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## SUBALPINE HUON PINE NEAR FRENCHMANS CAP

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### Introduction

Huon pine (*Lagarostrobos franklinii* (Hook.f.) Quinn) is perhaps Tasmania's most famous tree species yet until recently its distribution was poorly known and much is yet to be learned about its ecology. Gibson (1986) has recently provided good distributional data and estimated the area of Huon pine habitat at about 2400 ha. His survey, together with those of earlier workers (Pedley *et al.*, 1980, Davies, 1983), showed that Huon pine is, for the most part, a riparian species which occurs at low elevations. However, in a few localities Huon pine can extend up slopes and well away from rivers. The highest elevation stands surveyed (Davies, 1983, Gibson, 1986), were at 680m and within the catchment surrounding Lake Vera. There is paleobotanical evidence that Huon pine may previously have occurred in high elevation areas with cold temperatures (Macphail and Colhoun, 1985). Fossilized pollen of Huon pine was found at Ooze Lake, situated at 880m in the South Coast Range. The pollen was dated *ca* 17,000 years BP, which was during the last glaciation.

This article lists four additional extant Huon pine stands which occur in the vicinity of Frenchmans Cap. One of the stands is particularly noteworthy as it is quite extensive and its upper margin is over 900m in altitude. It contains several subalpine species not previously reported growing in association with Huon pine (Davies, 1983, Jarman *et al.*, 1984, Gibson, 1986).

### The Stands

The four stands were observed from well known bush walking destinations, identification of the Huon pines being considerably assisted by binoculars, and by comparison with distant views of known trees of the species around Lake Vera. The trees were most apparent when viewed at low sun angles.

The locations of the four stands are shown on Map 1 and they are listed in Table 1 along with relevant data.

They are difficult of access but part of the first listed was visited to confirm the presence of Huon pine which can be confused with large specimens of *Diselma archeri* when viewed from a distance.

The Lake Gertrude stand is by far the largest and is mainly situated on a steep south-east facing hillside. The southern portion of the stand occurs on flat areas around the shores of Lakes Gertrude and Cecily. The stand may have a larger extent along the northern shore of Lake Cecily than shown on the map, as the northern shore cannot be seen from Barron Pass. The density of Huon pine trees was low for most of the area—probably less than 10 trees per hectare. The northern end of the stand was visited (grid reference 048 193) and a species list made. Huon pine voucher specimens were taken for lodgement in the Tasmanian Herbarium.

The plant community at the site is best described as implicate rainforest (species and community nomenclature follows Jarman *et al.*, 1984). The dominant trees are *Lagarostrobos franklinii* and *Athrotaxis selaginoides* up to 10m tall and 60cm diameter (although larger trees occur further into the stand). Other canopy species are *Eucryphia lucida*, *Nothofagus cunninghamii* and *Phyllocladus aspleniifolius* although many individuals are shrubs rather than trees. The shrub layer is dense with tangled individuals of *Archeria serpyllifolia*, *Nothofagus gunnii*, *Trochocarpa cunninghamii* and *Trochocarpa gunnii*. Other common shrubs are *Coprosma nitida*, *Diselma archeri*, *Lomatia polymorpha*, *Orites diversifolia*, *Podocarpus lawrencii*, *Richea pandanifolia*, *Richea scoparia*, *Tasmania lanceolata* and *Telopea truncata*. Surprisingly, there was an absence of ferns although mosses and lichens were abundant. These formed a ground cover interspersed with clumps of *Astelia alpina*.

The community is remarkable as it contains species such as *Nothofagus gunnii*, *Diselma archeri* and *Podocarpus lawrencii* which have not been previously reported in Huon pine communities (Gibson, 1986; Jarman *et al.*, 1984; Davies, 1983). The occurrence of *Athrotaxis selaginoides* is unusual but it is known to occur with Huon pine at several localities such as Travellers Creek, Newall Creek, near Teepookana, and the King Billy Range.

Two *Athrotaxis cupressoides* were growing near the recorded community although they did not form part of it. This means that six of the eleven Tasmanian coniferous species were growing in an area with an approximate radius of 100m.

TABLE 1

Stand Name	Grid Reference for Centre of Stand (Franklin, 1:100,000)	Approximate Area (ha)	Highest Elevation (m)	Vantage Point Used to Map
1. Lake Gertrude	048 186	40	920	Barron Pass
2. Pine Knob	060 205	2	600	Daverns Cavern
3. Lake Marilyn	073 175	2	720	Philps Peak
4. Lake Magdalen	035 175	2	840	Clytemnestra

### Discussion

The occurrence of additional Huon pine stands in the Franklin River catchment is not surprising. What is unusual is the high elevation of some of these stands and their occurrence with subalpine species not normally associated with Huon pine. Huon pine has generally been considered a lowland species and it has been assumed that it has a low frost tolerance. The occurrence of higher elevation stands suggests that its frost tolerance may be higher than previously thought. However, much of the Lake Gertrude stand lies in a steep-sided valley with good cold air drainage and would be reasonably sheltered from severe frosts and icy winds.

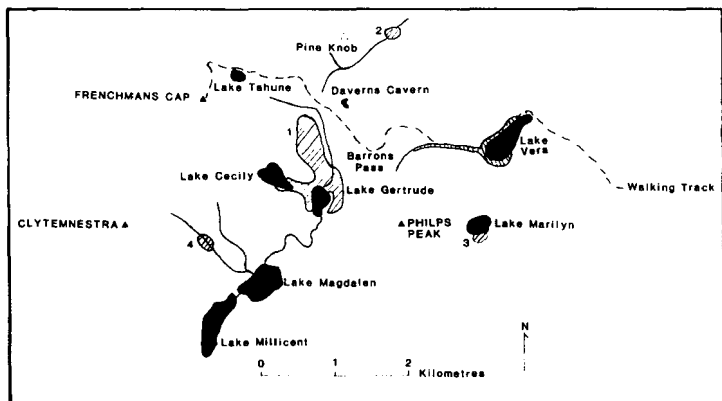
Huon pine can survive at high elevations and the species has a broad altitudinal range, from sea level to 900m. The realization that altitudinal outliers can exist for this species is important when interpreting paleogeographical data and when attempting to draw conclusions about past climatic conditions.

### Acknowledgement

Dr M. Brown and Mr N. Gibson provided useful comments on the draft.

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MAP 1—Location of Huon Pine stands near Frenchmans Cap  
(Note—Stands near Lake Vera have been previously reported)

## BOOK REVIEW

### The Cambridge Illustrated Dictionary of Natural History

By R.J. Lincoln and G.A. Boxhall. Published by Cambridge University Press, Melbourne.

R.R.P. \$49.50 (hardcover only)

*Reviewed by L.E. Wall*

This is a very extensive dictionary containing more than 10,000 entries dealing concisely with plants, animals and micro-organisms, their habits, lifestyles, associations, feeding, reproductive strategies, behaviour and physiology, as well as the taxonomic names of all groups of living organisms based on a modern system of classification. Definitions give brief details of structure, biology, distribution, diversity, and are cross-indexed with the most widely used common names.

The most flowering plants, vertebrate animals and some insects the classification is taken down to the family level. Fossil groups are also covered, but more selectively, with an emphasis on well-known names. The text is complemented by a good selection of illustrations of typical or familiar forms that are representative of the groups.

Whilst this book is very comprehensive in its cover of living and fossil forms its cost is likely to limit its market to dedicated students and teachers of natural history subjects.

## FOOD AND FEEDING OF THE LAUGHING KOOKABURRA AND TAWNY FROGMOUTH IN TASMANIA

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The Laughing Kookaburra *Dacelo novaeguineae* was introduced to Tasmania early this century (Green, 1977) and is now common and widely distributed. Being an introduced species, it is not protected here. It is diurnally active and is often persecuted because of its reputation for eating small birds and reptiles.

The Tawny Frogmouth *Podargus strigoides* is an indigenous, protected species, nocturnally active and of approximately the same size and colour as the Kookaburra. Both species are predatory feeders but are active in distinctively separate time zones.

In recent years, numbers of each species have been salvaged and processed into the collections of the Queen Victoria Museum. From these, the gut contents were preserved and stored for later study. This material, together with some data on old skins from which the gut contents were not retained, has now been sorted and is tabulated in Tables 1 and 2. Data are presented in seasonal order, disregarding the year, so to better compare seasonal occurrence of food items.

These data indicate that both species are opportunistic predators with insects, both adult and larvae, forming the bulk of their diets.

In the 15 Kookaburras examined by us, no bird remains were found. The two small mammals (Table 1), though generally considered to be nocturnal, are occasionally active in day-time. The three species of lizards (Table 1), together with the kookaburra's well known habit of eating snakes, demonstrate that this bird is not selective in its predation upon reptiles, size being the main limiting factor.

Most of the invertebrates in Tables 1 and 2 are medium to large size, as befits the size of their predators. Both crepuscular and diurnally active insects are represented in the samples of kookaburras.

Those from frogmouths are mostly crepuscular, giving the impression that these birds feed mainly at dusk and dawn. Most are ground dwelling although a few are associated with tree foliage (long-horned grasshoppers and cicadas) or tree trunks (longicorn beetle and huntsman spiders). The greater proportion of some specific items in samples (longicorn beetles, burying beetles and loopers) is probably a reflection of opportunism rather than favouritism. The division of prey species between the two predators, is, in all probability, a reflection of the degree of exposure during the time zones in which the predators hunt, rather than selective feeding.

Table 2 includes only one frog from the 15 frogmouth samples. However, one of us (R.H.G.) recalls examining the gut contents of a road killed frogmouth, picked up on a wet night from a busy highway in 1960, which had engorged itself on Brown Tree-frogs *Litoria ewingii*. At the time these frogs were active in large numbers and moving across the highway, providing an apparently irresistible but eventually fatal attractive to the frogmouth.

It is interesting to reflect upon the similarities of the Tawny Frogmouth and Laughing Kookaburra. Both are about the same length, 400-460mm and body weight, 300-420gm; both are of a generally dull greyish plumage, both hunt by perching, watching and alighting upon their prey; both have relatively short legs and weak feet which are not used to seize prey and, in both, the beak is their tool of offence and defence.

The beak of the frogmouth, in many respects, resembles that of the kookaburra except that it is considerably shorter and broader, thus providing a much wider gape, an obvious advantage to a nocturnal predator in its attempts to secure prey at night.

It is also interesting to consider a report received by one of us (R.H.G.) in November 1986, of a kookaburra feeding a brooding frogmouth in the Cliff Grounds near Launceston. Upon investigation the nest was found to be in a eucalypt fork about 6 metres above ground and occupied by a half grown nestling being partly sheltered by an adult. A family of kookaburras was living in the immediate vicinity. Feeding was not observed on this visit of 90 minutes but an assurance was given by the chair-lift attendants that he had witnessed, on several occasions, a kookaburra fly to the nest with a small lizard which was happily accepted by the adult frogmouth.

Though both species are recorded elsewhere as taking food items additional to those listed here, it is apparent that there is a similarity in their food and feeding methods, one utilising a diurnal niche and the other the nocturnal equivalent.

There is little evidence to support the commonly held assumption that the introduction and subsequent establishment and spread of the Laughing Kookaburra in Tasmania has resulted in the decline of some small bird populations. Certainly its predation upon vertebrate fauna is quite insignificant in comparison with that of the indigenous raptors which regularly take a wide variety of mammals and birds (Green *et al.*, 1985, Czechura *et al.*, 1987).

Many hundreds, possibly thousands of kookaburras have been killed in Tasmania, and continue to be killed by would-be do-gooders in the blind belief that, in so doing, they are assisting in the conservation of indigenous fauna. Almost all of this material and the evidence it contained has been destroyed and the data lost. Had it been kept and properly processed we would today have a far better knowledge of the niche the kookaburra now occupies in Tasmania. Such material should never be wasted, and if this handsome kingfisher is being continually killed, for whatever reason, then the carcasses should be salvaged and presented to a suitably qualified person or research institution for further study.

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DATE/ LOCALITY	CONTENTS	APPROX. NUMBER
Jan. 1986 Evandale, N. Tas.	Swift Moth (larvae) <i>Oxycanus</i> sp.	2
Jan. 1986 Evandale, N. Tas.	Christmas Beetle Mealworm Beetle <i>Lamprima aurata</i> TENEBRIONIDAE indet.	2 1
7.iv.86 Waverley, Launceston	Field Cricket <i>Teleogryllus commodus</i>	20
10.viii.86 N. Tas.	Cockchafer Beetle <i>Adoryphorus couloni</i>	6
10.viii.86 N. Tas.	Cockchafer Beetle <i>Adoryphorus couloni</i>	3
10.viii.86 N. Tas.	Small amount of grass	—
23.viii.85 Trevallyn, Launceston.	Stag Beetle Leaf-eating Beetle Weevil <i>Lissotes rudis</i> <i>Paropsis</i> sp. <i>Leptopius</i> sp.	1 1 1
(Regurgitation pellet)	Weevil Dung Beetle CURCULIONIDAE indet. <i>Onthophagus australis</i>	1 1
9.ix.85 Scottsdale N.E. Tas.	Corbie Grub (larvae) <i>Oncopera</i> sp.	4
Sept. 1985 Bridport N.E. Tas.	Cockchafer Beetle (larva) Army Caterpillar (larvae) <i>Scitula sericans</i> <i>Persectania ewingii</i>	1 3
3.xii.86 Underwood N. Tas.	Mealworm Beetle TENEBRIONIDAE indet.	1
3.xii.86 Underwood N. Tas.	Locust ACRIDIDAE indet.	2
x3.xii.86 Underwood N. Tas.	Little Pygmy Possum Mountain Dragon <i>Cercartetus lepidus</i> <i>Amphibolurus diemensis</i>	1 2
Evandale N. Tas.	Christmas Beetle <i>Lamprima aurata</i>	3
30.x.65 Greens Beach N. Tas.	Beetles and larvae Southern Blue Tongue (15cm long) COLEOPTERA indet. <i>Tiliqua nigrolutea</i>	— 1
28.vi.69 E. Devonport Tas.	Metallic Skink (14cm long) House Mouse <i>Leiopolisma metallica</i> <i>Mus musculus</i>	1 1

**Table 1.** Food items represented in the gut contents of Laughing Kookaburras.

DATE/ LOCALITY	CONTENTS	APPROX. NUMBER
Jan. 1983	Cave Cricket	<i>Apotrechus</i> sp. 1
Poatina	Ground Beetle	<i>Promecoderus</i> sp. 1
N. Tas.	Weevil	CURCULIONIDAE indet. 1
	Cockroach	<i>Polyzosteria</i> sp. 1
	Cockroach	BLATTODEA indet. 3
	Army Caterpillar (larvae)	<i>Persectania ewingii</i> 3
	Caterpillar	<i>Epicoma</i> sp. 2
	Spider	ARANEAE indet. 1
7.i.85	Earwig	<i>Labidura riparia</i> 1
Bridport	Cockchafer Beetle	<i>Heteronyx</i> sp. 2
N.E. Tas.	Weevil	CURCULIONIDAE indet. 2
	Looper Moth (larvae)	<i>Ciampa arietaria</i> 2
24.i.82	Scarab Beetle	<i>Pimelopus nothus</i> 1
Coles Bay	Scarab Beetle	<i>Cryptodus tasmanianus</i> 1
E. Tas.	Cicada	<i>Cicadetta</i> sp. 1
20.ii.69	Beetles	indet. —
Blackwall N. Tas.		
14.iii.86	Beetles	Indet. —
Railton N. Tas.		
20.iii.84	Longicorn Beetle	<i>Phoracantha</i> sp. 10
Mt. Arthur	Weevil	CURCULIONIDAE indet. 3
N. Tas.	Spider	ARANEAE indet. 1
	Scorpion	<i>Cercophonium squameus</i> 2
	Frog	Amphibia indet. 1
20.iii.84	Burying Beetle	<i>Ptomaphila lachrymosa</i> 20
Mt. Arthur	Rove Beetle	<i>Creophilus</i> sp. 3
N. Tas.	Scorpion	<i>Cercophonium squameus</i> 2
20.iii.85	Cave Cricket	<i>Apotrechus</i> sp. 1
Underwood	Weevil	CURCULIONIDAE indet. 1
N. Tas.	Weevil	AMYCTERINAE sp. 1
	Leaf-eating Beetle	<i>Paropsis</i> sp. 2
	Millipede	DIPLOPODA indet.
15.iv.86	Long-horned Grasshopper	<i>Caedicia simplex</i> 8
N. Tas.	Weevil	CURCULIONIDAE indet. 3
	Huntsman spider	<i>Delena canderides</i> 1
22.iv.85	Long-horned Grasshopper	<i>Zaprochilus australis</i> 1
Bakers Beach	Field Cricket	<i>Teleogryllus commodus</i> 5
turnoff	Swift Moth (larvae)	<i>Oxycanus</i> sp. 1
13.v.61	Cave Cricket	<i>Apotrechus</i> sp. 2
Storeys	Weevil	CURCULIONIDAE indet. 1
Creek	Gum Moth (larvae)	LASIOCAMPIDAE indet. 1
	Spider	ARANEAE indet. 1
26.viii.76	Looper Moth (larvae)	<i>Ciampa arietaria</i> 10
Epping Forest N. Tas.		
Oct. 1984	Corbie Grub (larvae)	<i>Oncopera</i> sp. 2
Hadspen N. Tas.		
11.ix.67	Grubs	indet. —
Exeter	Spiders	
W. Tas.	Crabs	
1985	Weevil	<i>Leptopius</i> sp. 2
N. Tas.	Mealworm Beetle	TENEBRIONIDAE indet. 3
	Click Beetle	ELATERIDAE indet. 1
	Army Caterpillar	<i>Persectania ewingii</i> 3

TABLE 2. Food items represented in the gut contents of Tawny Frogmouths.