An Excursion into Southern Western Australian Eucalypts

by Dr. Stephen Hopper, Research Officer, W.A. Wildlife Research Centre

The eucalypts of southern Western Australia are among the most valuable biological assets of our State. Their monetary worth is apparent in the many millions of dollars earnt annually and the thousands of jobs that arise from industries such as forestry, plant nurseries, beekeeping, wildflower harvesting, tourism, recreation and land reclamation. Equally important is the value of eucalypts in contributing to the richness and complexity of wild communities of plants and animals. Being dominant trees or mallees, the eucalypts play a conspicuous role in the landscapes seen every day by most Western Australians.

The number of eucalypts in the southern half of the State is not know precisely. Probably 150-200 occur in the region, and at least 70% are found nowhere else. Because there are so many species, and because some show only subtle differences in their nuts, buds, flowers, foliage, seeds or seedlings, the identification of our eucalypts appears a formidable task to the uninitiated botanist. Like many of my colleagues, until recently I was content to learn to recognise a few of the striking ornamental eucalypts and important local trees and leave the identification of the rest to the experts. However, constant encounters with eucalypts in the field impressed upon me the need to learn more about their identification and biology.

In this article I wish to recount some of the experiences gained on a field trip in company with Ian Brooker, a botanist from the Division of Forest Research, CSIRO, Canberra. Ian specialises in the classification and naming of eucalypts. His aim for the trip was to collect specimens of W.A. eucalypts belonging to the subgenus *Monocalyptus*, a group that includes many important timber trees such as jarrah *(E. marginata)* as well as a number of the rare mallees of the State. The collection was for a study of the evolution of the group that Ian was undertaking jointly with Dr Pauline Ladiges of Melbourne University and Dr Chris Humphries of the British Museum. As it turned out, he was able to obtain all the specimens required, plus some unexpected bonuses. At the same time, I was able to make a collection of correctly named specimens for future reference by workers at the Wildlife Research Centre, and learn a lot about eucalypts in the process.

◀ Statuesque karri Eucalyptus *diversicolor* lining valley slopes in the Warren National Park south-west of Pemberton. This important timber tree is the second tallest hardwood in the world. The karri forest occupies the highest rainfall region of south-western Australia, and harbours many plants and animals found nowhere else. (Photo S.D. Hopper)

Granite Rocks

The trip lasted from November 8-17, 1981, and followed a route of some 3 620km as shown on the map. Our first stop east of Perth was near the boundary of the wheatbelt north-east of Merredin at a stand of caesia *(E. caesia* subspecies *magna)*. This rare spectacular mallee is confined to the crevices and margins of large granite rocks in the central wheatbelt. It is widely grown in cultivation because of its large pink flowers, white branchlets, buds and fruits, and handsome red-brown bark. In winter large numbers of honeyeaters are attracted to its flowers. Ian and I had visited the rock on which it was growing two years previously. We collected some specimens of caesia and of a form of silver mallee *(E. crucis)* soon to be named subspecies *lanceolata*. Pressing eastwards, we made for Coolgardie that night.

Coral Gums

It took the whole of the next day to travel the 160 km between Coolgardie and Norseman. Largely for my benefit, we stopped whenever a new eucalypt was seen so that I could obtain a specimen and take photographs. The season had been a good one in the Goldfields and almost all of the 25 species we saw that day had lush new growth and an abundance of buds. One striking species in flower was the coral gum *Eucalyptus torquata*. We saw this small rough-barked tree in isolated stands at several location. Honeyeaters invariably were calling from these trees, and Yellow-throated Miners, Yellow-plumed Honeyeaters and Red Wattlebirds were seen taking nectar from the pink flowers.

An area of low woodland to the north-west of Norseman was the highlight of the day. Here a mixture of nine different eucalypts was located: (salmon gum *Eucalyptus salmonophloia*, Dundas blackbutt *E. dundasii*, Dundas mahogany *E. brockwayi*, merrit *E. flocktoniae*, red morrel *E. longicornis*, gooseberry mallee *E. calycogona*, snap-and-rattle *E. gracilis*, a form of goldfields blackbutt *E. lesouefii* with strongly-ribbed fruits and known for a long time as *E. pterocarpa* and an unnamed species related to capped mallee *E. pileata)*. Six of these were small trees with smooth white bark. At a glance the woodland appeared to be uniform but new species came to light with each specimen of buds and fruits that was collected. The richness of this tree community was reminiscent of that seen in the rainforests of Queensland. Yet we were standing in an arid zone woodland whose climate, in any country other than Australia, would render the vegetation desert.

Heading south from Norseman the next day we stopped at a smooth-barked tree 8 m tall that turned out to be narrow-leaved red mallee *E.*

▲ Flowers of ridge-fruited mallee *Eucalyptus angulosa* with buprestid beetles taking nectar. In addition to insects, flowers of this south coastal mallee attract honey possums and several species of honeyeaters. (Photo S.D. Hopper).

▼ A New Holland Honeyeater, its bill covered in pollen, pauses vigilantly after feeding on nectar of the rare granite rock mallee *Eucalyptus caesia*. South-western Australia has several unusual eucalypts like this one that are predominantly pollinated by birds. (Photo S.D. Hopper)

▼ Flowers and foliage of a stunted form of jarrah *Eucalyptus marginata* growing in the Stirling Range National Park. Jarrah dominates most of south-western Australia's small area of forest. Despite its economic importance as a timber tree, aspects of the biology of jarrah such as its pollination are virtually unknown. (Photo S.D. Hopper)

foecunda. I was familiar with this species as a common mallee of the wheatbelt. Its occurrence as a tree near Norseman is an enigma, although the infrequency of bushfires in this region is a possible explanation.

South of Salmon Gums at Truslove, we turned east towards some granite rocks in an area under consideration for the release of new farmland. Goblet mallee *E. merricklae*, a species with erect narrow leaves and cherry-red buds, was observed on road verges not far east of the main road. Also encountered in the same area were *E. halophila*, a recently named mallee of salt lake margins, and an as yet unnamed species, probably in the series *Incrassatae* with stiff leaves, big fruits and buds, and a preference for winter-wet depressions in low relief.

The Ironbark

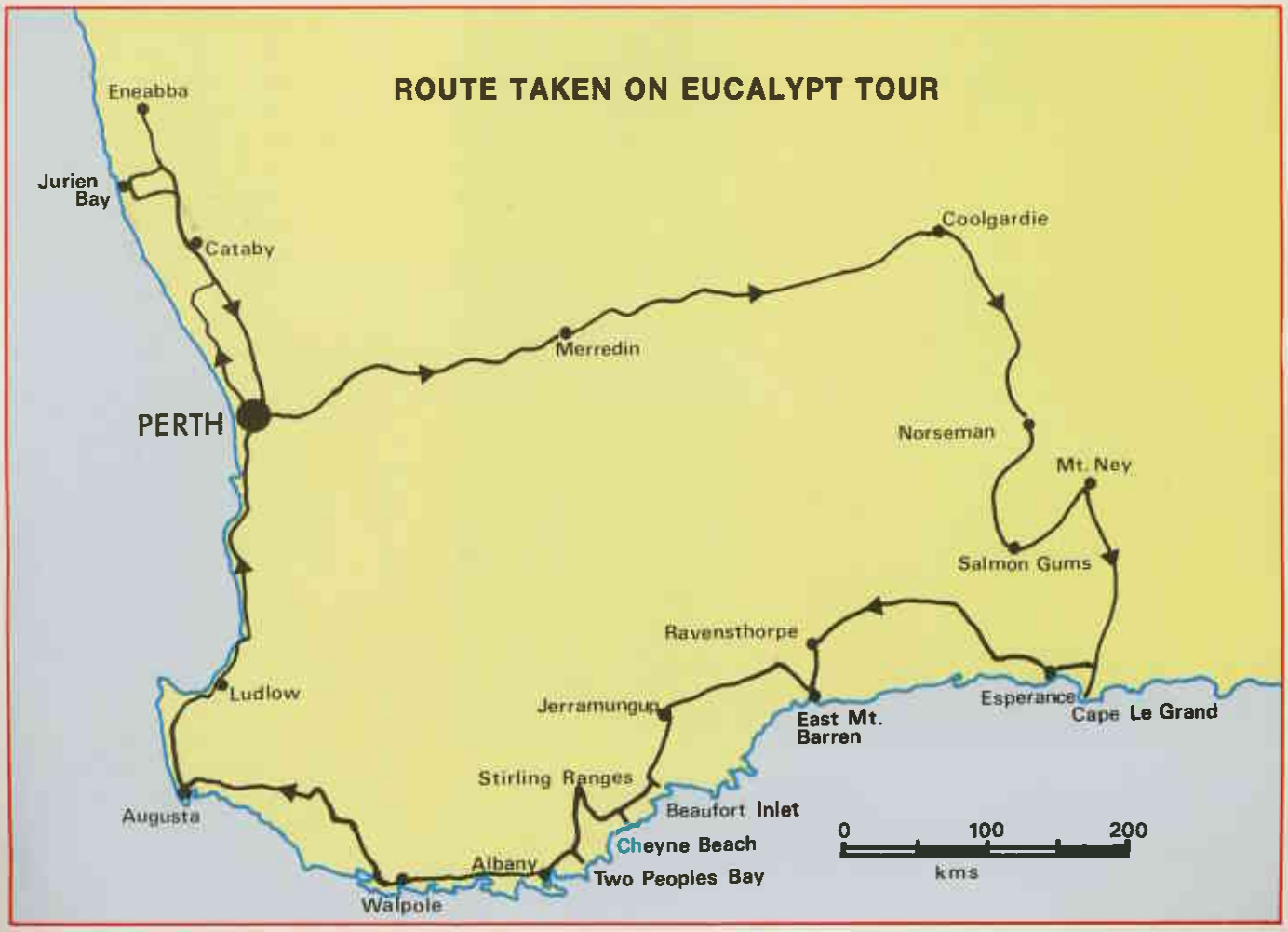
After camping overnight bedside an inland occurrence of bushy yate *E. lehmannii* on the granite slopes of Mt Burdett, we proceeded eastwards to Mt Ney. In transit we made the first of many new discoveries on the trip — an ironbarked tree mallee possibly related to redwood *E. transcontinentalis* but apparently unnamed. A few isolated clumps were found near Mt Ney and later we found large populations of it west of Grass Patch. Also in the Mt Ney area were some stands of cap-fruited mallee *E. dielsii*, an uncommon species near the eastern limits of its range.

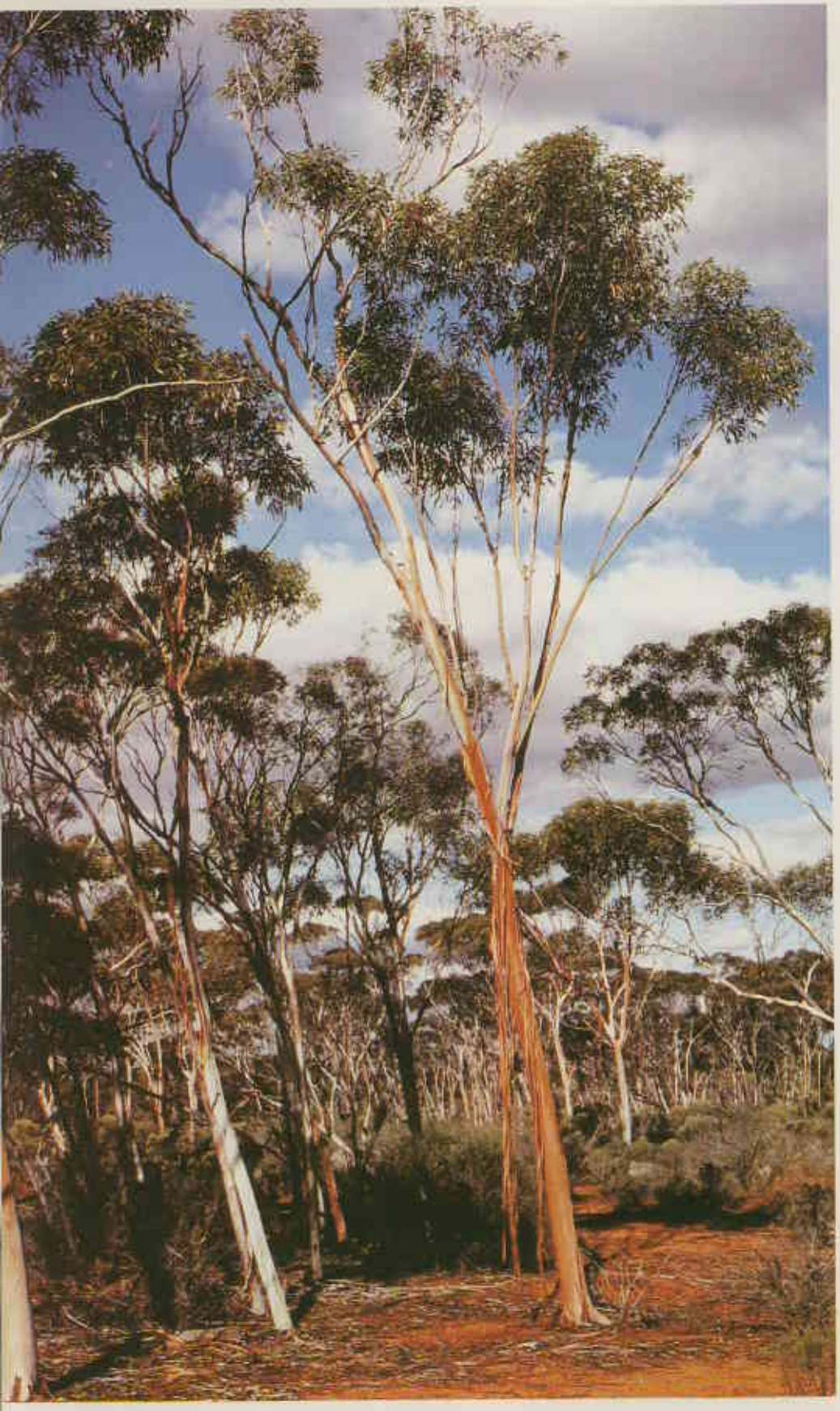
Cape Le Grand National Park was the next site on the itinerary. After seeing the ranger to inform him of our porposed work, samples of three rare species named by Ian were collected — Twin Peak Island mallee *E. insularis*, Mount Le Grand mallee *E. aquilina* and Lucky Bay mallee *E. ligulata*. These mallees were first brought to Ian's attention by Dr Arthur Weston who conducted a survey of the vegetation of the Park early in the 1970s.

In addition to these three, another eucalypt was collected during our brief visit that may prove to be new to science. The spectacular mountains, valleys and granite headlands of this National Park probably hold other rare eucalypts awaiting discovery by botanists prepared to walk its rugged terrain.

New eucalypts, new farms

We departed north-west from the howling winds of Esperance the next day and drove along the margins of current farms in a sweeping westerly arc to Ravensthorpe. This covered another region of mallee country proposed for release for new farms. The richness of the eucalypt flora encountered was remarkable. Up to ten species were found growing together at some locations (e.g. south-west of Grass Patch), the species seen in one hectare of seemingly uniform mallee were tall sand mallee *E. eremophila*, Jerdacuttup mallee *E. goniantha*, hookleaved mallee *E. uncinata*, Hopetoun mallee *E. leptocalyx*,





▲ An unnamed form of goldfields blackbutt *Eucalyptus lesouefii*, known by foresters as E. "pterocarpa". The seemingly uniform woodland in the background consists of nine distinct eucalypt species, six of which have smooth white bark. Such local species richness, and the presence of unnamed and undiscovered species, are features for which the south-west Australian Goldfields and Mallee region are famous. (Photo S.D. Hopper)

fuchsia gum *E. forrestiana* subspecies *forrestiana*, Port Lincoln mallee *E. conglobata*, merrit, black marlock *E. redunca*, goblet mallee and the unnamed ironbark mallee first seen near Mt Ney. Apart from the ironbark, other novelties seen in the region included a population of narrow-leaved mallee *E. angustissima* (a rare species not previously recorded from the area), unnamed tree forms of Port Lincoln mallee, tall sand mallee, black marlock and unnamed smooth-barked mallees related to flat-topped yate *E. occidentalis* and to redheart *E. decipiens*. At the end of the day I was left wondering if so much came to light among the eucalypts in just one day's travel through this region, how many other plant species as yet undiscovered would stay so forever if proposed land releases for agriculture go ahead at a faster rate than botanists can survey the flora?

Ravensthorpe Range

We spent the night in Ravensthorpe at the home of Andrew Chapman, a friend who was in the same zoology course as me at the University of Western Australia, and who had taken up life in the country after spending several years working with the W.A. Museum. An inspection of the rough-barked trees around Andrew's house the next morning showed that they were not york gums *E. loxophleba* as I had previously supposed, but actually a mixture of red morrel and a new species with small glandular buds and fruits named *E. myriadena* (= many glands) by Ian.

Andrew and John Bennett (headmaster of the Ravensthorpe school) accompanied us south-east as far as the Ravensthorpe Range to show us the recently named rare mallee *E. bennettiae*. The range is another area very rich in eucalypts. Within a few hundred metres along the track we traversed, 14 species were encountered — *E. bennettiae*, warted yate *E. megacornuta*, the unnamed smooth-stemmed mallee related to flat-topped yate, bushy yate *E. lehmannii*, Jerdacuttup mallee, black marlock, swamp mallet *E. spathulata* var. *grandiflora*, hookleaved mallee, capped mallee,

merrit, lerp mallee *E. incrassata*, tallerack *E. tetragona*, bell-fruited mallee *E. preissiana*, and Desmond's mallee *E. desmondensis*.

Next we proceeded into the Fitzgerald River National Park to see the remarkable whipstick weeping gum *E. sepulcralis*. Andrew directed us to a location where these slender-stemmed mallees emerged up to 10 m over an open low scrub of the spectacularly coloured *Hakea victoria*. It was one of the most unusual and photogenic vegetation formations I had seen in Western Australia. Proceeding further south to East Mount Barren, we were to see two more rare eucalypts and encounter another striking plant — the crimson flowered *Regelia velutina* in full bloom. The day ended abruptly at Jerramungup with the vehicle refusing to start while in the only garage for miles.

Newbey's mallee

Several species of note were found as we made our way south and west of Jerramungup the next day. The Beaufort Inlet area had *Eucalyptus newbeyi* in full bloom. This small 7m tree was named early in 1981 in honour of Ken Newbey, an outstanding field botanist and farmer from Ongerup. The clusters of large yellow flowers of *E. newbeyi* hung in dense masses from the low open canopy of the trees, and attracted a host of New Holland Honeyeaters and Red Wattlebirds. When taking nectar, the heads of the New Holland Honeyeaters were completely surrounded by the long erect stamens of the flowers so that pollen was deposited as far back as the neck of the birds. The inlet area also contained stands of unnamed trees related to flat-topped yate and black marlock; and a mallee species that Ian had never seen before.

A brief stop was made south-west of Wellstead to collect material from roadside mallees that probably were hybrids between the apple mallee *E. buprestium* and the Albany blackbutt *E. staeri*. We struck the coast again at Cheyne Beach to examine a stand of Woolbernup mallee *E. acies*. Its cream flowers with erect stamens were being visited by pairs of large copulating thynnid

▲ A Bald Island Marlock *Eucalyptus conferruminata* stands 1m tall on the coastal slopes of Mt. Gardner in Two Peoples Bay Nature Reserve. This widely cultivated species was only recently recognised as being distinct from its close relative the bushy yate *E. lehmanii*. (Photo S.D. Hopper)

▲ The spectacular buds of *Eucalyptus newbeyi*. Each one is 8cm long. This rare south coastal tree was named in 1980, and is not yet widely cultivated. Its flowers attract numerous honeyeaters who have to bury their heads to the neck in stamens to harvest nectar. (Photo S.D. Hopper)

◀ The distinctive juvenile foliage of merrit *Eucalyptus flocktoniae*. All eucalypts produce juvenile leaves that are different in form from those on the adult plant. Merrit produces adult foliage, buds and fruit that are often difficult to distinguish from those of its close relative redwood *E. transcontinentalis*. The juvenile leaves of these two species are quite different, and hence are valuable for identification by botanists in the field. (Photo S.D. Hopper)

▼ Western pygmy possum taking nectar from a flower of *Eucalyptus caesia* on Boyagin Rock Nature Reserve near Pingelly. Little is known about the importance of these mammals as pollinators of south-western eucalypts. (Photo S.D. Hopper)

wasps with yellow and black abdomens. In addition to the Woolbernup mallee, two undescribed mallees related to ridge-fruited mallee *E. angulosa* and to redheart were seen.

Although Two Peoples Bay was our destination for the night, we decided to go via the Stirling Range to see *Eucalyptus talyuberlup*, another recently described mallee. It was a fortunate decision because two unnamed mallees were located as well, and we found large populations of the rarest of the kangaroo paws, *Anigozanthos onycis*, in the national park. On the basis of our discoveries during just one hour in the park, I resolved to do some more work in the Stirling Range in the near future.

Mallee to karri

The next morning involved a three hour hike over the rugged terrain of Mount Gardner on Two Peoples Bay Nature Reserve. Graeme Folley, the resident reserves officer, led the way to stands of the robust form of Bald Island marlock now known as *Eucalyptus conferruminata* (previously this species was confused with bushy yate. With a cloudless sky and light wind, we had grand views of the islands and headlands to the west and the Porongurups and Stirling Range to the north.

The long journey from Albany to Augusta consumed the rest of the day. Some relief was provided by a detour through the Valley of the Giants east of Walpole. Here majestic karri *E. diversicolor*, red tingle *E. jacksonii*, yellow tingle *E. guilfoylei*, jarrah and Rate's tingle *E. brevistylis* towered above the road.

After a windy night in Augusta, the ranger at Cape Leeuwin assisted us in locating the rare vine *Kennedia macrophylla* which I wished to photograph, and the Boranup mallee *E. calcicola*. Another crystal clear day was with us, making the coastal scenery and karri forests near Augusta handsome to view indeed. Most of the morning was spent driving along tracks and firebreaks in the Leeuwin National Park in an attempt to locate the southernmost stand of Boranup mallee. Having achieved this, we made for Perth in the afternoon. The statuesque tuart forests *(E. gomphocephala)* at Ludlow were of interest on the way, as were trees of redheart near Naval Base that had much rougher dark grey bark than their counterparts on the south coast. Otherwise the coastal plain offered relatively few new eucalypts comparable to those seen in the previous few days.

Rare northern mallees

The last day involved a round trip to Eneabba and back. Two rare species of the Jurien Bay area were the main aim of this leg of the journey. Trees intermediate between river gums *E. camaldulensis* and flooded gums *E. rudis* were observed on flats and watercourses north-west of Gingin. A clump of the northern heathlands race of the Mottlecah *E. macrocarpa* was seen covered in large red flowers south of Cataby (see SWANS Vol. 11 No. 3).

Johnson's mallee *E. johnsoniana*, one of our target species, was found in flower and bud at several locations north-east of Jurien Bay. It was usually less than 1.5m tall but nonetheless conspicuous by a flush of new, yellowish growth as an emergent mallee from the dense low heath of the region. An unexpected find was that the tallerack in the area occurred in two forms, one with typical fruits and the other with fruits intermediate between the typical form and those of the related Gittins mallee *E. gittinsii*.

We spent a few hours on the farm of John and Judy Browne examining a population of the rare whipstick Badgingarra mallee *E. pendens*. Like its close relative the weeping gum, this species emerges from the low heath as a spindly thin-stemmed mallee up to 3m tall, instantly recognisable when silhouetted against the horizon. The Brownes have left areas of uncleared bush on their farm for the purposes of soil conservation and to preserve some of the rich flora that characterises the region in which they live. The value of such an enlightened approach to farm management for flora and fauna conservation cannot be overstated, particularly in country where the flora changes dramatically in composition over distances of less than a kilometre.

We completed this last day with an hour's work at the Wildlife Research Centre changing newspaper sheets on our drying specimens. In all, Ian had collected about 600 specimens, 200 packets of nuts and seed, and 50 jars of buds and flowers preserved in alcohol. It was un invaluable collection, containing the first material available of several new eucalypts. In our ten days we had seen 125 different species, about a quarter of the whole genus.

It will take several months for all the material collected to be investigated and understood. Each presumably new species needs to be compared with specimens in the herbarium, the seeds need microscopic examination, and seedlings need to be raised to be sure that something really new is at hand and to determine relationships with other eucalypts.

The trip instilled in me lasting impressions of this fascinating and economically important group of plants. It's clear that much remains to be discovered about southern Western Australian eucalypts. Moreover, pressure for the release of new land for agriculture places some urgency on botanical surveys of the genus in the regions concerned.