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A.S.P.P. DAY TOUR OF NORTHERN SHRUBLANDS AND HEATHLANDS

14TH AUGUST, 1982

Today's tour takes us through some of the most floristically rich areas in Western Australia. Although we will be traversing some of the richest areas we will see only a sample of the 1,500 species found in these northern sandplains and laterite heaths.

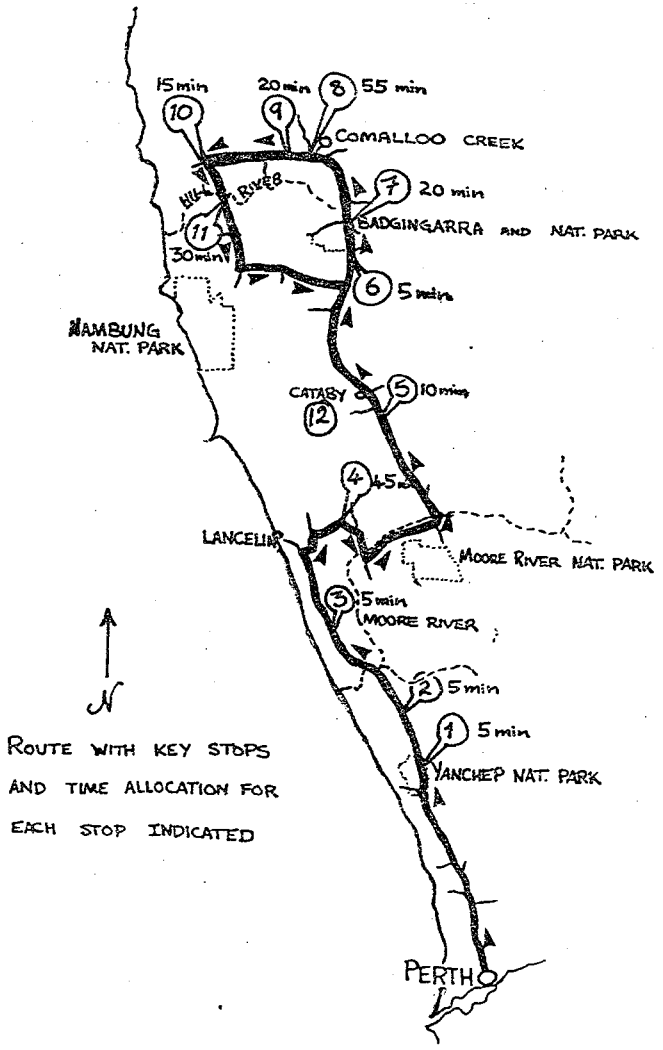
The accompanying notes briefly describe the landforms and vegetation types to be expected and points of special interest at each key stop (numbered 1 - 11 on the enclosed route map). A comprehensive but not exhaustive species list is included.

Collecting Permits:

A general permit applies to members of the tour which allows collecting for personal and institutional herbaria from National Parks and Crown land.

Tour participants if collecting plant material should observe the following guidelines:

- the amount of plant material collected should be kept to the barest minimum.
- avoid collecting rare species - these will be pointed out by tour guides
- field presses and tags will be available.
- voucher specimens should be lodged with the Western Australian Herbarium. Arrangements can be made with a tour guide.
- whole-plant collections should be avoided. Mosses, liverworts, and fungi are exempted.



ROUTE WITH KEY STOPS AND TIME ALLOCATION FOR EACH STOP INDICATED

TIME	STOP NO.		TIMETABLE OF MAJOR STOPS
7.30am		7.45	- Depart St. George's College
8.30	1.		- Yanchep National Park and Fenland (stay in bus)
8.53	2.	8.45	- Wilbinga tuart forest (stay in bus)
9.33	3.		- coastal heath (stay in bus)
~~10.08~~ 9.50	4.		- *Banksia woodland*. Morning tea (~~50~~ min)
? 11.20	5.		- fireweeds (stay in bus)
12.06	6.		- rare endemic, *Eucalyptus pendens* (~~stay in bus~~) 30 min
~~12.15~~	~~7.~~		~~- Badgingarra refreshment stop (20 min)~~
1.05	8.		- Coomalloo Creek lunch stop. Giant cycads, Wandoo woodland and heath (60 min)
2.15	9.		- laterite breakaway with *Kingia australis* (20 min)
2.50	10.		- wetland with *Viminaria juncea* (10 min)
3.30	11.		- regrowth following burn. Afternoon tea (30 min)
4.00			- depart for St. George's College
5.20 (lost 20 min. here)			- Cataby refreshment stop - take-away food available
			- arrive back at approx. 7.30. 8.00 pm.

P.S. Please observe the no-smoking rule that applies to buses in W.A. and note that the vegetation is highly flamable.

Ht : 3.66 m m. vieillot

TOUR ITINERARY

FIRST LEG

Travelling north we leave the urban sprawl of Perth at the northern suburban centre of Wanneroo. This area was originally settled in the 1930's for the purposes of grape growing and intensive horticulture. Since then Wanneroo and the satellite developments of Whitfords and Mullaloo have expanded to form a northern corridor of urban development. In the last five years this corridor has seen the most rapid development in Western Australia.

LANDFORMS

For the next few hours we will be travelling on a consolidated aeolian deposit forming part of the Spearwood Dune System. The dunes are Pleistocene age and consist of leached yellow and brown soils containing appreciable iron and calcium content. In many areas carbonate has been precipitated at lower levels to form layers and columns of hard, compact limestone deposited from solution by percolating waters.

In some areas the hard capstone and aeolianite core are exposed at the surface to form the coastal limestones. Deflation areas or blow-outs are a frequent feature of these regions with spectacular natural sculptures formed where carbonate-solution pipes are present.

VEGETATION

Deep sands support a tall open forest of tuart, jarrah, and marri (*Eucalyptus gomphocephala, E. marginata,* and *E. calophylla*) with a rich and varied understorey of low shrubs, dominated by myrtaceous elements and a diverse and abundant herbaceous flora consisting of tuberous members of the Droseraceae, Liliaceae, and Orchidaceae.

Near-coastal areas with shallow soils over limestone support coastal heath dominated by members of the Proteaceae (*Hakea lissocarpha, H. trifurcata, Dryandra* spp.), Mimosaceae (*Acacia saligna, A. cyclops, A. rostellifera*) and Myrtaceae (*Melaleuca* spp., and *Eremea* spp.) and occasional small trees of *Santalum acuminatum* (Quandong). Deeper sands typically support *Banksia* woodland with a low shrub understorey and occasional emergent tree species notably the hemiparasite, *Nuytsia floribunda* (Loranthaceae).

When treated with phosphorus , deeper soils of this system support intensive silviculture with particular emphasis on introduced pines (*Pinus sylvestris, P. pinaster and P. radiata*).

Co-ordinated drainage is dominated by the Moore River - a sluggish waterway usually no more than a string of water holes with its source in the Dandaragan Plateau, 50km further inland. The more fertile and well watered soils adjacent to the river support varied eucalypts the most dominant being river gums, *Eucalyptus camaldulensis*, flooded gum, *E. rudis*, and marri,with drier areas supporting scattered pockets of York gum, *E. loxophleba*. We will cross the Moore River on several occasions.

Swamps and lakes are a frequent feature of this landscape and numerous fen-lands, karst-lakes and ephemeral lakes will be seen. One such permanent fresh-water lake which will be the last stop of the day will possess features typical of many wetland areas viz. margins dominated by the bullrush, *Typha domingensis* and the jointed rush, *Baumea articulata*. A paperbark, *Melaleuca raphiophylla*, is able to withstand long periods of inundation and grows as a dense perimeter of low trees around this lake. Where inundation is brief, another paperbark, *Melaleuca preissiana*, forms impressive stands of white trunked trees.

KEY STOPS (as marked on preceding map)

1. Road cutting - illustrating typical coastal limestone supporting low heath.

3. Wilbinga Reserve - site of proposed nuclear power plant. Fine example of tuart (*E. gomphocephala*) forest.

2. Yanchep National Park - fenland. Dominated by *Typha domingensis* and *Banksia littoralis*.

4. Morning tea stop - *Banksia* woodland with complex heath. A comprehensive herbarium has been assembled for this stop. Special demonstrations will include - excavation of haustorial connections of the hemiparasitic tree, *Nuytsia floribunda*.

- herbaceous species with fire dependent flowering responses.
- proteoid roots.

SPECIES LIST

Acacia pulchella

Acacia sphacelata

Banksia attenuata

Calectasia cyanea

Calothamnus sanguineus

Casuarina campestris

Casuarina humilis

Caustis dioica

Conospermum stoechadis

Conostephium pendulum

Daviesia divaricata

Daviesia incrassata

Drosera erythrorhiza

Drosera sp.

Dryandra nivea

Eremaea sp.

Eucalyptus todtiana

Hakea costata

Hakea ruscifolia

Hibbertia crassifolia

Hibbertia hypericoides

Hovea stricta

Hybanthus calycina

Jacksonia floribunda

Kunzea sp.

Leucopogon striatus

Nuytsia floribunda

Oxylobium capitatum

Persoonia comata

Petrophile linearis

Petrophile macrostachya

Schoenus subflorus

Spyridium tridentatum

Stirlingia latifolia

Stylidium repens

Synaphea polymorpha

SECOND LEG

For the first half of this leg we are travelling on a Pleistocene accumulation of beach sands along an old coastline. The dunes are low hills up to 80 metres with sand swamps in the interdunal swales. These swamps will be particularly evident near the township of Cataby.

Soils are grey, quartz sands of a highly leached nature which are chemically and physically infertile.

Drainage is uncoordinated with the quartz-sand ridges draining excessively into ill-drained swamps. These depressions have a metre or so of surface sand over an almost impermeable organic hardpan.

From the start of Badgingara National Park there is a sudden change from the sandy quartz soils of the Bassendean and Spearwood systems to the dissected plateau and lateritic soils of the Dandaragan Plateau.

Breakaways and talus slopes support an immensely rich and varied heath flora. Occasionally the heath is dissected by groves of mallee and conspicuous patches of wandoo woodland (*Eucalyptus wandoo, E. accedens*).

A feature of many gullies in this region is the presence of exceptionally tall specimens of the cycad, *Macrozamia riedlei*. Only one other isolated pocket of specimens near the south coast attain the dimensions reached by the specimens seen today.

The laterite heath flora displays a remarkably high degree of endemism. Some 10 species are endemic to the hills in this region, many genera being monotypic. Some examples of local endemics will be shown en-route.

Equally fascinating is the intense richness of the heath flora. This is demonstrated in the constellation of species that have evolved in the Epacridaceae and such genera as *Anigozanthos, Conostylis,*

Drosera, Isopogon, Petrophile, Conospermum, Hakea, Dryandra and *Banksia*. Estimates of the richness of laterite heath have shown up to 60 species in a one metre square quadrat.

To equal the taxonomic diversity is the range of life-forms and growth-forms which have evolved to cope with nutritional, climatic and pyrogenic stresses. Epicormic and lignotuberous resprouting, plagiotropism (including the only known rhizomatous cypress), stem corkiness, stilt roots and phyllodiny are a few examples. The ultimate degree of specialisation is seen in the diminutive endo-holoparasitic, *Pilostyles hamiltonii* (Rafflesiaceae). The entire growth form of the plant is restricted to a thin unicellular thread living inside the vascular system of the host plant. Only when flowering occurs through the bark of the host is there external evidence of the parasite living within. A dried sample of host plus flowering parasite will be passed around the bus as the plant is difficult to find at this time of the year.

KEY STOPS

5. Fireweeds - a brief look at a road verge population of *Gyrostemon ramulosus* (Gyrostemonaceae).

6. Endemic species - a local endemic *Eucalyptus pendans*. Less than 1,000 individuals are known of this rare, weeping eucalypt.

7. Badgingara Roadhouse - refreshment stop. A wide range of sand-laterite heath species occur within a 100 metres of the roadhouse.

8. Comalloo Creek - lunch stop. Examination of *Eucalyptus accedens* suppression of understorey. Giant cycads and demonstration of age determination. Range of sand - laterite heath species, with a walk along Comalloo Creek to the lateritic breakaway.

SPECIES LIST

Acacia lasiocarpa

Alexgeorgia arenicola

Andersonia lehmanniana

Banksia grossa

Billardiera erubescens

Conospermum triplinervium

Conostephium pendulum

Conostylis crassinervia

Conostylis teretiplius

Cryptandra glabriflora

Gompholobium knightianum

Hakea trifurcata

Hypocalymma xanthopetalum

Laxmannia sessiliflora

Leucopogon striatus

Melaleuca raphiophylla

Petrophile brevifolia

Pimelea suaveolens

Pithocarpa corymbulosa

Pityrodia verbascina

Scaevola canescens

Scholtzia parviflora

Stirlingia latifolia

Verreauxia reinwardtii

THIRD LEG

The third and final leg of the excursion takes us from laterite breakaway (Mt. Benia) back to vegetation representative of the Bassendean Dune System.

LANDFORMS

Descending out of the laterite plateau we will gain a superb view of the sandplain and ocean in the distance before crossing the Warradee Fault line. This line marks the end of the laterite heath and the start of Hill River Sandplain flora. This region contains mixed geological and floristic elements, some will be familiar from previous stops.

KEY STOPS

9. The first stop will be in laterite plateau and breakaway country. The complexity and richness of the laterite heath will be clearly evident at this stop. Special note should be taken of the colonies of *Kingia australis* (Xanthorrhoeaceae), an arborescent monocot related to the blackboy. This species unique growth habit will be demonstrated. Spp. List p.11

10. Roadside wetland possessing good stands of the legume *Viminaria juncea*. A demonstration will be given of the autecological studies being conducted on this species including - assessment of N_2-fixation and the biology of pneumatophores and proteoid roots for survival of the species in waterlogged soils.

11. Final stop will examine a spring fed perennial lake where a severe fire last summer burnt the nearby *Banksia* woodland. Examples will be seen of resprouting after fire, pyrogenically stimulated flowering and precocious growth and flowering of *Anigozanthos* spp. (kangaroo paw and cat's paw)

At the conclusion of this stop the tour ends and we depart for Perth. E.T.A. at St. Georges College, 7.30 pm.

SPECIES LIST

Acacia latipes

Adenanthos cygnorum

Astroloma microdonta

Calectasia cyanea

Calothamnus torulosus

Comesperma volubilis

Daviesia nudiflora

Daviesia preissii

Grevillea pilulifera

Grevillea synaphea

Hakea conchifolia

Hakea flabellifolia

Isopogon linearis

Lambertia multiflora

Leucopogon conostephioides

Leucopogon striatus

Petrophile striata

Restio aff. sphaceluta

Undescribed genus aff. *Ecdeiocolea*

AGRICULTURAL/HORTICULTURAL PRACTICES

Besides intensive horticulture and market gardening near Wanneroo the remainder of the excursion is through country supporting a variety of agricultural enterprise.

SOILS

As stated previously the most common soils are the notoriously infertile deep sands. Success with farming requires the addition of P, N, K, Cu and Zn for cereals, plus Mo for legumes. Laterite areas erode easily and rarely support viable crops or pasture.

PASTURES

Include a variety of annual grasses, subclover (varieties Dwallganup, Wogenillup, Dalliak, Seaton Park), capeweed and Serradella (Pitman variety).

CROPS

Barley (Clipper variety), oats and wheat (Miling and Gamenya) with lupins (Unicrop, Marri and Yilyarrie) on the heavier soils further inland.

STOCK

Sheep (Merino and crossbreeds) and cattle (Angus).

The unique flora of the region has also prompted the development of a thriving cut-wildflower industry.

In many areas cleared farmland is being returned to species native to the area. Species include kangaroo paws (several species including hybrids), black kangaroo paw (*Macropidia fuliginosa*) *Banksia* (especially *B.speciosa, B.menziesii, B.prionotes* and *B.ashbyi*). *Dryandra* species and everlastings (mainly *Helipterum roseum*).

Open range wildflower picking occurs throughout the region but is tightly regulated and policed by the Department of Fisheries and Wildlife.

The majority of flowers are dried and in many cases tinted various colours before export to markets in the U.S.A. and Europe.