

THE
BRODIE
CLUB



ROYAL ONTARIO
MUSEUM OF ZOOLOGY

THE 962nd MEETING OF THE BRODIE CLUB

The 962nd meeting of the Brodie Club was held on Dec. 11, 2001 in Room 432 of the Ramsay Wright Zoological Laboratories at the University of Toronto.

Chairman: John Speakman

Secretary: Sandra Eadie

GUESTS:

25 members and eight guests

Anne Fowle and Isabel Boardman, guests of Bernard and Claire Muller

Rosemary Addison, guest of Ed Addison

Stephanie Bryant, Peter and Frances Money, guests of George Bryant

Chester Gyski, guest of Sandra Eadie

Eleonora Bertin, mother of Oliver Bertin and wife of late member Leonard Bertin

SPEAKER:

George Bryant introduced Dr. Peter Money, a geologist by training, whose recent passion and mission, together with his wife Frances, has been to see all the world's generally recognized penguin species in their natural habitat. Dr. Money attended McGill, the University of British Columbia and the University of Alberta and is now retired from the government.

Penguins, Petrels, Pinnipeds, Pleurophyllum, Plus

Dr. Money showed slides from his successful quest and spoke about penguins, their predators, their environments, associated species and aspects of their characteristics and behaviour.

The Antarctic convergence, where cold Antarctic waters of the Southern Ocean are overridden by warmer water of other oceans, is the biological boundary of the Antarctic. The Falklands and many New Zealand and Australian islands are in the sub-antarctic, which is the coldest part of the southern temperate zone and the home of most penguin species.

The 17 generally recognized penguin species are divided into six genera. There are four species of banded penguins, six crested, one little blue, one yellow-eyed, three brush-tailed and two large penguins. Only two species, are wholly Antarctic, the Emperor and the Adelie. Another three have colonies both north and well south of the Antarctic

convergence. The King Penguin, has its southernmost colonies just south of the convergence. As a group, penguins are mainly temperate zone birds.

Fossils show that penguins evolved in the southern temperate zone about 45 million years ago from proto-petrels and share common ancestry with such birds as Giant Petrels and Wandering Albatrosses.

The four species of banded penguins are also known as jackass penguins because of their braying calls. Three of the four live in the South American sector. The fourth is the single-banded African Penguin, with an estimated 80,000 pairs. Magellanics, birds of the Falkland islands and the coasts of South America, are the commonest banded penguins, at about 750,000 pairs. The other banded species are Humboldts from the Pacific coast of South America, a one-banded species, and Galapagos Penguins, a two-banded species with ill-defined bands. There are probably no more than a few thousand pairs of each of these two species. Juvenile banded penguins of all species look very much alike. Banded species are average-size penguins except for the Galapagos which is the second smallest penguin after the Little Blue.

Predators on Galapagos Penguins include Sally Lightfoot Crabs on land, eaters of eggs and weak chicks; and Galapagos Sea-lions and Fur Seals at sea. Both of these are eared seals. All eared seals whose ranges overlap those of penguins are predators on penguins at sea.

The main Magellanic colonies are on the Atlantic coast of Patagonia. Here they come ashore on pebble beaches, interspersed with sea cliffs, and go through tussock grasslands to nesting sites up to several kilometres inland. This nesting area is the home of another flightless bird, Darwin's Rhea, and of the Guanaco. Scenery in the Falklands is similar to Patagonia, but the damper climate results in particularly luxuriant tussock grasses. Radiocarbon dating shows the oldest known clumps have about 300-year-old-cores.

Southern right whales are a spectacular marine mammal associated off the Valdes Peninsula of Patagonia with Magellanic, and off South Africa with African Penguins.

Magellanics predators include South American Sea Lions, and, on the Falklands, the endangered Striated Caracara, a penguin-sized hawk, and the Turkey Vulture.

In southern South Africa, Cape of Good Hope is near the centre of African Penguin territory. Here penguin associates include Angulate Tortoises, known to fall into penguin burrows. The antelopes Springbok, and Bontebok and the rare Cape Mountain Zebra are seen in coastal areas within the African Penguin's nesting range. A Cape Gannet colony and an adjacent Cape Cormorant roosting area had African Penguins nearby. A common African Penguin predator is the Cape Fur Seal. Leopards have been known to nearly wipe out mainland colonies.

The six species of crested penguins, plus the Little Blue and Yellow-eyed are essentially Australasian except for the circumpolar Rockhopper and the Macaroni, which occurs only in the American and African sectors.

The Little Blue, or Fairy Penguin, occurs around the coasts of New Zealand and Tasmania and along the southern coast of mainland Australia. This is the smallest penguin at 1 kg. and 42 cm long. The population is probably several hundred thousand. Little Blues nest in burrows in grassy areas.

The Yellow-eyed Penguin, an average-sized species, occurs from New Zealand's south island to the sub-antarctic Auckland and Campbell islands. Estimated at 1,500 pairs, it could be the world's rarest penguin. Yellow-eyed Penguins nest in shaded areas in grasslands or, preferably, in shady coastal forests of Southern Rata.

The Crested is an average-sized species, confined to the Bounty and Antipodes islands southeast of New Zealand. There may be anywhere from 200,000 to 1 million pairs.

The Snares Crested, found only on the Snares Islands, which have a total area just under 3 square km. This species, estimated at 33,000 pairs, can be distinguished from the Fiordland Crested by having a pink area, bare of feathers, at the base of its bill, a feature the Fiordland lacks. There may be as few as 1,000 or as many as 10,000 pairs of Fiordlands, another candidate for the rarest penguin.

Snares and Fiordland Penguins and Rockhoppers are small penguins, about 3½ kg, and 55cm tall. The total Rockhopper population may be about 3 million pairs or much less – there are counting problems and rapid population declines in the Falklands in recent years.

The other two crested penguins are average-sized, orange-crested, red-eyed species. One, the Macaroni is black-throated, the other, the Royal is white-throated or pale gray-throated. The Macaroni is the most abundant species, about 12 million pairs. About 35 to 40% of the world's penguins are Macaronis, and they are widely distributed. They are close to average penguin size, at about 5 kg and 70 cm long, the size of a very small turkey that comes just below your kneecap when it is standing. The Royal, about 850,000 pairs, takes the place of the Macaroni on Macquarie Island, about half-way from Tasmania to Antarctica.

Crested penguins live in a variety of habitats. The Fiordland Crested lives in temperate rainforests, in coastal parts of the New Zealand alps. The closely related Snares Crested builds nests in daisy-tree-olearia-forests on the Snares islands

A sampling of associated species on or near New Zealand's south island includes Silver Gulls, Spotted and Pied Cormorants, and, immediately off shore, Sperm Whales. It also includes beach-foraging Brown Kiwi and Tuatara. Tuatara look superficially like lizards – but are the only living species of sphenodont – their relatives 225 million years ago were contemporaneous with early dinosaurs.

On Campbell Island, about 700 km south of New Zealand's south island, the native, so-called "megaherb" vegetation is making an excellent comeback after removal of introduced sheep. This amazing flora is in large part endemic. It includes anisotome latifolia, a carrot relative, bulbinella rossii, a lily, hebe benthamii, a foxglove relative, gentiana Antarctica, the orchid thelymitra cyanea and the three daisies that constitute the genus pleurophyllum, described as 'representative of an ancient Gondwana flora'. These three species are found only on these sub-antarctic islands.

The brush-tailed species include the Adelie. Although the Adelie is many people's idea of the typical penguin, at about 2.5 million pairs it is only third or fourth in overall abundance; and atypically it is a wholly Antarctic bird. It is superbly cold-adapted – even the edges of its bill are heavily feathered. The Chinstrap, at about 7 ½ million pairs, is the most abundant brushtail. Chinstraps and Adelies are average-sized penguins. Gentoos are the third largest penguin. There are about 300,000 pairs. The highly distinctive white patches over the eyes make the Gentoo recognizable at a considerable distance.

The two large penguins are the King and the Emperor. Money has seen Emperors, a strictly Antarctic bird, only at far binocular range in the wild. This is by far the biggest species, adults are 1.5 metres tall and weigh up to 30 kg. The population is about 200,000 pairs. The King, averaging about 95cm tall, weighs on average about half as much as the Emperor. There are about 1 million pairs of Kings. The King is the most colourful species.

King chicks are born nearly naked and have grayish skin, but are soon covered by brown down. For about 50 years after Kings were first seen, King chicks were thought to be a separate species, the furry brown penguin.

Antarctic environments feature mainly ice, snow, and bare rock, although the Antarctic peninsula has a few areas with vegetation, mainly mosses and lichens. Only about 2% of the land area where Adelies breed is free of ice and snow at mid-summer and much of this consists of steep rock faces. Fold-type mountains dominate the terrain in both the Antarctic peninsula area south of South America and the Ross Sea area south of New Zealand. Cobble or boulder beaches are major landing places and largely control distribution of penguin colonies. The Ross ice shelf in the Ross Sea is about as big as France and about 150 metres thick. There is much sea-ice, even at mid-summer. In some years sea ice, attached to the shore, may not allow Adelies to reach open water close enough to their colony to feed their chicks, and all of the chicks in the colony perish.

South Georgia has endemic bird species, notably the world's only carnivorous pintail, the South Georgia Pintail, and introduced reindeer.

Circumpolar predators on penguins include orcas; Antarctic Fur Seals, and Leopard Seals. Predatory birds are mainly scavengers although most will steal penguin eggs if they can and will attack young chicks or injured adults. They include the Northern Giant Petrel and Southern Giant Petrel. Other predators include Brown Skuas and South Polar

Skuas, Kelp Gulls, and sheathbills. Sheathbills are kleptoparasites – they steal food by distracting adult penguins feeding their young and then eat anything dropped.

Penguins must be insulated for spending months on end in cold water. However, they cannot be too buoyant as they deep dive for food. About 70% of their insulation and excess buoyancy comes from air trapped beneath their incredibly dense overlapping feathers. All penguin species adjust for the excess buoyancy by swallowing small pebbles that amount to 8 to 10% of their body weight. These are used simply as weights, not to grind food. They are regurgitated when on land for any substantial time.

On land penguins can easily overheat. They deal with this by shunting blood to the lightly feathered undersides of their flippers, which turn pink. Some northerly penguins also have featherless patches on their heads which can be flushed with blood, also turning them pink. As birds cool these pink patches shrink. Penguin flippers are modified wings that are sufficiently powerful that penguins can literally fly under water. If in a hurry they can porpoise. No other birds can do this. They may also paddle, like ducks. Penguin beaks are modified according to the main prey species, long and thin for squid, short and broad for krill and other crustaceans, or intermediate for species adapted to mixed diets which may feature much fish as well as krill.

At sea, most species of penguins fish and travel in groups, increasing the chances of finding a school of prey animals when fishing and decreasing the odds any given bird will be eaten. In coming ashore penguins wade if possible, but can and will do nearly vertical leaps to land on their feet up to over a metre above water level.

Going back to sea involves wading or diving in. On shore, penguins generally walk more or less upright but may toboggan if in a hurry and on a suitable surface. Rockhoppers usually hop and they and other species will jump off ledges if this is the fastest route.

Penguins come ashore to moult which they do all at once, unlike most other birds, as they need full insulation when they go to sea. They also come ashore to produce off-spring. Southern species need sites where eggs will not be deeply buried by late snowfalls or end up in ice-water during periods of melting. They do amazing climbs to reach such sites..

Most species nest in colonies sometimes very large. Gentoos usually have smaller colonies, 1,000 pairs or fewer. Gentoos are the only non-migratory southern penguins – consequently their feeding area is comparatively small and generally cannot support large colonies. Some northern species form large colonies but others occur in small, loosely associated groups. The Yellow-eyed Penguin will not even nest in sight of another Yellow-eyed. Crested penguins, especially Rockhoppers are in mixed colonies with such species as Black-browed Albatross and Blue-eyed cormorants.

Many northern species nest in burrows. Many of the crested species prefer rock outcrops or areas of well-drained rocky or tussocky soils. Kings and Emperors do not build nests at all, but carry their single egg on their feet, tucked in brood pouches. Most brush-tailed penguins build pebble nests. The northern Gentoo subspecies prefers to use vegetation for

its nest. Successful male brush-tailed penguins are accomplished thieves, regularly stealing nesting materials from their neighbours and presenting them to mates or potential mates.

Before mating comes courtship, which in most species involves the male pointing its beak skywards and calling in an ecstatic display. Commonly two or more birds compete. Each species has its own variation – crested penguins, for example, display their crests with a lot of side-to-side head shaking. When King Penguins get serious about mating, males do the ‘pencil walk’. By making himself as tall as possible he hopes to attract a female. Birds pair up by doing mutual displays. In most species, pairs continue mutual displays, as part of pair bonding, even after laying eggs.

Mated pairs protect their territory by pecking at intruders. They are generally peaceable outside of their nesting territory, except for the anti-social Yellow-eyed. Much penguin social behaviour is not well understood.

Fifteen of the 17 penguin species lay two eggs; Kings and Emperors lay one. The six crested species never raise two chicks. Members of other genera may raise both chicks, but only under favourable conditions. Male and female penguins take turns brooding eggs, except for Emperors. All penguins feed chicks by regurgitating food.

Fred Bodsworth thanked the speaker.

The meeting was followed by a session of good cheer fuelled by Christmas treats brought by the members and the Mullers’ special Christmas drink.

NEXT MEETING:

The next meeting of the Brodie Club will be at 8 pm on Tuesday, Jan. 15, in Room 432 of the Ramsay Wright Zoological Laboratories. The speaker will be on Sherwin Dresser on How a Little Knowledge of Parasitology can be Harmful to your Health.