Mary Boswell* observed about six on the weekend.
David Tomlinson noticed a fox in the garden a couple of weeks ago. A second fox appeared and settled on a butterfly log pile, while the first laid down on the compost heap, and they slept during the day for about two hours. He has only seen one at a time before and wonders if this is a pair looking for new territory.
Hugh Currie was at the Brantford Airport a week ago and observed about 15 Gray Partridge… the first time in three years they have been seen. *Ron Pittaway* added that *Jean Iron* looked, unsuccessfully, for them for three hours today.
Ron Pittaway informed the club of a book of note. It is *Wild Places in Canada* by George Fairfield. George is a long-time naturalist and birder in Toronto, on Pelee Island and in Haliburton County. He worked for Ontario Hydro and did a lot of canoe tripping in Northern Ontario taking water levels before dams were built.
The book contains records of observations, back to 1940 and his photos which go back to his boyhood.



Wild Places in Canada ISBN # 9781926962023 is published by General Store Publishing House, 499 O'Brien Rd., Box 415, Renfrew, ON, K7V 4A6. Phone 613-432-7697 email orders@gsph.com

CORRESPONDENCE

By Email Tue, Feb 15, 2011 at 6:48 PM
Dear Brodie Club members:.
I regret not being able to attend Brodie Club meetings this winter and spring since present commitments will keep me in Ottawa for the balance of the year. I expect to renew membership in the Brodie Club in September, and hopefully be able to return to the Toronto region by December of this year.
With best wishes to all,

Ed Bousfield elbousf@rogers.com

February 10/11
Dear Brodie Club,
It gives us the greatest reward to receive news and lectures.
We would like to attend meetings sometimes, but Bernard is very frail. He will be 95 in June. He tries to keep up and enjoys news and Email letters, TV news, documentaries etc. and still a great reader (at the moment, The Life of Thesiger). He climbs the stairs 20-30 times daily until warm weather when he expects to walk again.
The merlins in the village successfully reared 3 young. A pair of ravens has moved nearby. The bald eagles and great blackbacks are here for the winter – come and go.

Greetings to all, Claire Muller… saw 2 robins Feb. 8

The meeting was adjourned at 9:15 PM

NEXT MEETING

The next meeting will be held Tuesday, March 15 at 7:30 pm in Room 432 of the Ramsay Wright Zoological Laboratories. **John Fryxell**, of the Department of Integrative Biology, University of Guelph will speak on **Studies in Serengeti National Park (Tanzania); Big Game Ecosystem.**

2011 Brodie Club Outing

Torrance Barrens

Muskoka

Saturday/Sunday
10 and 11 September 2011

Meet Saturday at 10:30 a.m.

Torrance Barrens Conservation Reserve Parking lot
~8 km southwest of Torrance on Muskoka Road 13

Leader: George Bryant

Torrance Barrens are spectacular in fall with lots of colour and no bugs. Expect to see asters, goldenrods, shrubs and Atlantic Coastal plants. Butterflies, dragonflies, mammals, herptiles and birds will all still be evident. There are several trails, walking is easy — one does not have to walk far to see lots. Bring lunch and wear hiking boots.

Dinner Hosts

George and Stephanie Bryant invite all to dinner at their cottage on nearby Pine Lake

After Dinner Star Gazing

George and Stephanie's cottage is close to Torrance Barrens Dark Sky Reserve

Overnight Accommodations

Trudy and Jim Rising can accommodate several people at their cottage

Hotels and Motels in Gravenhurst

Sunday

George Bryant will lead a half day outing to nearby Hardy Lake (a "reserve" provincial park). We will take an excellent 2 km trail with interesting views and entirely different flora and fauna.

Getting there

Gravenhurst is ~150 km (1 ½ hrs) from junction of Hwy 400 and 401; Torrance Barrens parking lot ~25 km (1/2 hr) from Gravenhurst