FOREST NOTES

Forests Department Perth Western Australia

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FOREST NOTES

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EDITORIAL NOTE:

This issue of Forest Notes is smaller than usual for a very simple reason - lack of material.

A twice-yearly issue is possible, given sufficient input, and so the problem rests in the hands of the readers.

TO THE POINT .....

Most foresters will not fail to see the insidious growth of unnecessary paperwork as a major threat to communications efficiency. Some even resort to speed reading to try to cope better.

We all occasionally need to be reminded that the length of a communication is not always a valid guide to its importance.

This point is neatly made in these examples:

*	*Lord's Prayer*	*56 words*
*	*Lincoln's Gettysburg address*	*266 words*
*	*The Ten Commandments*	*297 words*
*	*The 23rd Psalm*	*118 words*
*	*U.S. Government order on cabbages*	*26,911 words*

WINDBREAK ESTABLISHMENT TRIALS

by A. ANNELS and C. SCHUSTER

In July 1973 a range of tree and shrub species were planted as windbreak trials in sandy areas liable to "blow out" in the Boxwood Hills district. These plantings followed requests for assistance from the local branch of the Farmers Union.

Wind erosion is a major problem on many sites in this area, with crops sometimes being blown out before they can become established. The most destructive winds are from the north-west in autumn or early winter, although they are likely to occur at any time throughout the year. The average rainfall is approximately 450 mm with the main falls on average being in the winter months, June 96 mm, July 90 mm, August 80 mm, September 80 mm with some summer falls resulting from the south coastal influence, although these last are unreliable. Natural vegetation consists of Mallee eucalypt spp., Banksia spp. and Christmas Tree, with patches of Flat-topped Yate in the gullies and drainage lines on the heavier soils.

The problems of windbreak establishment in this area are briefly:

1. To find windfirm species that will grow quickly to a reasonable height.

2. To find species that will grow successfully with a comparatively low rainfall.

3. To develop a system of planting that will provide a high percentage of establishment under harsh wind conditions and possible sand-blasting.

To select possible species two trials were established using the following species as combinations of low bush trees or shrubs, and taller trees.

Eucalyptus gomphocephala	Tuart
Eucalyptus lehmannii	Bald Island Marlock
Eucalyptus occidentalis	Flat-topped Yate
Eucalyptus camaldulensis	Murray Red Gum
Eucalyptus bicostata	Southern Blue Gum (Eurabbie)

Eucalyptus globulus	Tasmanian Blue Gum
Eucalyptus sargentii	Salt River Gum
Eucalyptus forrestiana	Fuschia Mallee (Forrest's Marlock)
Eucalyptus gardneri	Gardner's Blue Mallet
Eucalyptus kondininensis	Stocking tree
Eucalyptus nicholi	Nichol's Willow-leaved Peppermint
Eucalyptus platypus	Round-leaved Moort
Eucalyptus platypus var. heterophylla	Moort
Eucalyptus spathulata	Swamp Mallet
Eucalyptus cladocalyx	Sugar Gum
Eucalyptus cladocalyx var. nana	Dwarf Sugar Gum
Pinus eldarica	
Pinus pinaster	Maritime Pine
Pinus pinea	Stone Pine
Pinus halepensis	Aleppo Pine
Leptospermum laevigatum	Vic. Ti-tree
Hakea laurina	Pin Cushion Hakea
Cytisus proliferus	Tree Lucerne
Callitris calcarata	Cypress Pine
Tamarix aphylla	Tamarisk

To provide protection for the planted seedlings and to minimise wind erosion, the experimental areas were sown with cereal rye at 95 kg/ha in the early winter. By the time of planting (in July when soil moisture was sufficient), this had reached a height of approximately 20 cms plus. Sites were prepared several hours before planting by spraying a patch 0.8 m in diameter with a mixture of Grammoxone Reglone contact defoliants. This had the effect of killing the vegetation around the planting site and retaining the rest of the cereal rye as a cover crop for the young trees. All planting stock used was in plastic tubes or pots, and each plant received 56 gm of complete fertilizer placed on the soil surface at time of planting. In the pine species the mixed fertilizer was replaced by Super-Copper-Zinc mixture.

In February 1974 an inspection of the plots was made, unfortunately one plot had suffered severe mortality due to a grasshopper attack, but the other plot showed an overall survival rate of 74%. This figure included three species which had virtually failed completely, Hakea laurina, Tamarix aphylla and Leptospermum laevigatum.

In March 1976 the plots were inspected and measured. The species which showed most promise were:

Tree species

Euc. globulus	78%	survival	4.40	metres	av.	height
Euc. cladocalyx	100%	"	2.86	"	"	"
Euc. gomphocephala	89%	"	2.69	"	"	"
Euc. bicostata	70%	"	2.68	"	"	"

Shrub species

Cytisus proliferus	100%	"	2.48	"	"	"
Euc. cladocalyx var. nana	92%	"	2.30	"	"	"
Euc. platypus var. heterophylla	82%	"	1.71	"	"	"

The above species are outstanding in growth, habit, and resistance to damage and also show good survival on the particular sites. Some of the other varieties show equally good survival rates, but either form or growth rate is poor.

In the 1976 planting season a windbreak plot was planted using the most successful species listed above and consisting of two rows each of shrub species and tree species.

A post planting inspection revealed damage caused by a severe wind storm following planting, although most plants were sending out fresh shoots. Two species that notably suffered very little wind damage were Eucalyptus globulus and Cytisus proliferus.

SOME EARLY FOREST ACTIVITIES IN W.A.

L. Talbot

The first Western Australian laws covering the sandalwood industry, timber cutting and bushfires, date back to the earliest year of the Swan River Colony - long before there was a Forests Department. In the years up to the 1890's these laws were administered by the police.

This early legislation was not intended to protect or conserve the forests, but rather to raise revenue and to protect private property.

Probably the first bushfires legislation was "An Ordnance to diminish the Dangers resulting from Bush Fires" which was proclaimed in 1847. This provided for the conviction of persons who wilfully or through carelessness set fire to the bush between the first day of September in any year and the first day of April in the following year. However, it permitted "the occupier" to light fires in the prohibited period, providing such fires did not extend beyond the limits of his property. As some graziers held leases over very extensive tracts of land it seems that they were still free to burn out vast areas of forest in the hottest, driest months of the year.

The penalty for breaches of the ordnance was a fine not exceeding £50 a very heavy fine in 1847. Of course it would have been most unjust to have inflicted such a heavy fine on aborigines, since members of that race had little or no understanding of British Laws, and for thousands of years had been free to burn the bush as they pleased. Besides, they had no money to pay fines. So in their wisdom, and undoubtedly out of a sense of justice, the law-makers of that time decreed that natives - and lads under sixteen - found guilty of lighting bushfires in the prohibited season might, in lieu of a fine, be publicly flogged receiving any number of lashes not exceeding fifty.

Entries in early police records show that policemen sometimes rode out into the bush to warn natives and sandalwood cutters against setting fire to the bush. Usually this followed a complaint, or an expression of concern, by graziers fearful that their runs might be burnt out.

Sandalwood cutting seems to have been the chief forest activity in the earlier years; most of the sandalwood coming from areas which are now no longer associated with that industry; mainly Great Southern districts. Policemen issued sandalwood licences, and a typical entry is this one from Eticup Police Station records of 1870 -

SANDALWOOD LICENCES

Sawyer 8/8/70 to 8/10/70	5/-
W. Grovan 15/9/70 to 14/11/70	5/-
J. Bates 1/10/70 to 31/11/70	2/6
C.S. Donovan 1/10/70 to 1/11/70	2/6

Jarrah sawlogs and sandalwood were among the first official exports from W.A., but perhaps an even earlier, though unofficial, forest-produce export was firewood. In February 1857 at least twelve New England whalers were anchored off Busselton, all engaged in trade with the settlers; selling just about everything the settlers required - crockery, glassware, nails, rope, clothing, candles, brooms, wire, brandy, apples (dried presumably), tobacco, slush oil, shoes etc., and in return buying beef, potatoes, onions, pumpkins, dairy produce and firewood. Customs records show that all the ships took on firewood, mostly from ten to sixteen cords each, for which they paid 10/- per cord.

The whalers frequented most of the bays around the South-West coast: Geographe Bay, Flinders Bay, King George Sound, Two People Bay and Esperance Bay were especially popular with them. Before about 1842 no customs duty was collected at these outer ports and consequently there are no official records of whalers' visits; but it was said that nearly 300 American and French whalers were operating along the south coast of Australia in 1841, and American whalers are known to have taken at least £30,000 worth of oil off the West Australian coast in 1837.

Whaling along the south coast of W.A. was pionerred by a Launceston based ship early in the century and it is known that American and French ships worked land-based Bay whaling operations in W.A. at least as early as the 1830's; and probably even earlier. One of these of which there is some record, was the French ship "Mississippi", the crew of which was engaged in Bay Whaling near Esperance when they assisted John Eyre in 1841.

Though there are no records to prove it, we can be sure that all the whalers which visited the South-West coast, took on supplies of firewood for the purpose of rendering down the whale blubber: an operation which was performed on board the whalers when at sea. It is likely too, that some of them obtained masts and spars, especially from places like Nornalup and Walpole Inlets.

A timber company was formed at the Vasse in 1849 and soon after that milling became an important industry in that district. Mr Henry Yelverton is credited with having built the States first steam powered mill at Quindalup. His first mill constructed in the 1850's was close to the Quindalup beach where he also erected a jetty, but a few years later, probably about 1860, he moved his mill some distance inland, closer to the forest, and ran a wooden railed railway line from it down to the jetty. It is not clear whether the first mill was steam powered or not, but certainly the second one was.

Other mills - or "timber stations" as they were called then - were built by the W.A. Timber Co. at Lockville, near Wonnerup - where the company also erected a jetty - and at Yoganup, out in the hills about 16 miles from Busselton.

Most of the workers at these mills were exconvicts, both expirees and ticket-of-leave holders. The T/L men had to report to the police whenever they changed employment or moved from one district to another. They were sometimes engaged in loading timber ships from the jetties, but they were not permitted to work on the ships or to go on board. No doubt for fear they might hide away on the ship, or be hidden by the crew, and so escape from the colony.

On their frequent visits to the mills the police kept a close check on mill workers. Sly grogging was quite rampant on the timber stations from time to time, and had to be put down. But, there were what we would now term "forest offences" to be attended to also.

On a visit to the Quindalup mill in 1876 Police Constable Carroll discovered four ticket-of-leave men cutting firewood on Crown Land, without having first obtained a licence. The constable rode back next day armed with a summons for each of the men to appear in court. Unfortunately the outcome of these cases was not recorded.

On June 6, 1874 P.C Kelly of Busselton wrote to Sub-Inspector Dyer of Bunbury.

> "I beg to state for your information that the Resident Magistrate has instructed me to warn Teamsters employed on carting timber for the W.A. Timber Co. that they must take out Timber Licences and if they neglect to do so the R.M. has instructed me to prosecute them for removing timber off Crown Lands without a licence. These instructions are issued in consequence of an opinion given by the Attorney General to the effect that Teamsters employed in carting timber away from a pair of licenced Sawyers or Fallers ought to be licenced also. I intend to proceed to Yoganup on 22nd inst., to carry out the instruction of the Resident Magistrate."

On June 23 P.C. Kelly laid charges against teamsters, charging them with removing timber from Crown Lands without a licence. The cases were heard before the Resident Magistrate W.R. Bunbury and J.G. Bussell esquires, and to the amazement of P.C. Kelly, all were dismissed.

The bench gave no reason for dismissing the charge. "It could not be for want of proof" wrote Kelly to Sub-Inspector Dyer "because the defendants admitted the charge of removing timber off Crown Land without a licence but pleaded that they had a right to do so."

However in November of the same year Lance Sergeant Back found several teamsters at Yoganup removing timber without a licence. Most paid Back for licences, but one named Tyler refused and was charged and fined £1-1-0 and ordered to take out a licence.

In another incident at Busselton in 1860 P.C. Newett seized 683 posts and 1083 rails which two timber cutters had split for a local grazier without having obtained a licence. The offenders were fined 20/- with 11/- costs and the rails and posts were forfeited to the crown.

For some time prior to 1896 forest activities had been administered by the Lands Department, but in that year a new department, the "Department of Woods and Forests" was created under the Minister for Lands. Mr John Ednie-Brown, a forester of world-wide experience. was appointed Conservator of Forests and took charge of the new department.

Ednie-Brown was responsible for the appointment and training of W.A.'s first forest rangers and timber inspectors and after he died in 1899 the Department continued on under Mr C.G. Richardson, who was not a trained forester, but had been chief clerk of the Department under Ednie-Brown. It was not until 1916 that another trained forester was appointed. The new appointee Mr C.E. Lane-Poole was made Inspector-General of Forests and later when the Forests Department was formed he became its first Conservator.

In 1903 there were seven forest rangers spread very thinly over the state. They were the Inspecting Ranger, Patterson, stationed at Chidlows Wells, Inspector Fitzgerald at Waroona, Forest Rangers, Brockman at Donnybrook, Willmott at the Warren, Williams at Collie, Kelso at Coolgardie and Penna (or possibly Pennell) at Menzies. Earlier three other rangers had been retrenched, one of them had been at Katanning looking after the old sandalwood area, one at Northam - the first sandalwood inspector - and the other at Southern Cross looking after mining timber. The Public Service Commissioner considered they were unnecessary.

The rangers' duties included preparation of all applications for conditional purchases in forest areas, homestead farms and grazing leases; applications to ringbark were referred to them for approval so that they could examine the land to see that no valuable timber would be destroyed. They had to issue licences, collect fees and royalties, control boundaries of leases, crown land and government reserves, and administer the Act and regulations generally. The Inspecting Ranger in addition to controlling his own area had to regularly inspect the other rangers' work.

The area controlled by each man was quite vast. Before the appointment of Willmott, Brockman's area covered the whole south-west of the Brunswick River, inland to the Great Southern Railway and right down to Albany. In 1903 the area south of a line between Bridgetown and Margaret River was handed over to Willmott. Even then Brockman's territory contained 7 mills and over 200 sleeper cutters. He had had up to 300 sleeper cutters and 10 mills to control, yet more than half his time was taken up with conditional purchase inspections and surveying lease boundaries.

The annual salaries of some Forestry Officers in 1903 were:- C.G. Richardson £300 (the same salary as Ednie-Brown had received), Inspecting F/R Patterson £220, F/R Kelso £180, F/R Brockman £170. The other rangers salaries ranged between £160 and £170. The nurseryman at Hamel received £225.

There were also several timber inspectors. One of these was a former convict who had been transported to Australia for murder and who, after his release, in a fit of rage killed another man for insulting his wife. He again escaped the gallows, being sentenced to only six months imprisonment because of strong provocation.

Before becoming a timber inspector he had worked in a mill at Sawyers where sly grogging was very prevalent. This former convict went to the mill manager and suggested he support an application for a licenced hotel. The manager did so, the licence was granted, sly grogging ceased and the mill crew became more sober and less troublesome. As a sleeper inspector he tried hard to do away with cutting sleepers on the quarter, but much to the relief of the sleeper-cutters he was unsuccessful in this.

When the Forests Department was formed some of the forest rangers mentioned here were absorbed into it and so became our first foresters. Old records can tell us much about the early days of forestry and the timber industry but they tell us very little about the sort of persons these men were.

Recently in a conversation I had with Dick Perry he described Forester Fitzgerald. It was a most vivid description and told me much more about the man than all the records could. Perhaps Dick and some of the other retired foresters can be persuaded to write something about those "old-timers" for Forest Notes.

ARAUCARIA SEED COLLECTION - P.N.G.

Chris Done (Nannup)

A specially trained group of about 15 men is stationed at Bululo for the specific purpose of Auracaria species seed collection. Since seed of the species is suitable for collection only during the period August/October each year the gang is employed for the other nine months on road maintenance works.

Since when is seed collecting such a difficult job that a special gang has to be maintained all year round to cater for it, you may ask. Fair enough too, but these blokes don't do their collecting at ground level in the wake of logging operations (because the amount obtainable in this way is far too limited), but they do their thing at 70 to 80 metres above ground level.

The two species concerned are Araucaria hunsteinii (Klinkii Pine) and Araucaria cunninghamii (Hoop Pine) which are important in plantations in P.N.G., and which both grow naturally in the Montane Forests of the country. Interest is being shown by other tropical countries (e.g. Malaysia) in Klinkii Pine and trial shipments of seed have been sent for evaluation to these places.

From about the end of May each year sample collections are made at weekly intervals from the various "seed stands" and when a large percentage of seeds in the cones is shown to be viable during lab. testing, a decision is made to start collecting in earnest. Fortunately the seed stands come into optimal production at varying times and attempts are made to collect from the stands with the highest percentage of viable seeds at a particular time.

The stands are rarely accessible by road except where logging is currently in progress, so it is usual for the "climbers" to have to carry their leg irons, rope, bags etc, in to the site - usually a distance of at least 2 km through rough terrain - before the day's work can commence. The climbers gain access to the crown of the dominant Hoops and Klinkiis by either climbing adjacent subdominant trees or by "walking" up the tree itself using leg irons and ropes to the lowest whorl of branches - from which point climbing through the branches is a relatively simple task.

Once "safely" in the branches, the climber uses a long light bamboo pole to reach ripe cones and knock them to the ground. The cones are pineapple shaped and vary from fist to football size. When all the suitable cones have been knocked down, ground teams bag them and carry them to the nearest point of road access for transport back to base.

The cones are then dried on racks in a well ventilated building till the seeds can be separated from the core and the trash removed. This takes 1-3 weeks, depending on the state of ripeness of the cones, and the seeds are then dewinged and placed in large airtight containers for cold storage if not required for immediate sowing.

Viability of the seed is maintained best under cold moist storage (0-4^{o}C for Klinkii), but even under these conditions it can be much reduced by the time the seed is required for sowing. Very poor germination has been obtained in some cases, particularly where the seed has had to travel long distances (e.g. overseas) or where it has been stored under less than ideal conditions.

The Department of Forests of Papua New Guinea has a target for annual collection of some 2000 kg of Klinkii seed, and 1200 kg of Hoop seed. Nearly all this is currently for domestic use. To collect this amount a combined total of over 20 tonnes of cones is required. Major areas of collection are at Bulolo, Wau, Garaina (Morobe Provence) and Jimi River in the Western Highlands Provence, whilst the main storage and handling centre is at Bulolo where a huge drying room and two new 4 m x 5 m x 2.4 m freezers are in operation.

"NANNUP NOTES"

D.A. Bottrill

Events of world shattering importance did not happen at Nannup since your correspondent's last report, however, like a volcano Nannup is unpredictable so watch out!

It is sad to report that the final move has been made to split the outstanding team of Forests Department staff who for the last four or five years has managed Nannup Division so well.

The Conservator's will be done and so Chris Done becomes D.F.O. Nannup. D.F.O. Ashcroft leaving for Como and the Northern Functional Group. Neil Phelps has moved to Bunbury to help get the Dardanup Chipwood Plant programme off the ground. Phil Tomlinson has moved to Jarrahdale to help it through the trauma of losing Frank Vince. Even your correspondent is to receive his reward for training all those brilliant people, by being posted to the seaside resort of Busselton. Arrivals at Nannup have been, F. Vince from Jarrahdale, and Ian Scott from Grimwade, with two further additions due in the near future as and when appointments are made.

LEWANA CLOSES

The closing of the Lewana Park outstation has been effected after a short but colourful history of 16 years. The settlement consisted of houses moved in from an older settlement at Willow Springs (the site of which is now an arboretum and pleasant picnic spot). Other houses came from Northern Division, the construction of the settlement being handled by Tuvik and Freedman and Daltons of Bunbury. A/F Harold Pears of Collie was in charge of the Lewana gang in the beginning as Overseer after moving there from Willow Springs, he remained as Lewana's overseer for 5 years.

The first year of the settlement seemed to be full of problems, these included plagues of snakes, cats and doublegees. The cats were dealt with as humanely and quickly as possible by night shooting, the report being that 50-60 cats had to be destroyed to reduce and disperse the numbers. Dozens of snakes were also killed during the first summer and from more recent reports it would appear that snakes still have a liking for the area.

Hard as it may be to believe by those of us in larger centres, these events all occurred from 1960 onward. In those days of satellites and television Lewana's water supply dried up, causing water to be carted by truck from Garvins Bridge during its first summer. Electric power was also something for the future, this not being connected until 1963, till then kero was king for lights and fridges.

The children of the settlement were originally required to attend school in Balingup and had to walk the first 1½ miles before connecting with the School bus. This meant that they had to leave home at 7 a.m. to meet the bus at 7.30. Anyone who knows Lewana will remember that the fog lies in the valley there until mid morning and the danger of up to 15 kids walking the narrow twisting Balingup road may be imagined. Due to this, approval was eventually obtained for the children to attend school at Nannup and a bus service to the settlement provided. This was just as well, for Lewana proved to be a fertile valley for more than pines, families of up to 11 children lived there at one time or another. In fact the last note-worthy event for the settlement was the birth of a baby boy to the wife of Overseer J. Smith only 6 weeks before the closure.

As there were no shopping facilities at Lewana all supplies had to be obtained from outside the settlement. Normally this did not present too great a problem, though during school holidays fresh bread and milk only arrived every other day without the school bus to bring it each morning. The problem of supplies however was never as bad as it became in 1963 and again in 1964 when flood waters cut the settlement off from Nannup and Balingup. In 1964 even after the floods had subsided the roads were impassable due to landslides so that the isolation extended to 4 or 5 weeks. During this time the children were taught lessons by the mothers at the settlement office. Milk had to be obtained from a nearby farm, which had to be reached cross-country by tractor. Other supplies were only obtainable by towing a jeep with a tractor, as far as Ellis Creek Road from where it could drive to Manjimup. Bridgetown and Nannup were also isolated at this time due to the flood. Through all its travails however, the Lewana gangs managed to get plenty of work completed and build a reputation as a good settlement. Men employed at Lewana in the past seem to have been well thought of as many of them have gone on to become overseers elsewhere due to their capabilities as forest workers.

Basically a very happy little settlement, Lewana survived close calls from fires and floods, plagues of rabbits and cats and other problems till the men finally worked themselves out of a job and were transferred elsewhere. Not an early settlement or a large one but one that served Nannup Division and the Department well.

Lewana is being leased to the Recreation Council and will not disappear entirely and it is hoped that the groups making use of it's houses will be inspired by the same good feelings and co-operation that grew there amongst the families of the Department.

PINES

Planting at Nannup this year was much drier work than usual due to the unseasonable weather. The Nannup gangs usually used the excuse that as they were wet outside they might as well be wet inside - the lack of this excuse did not seem to cramp their imbibing this year.

STAFF

A very interesting virus has been attacking staff from Nannup over the last twelve months. The incubation period for the virus seems to be 4-5 days and these days must be spent at the Geographe Bay Motel. The symptoms are fairly similar to ANZAC DAY or GRAND FINAL DEPRESSION but seem much harder to shake off. This infection seems to be fairly widespread as reports from all Divisions indicate sufferers and even Head Office was not spared.

Though he hasn't been with us very long, Chris Done has managed to increase the population of Nannup by one, a son - his wife Pip helped of course. Both parents seem very pleased with the results of an idea conceived in the Highlands of Papua-New Guinea and born in the Sunklands of W.A. A.D.F.O. Peter Beatty whose romantic pursuits were beginning to rival Warren Beatty's (a close relative we believe) has finally made a choice by becoming engaged. This has made for greater efficiency in the office as it limits the number of phone calls received and the guesses as to which lady is calling this time.

GOLF DAY

Nannup Golf Day was held again this year and despite a lower turn out than in the previous year, a good time was had by those attending. Due to the greater ability of Nannup Staff the results were most pleasing and just.

Mens Winner	Paul Marsh
Runner Up	Bob Brierley
Ladies Winner	Lorraine Marsh
Runner Up	Pat Phelps
Best Husband and Wife	Neil and Pat Phelps
Team Trophy	Nannup Division
Hardest Worker	Frank Vince
Ladies Hardest Worker	Jan Love

This event which is held each year required the support of Departmental staff as does this magazine, for Forest Notes and Nannup Golf Day. "Please Be In It".

"NANNUP GOLF DAY"

To Nannup once a year they come,
and try with skill and guile.
A perverse little ball to guide
over many a weary mile.
Over the hill beneath the trees,
one can hear a plaintive call,
of a Forester down on his knees
trying to find his ball.
He hit a great shot off the tee,
but finds to his great despair
when he gets to where his ball should be,
the rotten ball's not there.
Each hole he plays is just the same,
and crawling up "Cardiac Hill" he
swears he'll never play again,
though he knows darn well he will.
At the nineteenth hole he wipes his brow,
whilst he eats and drowns his thirst.
Then he collects his bets off sadder men
the lucky sod finished First.

*****

Your correspondent wishes you Goodbye from Nannup and it's whispering pines and hopes to send future reports from "Beautiful Busselton".

RECENT ADVANCES IN KARRI REGENERATION TECHNIQUES

By Cam Schuster and Tony Annels

Recently the majority of the sawmill cutting in the southern forest types has moved away from the pure karri stands into the mixed/karri stands. This, when taken with the overall expansion in sawmill cutting of karri, has placed greater pressure on the seed tree system that has been established to cater for karri regeneration.

Seed tree system of natural regeneration

This system involves selecting superior seed trees at a rate of 3 to 5 per hectare; clearfelling and utilizing the remainder of the stand, then burning to create an ashbed and remove the debris. After seedfall has occurred, the seed trees are logged by the sawmillers to remove any shade competition at all from the regenerating stand.

While this system is still the easiest and least expensive method of regenerating cutover karri stands, it has some disadvantages. Because an area can only be burnt when the seed trees have a sufficient seed crop to permit adequate regeneration, some cutover areas have to be left for up to three years unburnt due to the four-year floral cycle operative in karri. This not only constitutes a fire protection risk, but also means that there is a loss of up to 3 years in yield from the stand, as well as delaying restoration of the aesthetic qualities of the sites.

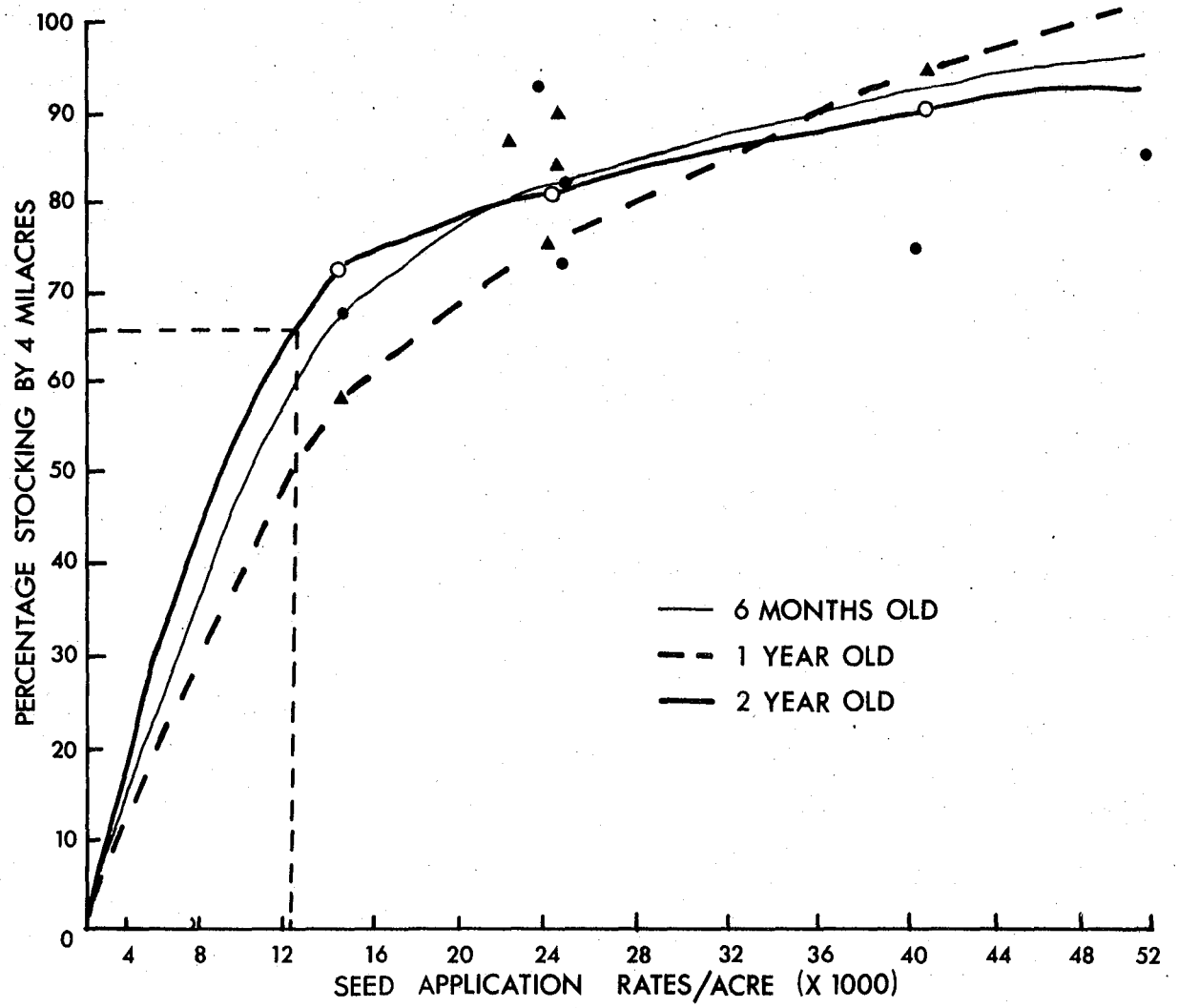
Artificial regeneration - Hand planting

In the past the major method of artificially regenerating cutover karri stands has been hand planting of open rooted nursery stock. This has been proved extremely successful but also has several disadvantages. These include the very high cost of the planting operation, and the need to tie a great deal of the labour resource to the one operation for the eight to ten weeks of the planting season.

Direct seeding

The major alternative to hand planting at present is artificial seeding. Although fragmented research has been continuing into this technique since 1935, it is only since 1974 when S.D.F.O. Kimber established trials using pelleted seed that the broadcast seeding of large areas has become feasible.

FIGURE 1


PERCENTAGE STOCKING BY 4 MILACRES
100
90
80
70
60
50
40
30
20
10
0
4
8
12
16
20
24
28
32
36
40
44
48
52
SEED APPLICATION RATES/ACRE (X 1000)
6 MONTHS OLD
1 YEAR OLD
2 YEAR OLD

The pelleting and seeding technique are similar to those developed by the Victorian Forests Commission for conditions similar to those found in the karri forests of the south west. Briefly, the pelleting is done in a small concrete mixer where clean seed is continuously rolled and undergoes successive applications of a water soluble glue (Methofas) and kaolin clay (a mass of approximately four times the mass of the seed is eventually added). Small quantities of an insecticide and fungicide are also added. The pelleted seed is then sieved to a uniform size for ease of spreading. To give a manageable volume for spreading, a bulking agent with inert pellets of similar size and density to the seed is used. At present Potato Manure E fertilizer suits this purpose and an application rate for seed and spreader of about 6.2 lb/ac (6.95 kgs/ha) is aimed for.

Three trials in all have now had at least two measurements. The results are shown in Figure 1.

It can be seen that all trials to date have achieved more than adequate regeneration; even at the lower seeding rates, i.e. above the 65% by 4 milacres stocking suggested as a minimum by White, (1972). Metric measurements have not been used here because all surveys up to 1976 have been done using the milacre standard, and this cannot be readily metricated.

The problem is then to determine the optimum application rate for most efficient use of the seed resource. Figure 1 clearly shows that to go above 24,000 seeds/acre does not greatly increase regeneration stocking, but merely results in wasted seed. The minimum sowing level at which seeding can be considered successful is not as well defined due to lack of data, but appears to be in the region of 16,000 seeds/acre. Trials are at present in hand to further research this aspect of broadcast seeding.

A further important aspect of artificial seeding that requires careful examination is the principle of spot seeding on favourable sites. This technique, if developed, will have an important influence on the efficiency of seeding operations as it will economise greatly on the use of seed while still allowing regeneration to fully restock an area. A field trial of this technique is being planned for autumn 1977.

The major disadvantage of the broadcast seeding techniques at present is the high use of seed (approximately 20,000 seeds/acre (50,000/ha), as opposed to around 600/acre (1500/ha) for regeneration by open rooted nursery stock). This means that at present, given the high cost of seed collection, seeding and planting are approximately comparable in cost. However seed collection costs can be substantially reduced as current techniques are refined, and this may reduce the cost of

seeding to below 75% that of planting (R.J. Underwood, pers. comm. 1976). Even under the present cost structure artificial seeding has the advantage of being far less labour intensive, as well as requiring far less time to treat a given area, than is regenerating by hand planting.

At present the seed tree system of natural regeneration is favoured only when the time of burning in a coupe coincides with a heavy seed crop (i.e. in general every fourth year large areas will be regenerated with the seed tree system).

This means artificial regeneration (i.e. hand planting or direct seeding) will become increasingly important in future karri forest management. Of the two artificial methods, hand planting will continue to predominate until the direct seeding operation can be refined by research, principally with the aim of economising in the use of seed.

SUMMARY

Broadcast seeding of karri is a successful and efficient method of regenerating cutover karri stands. At present the high intensity of seed use in the technique, and the accompanying high cost of seed collection limit its usefulness,but this situation is expected to change as seed collection efficiency improves.

The bulk of research to this time has revolved around firstly, testing the success of the technique, and secondly, limited trials of differing sowing rates. Field trials initiated in 1976 are examining the effect of soil type and time of seeding, and those planned for 1977 include trials to test low seeding rates and spot seeding techniques.

REFERENCE

White, B.J. 1972. Regeneration Surveys - Karri. Unpublished Ms. For. Dep. West. Aust.

MAINTENANCE OF ROAD-VERGE SHRUBBERY

A.B. SELKIRK

To study the effect of prunings on native shrubs a pruning trial was laid down in March 1976 in a roadside planting (of about 8 years of age) at Mundaring Weir H.Q.

Planting species with a capacity for regeneration under a certain amount of competition were selected, bearing in mind that little maintenance could ever be applied on such areas.

The original planting included kangaroo paws, which died out after flowering well for 2-3 years. No watering was done after the first year of establishment.

The resultant data sheets show that considerable improvement can be expected from the right type of pruning.

With the careful selection of species known to be adaptable to different soil types and aspects of road-verge environment, it could be expected that such management need not be expensive. Mechanical slashing could quite easily be used in conjunction with rotational prescribed autumn burning to favour these species requiring heavy prunings, and to obtain a recycling from seed of those destroyed by heavy slashing and fire.

Thorough preparation of the planting site is essential for initial establishment. Grouping of species according to their degree of vigour is necessary to reduce the possibility of site domination by a vigorous form.

Such species as Grevillea endlicherana, Grevillea drummondii and Grevillea bipinnatifida, could be included in a group of vigorous growers capable of regeneration after heavy pruning, slashing and burning, either from coppice shoots or seedlings. It may be desirable to develop stretches of monotonous verge of one species to accentuate the effect of a variety of colourful flowering species, e.g. Verticordia or Lechenaultia.

Perpetual maintenance of native flora on median-strip and road-verge environments is something fairly simple to manage, as shown by the data sheets, provided selection of species and soil types are given due consideration.

RESULTS AND COMMENTS ON PRUNING TRIALS

ON 8 YEAR OLD NATIVE SHRUBS AT MUNDARING WEIR 1976

SPECIES	TYPE OF PRUNING	GROWTH RESULTS	FLOWERING RESULTS	COMMENTS
Sollya fusiformis	Very heavy cutting to base stems	Very vigorous growth	Delayed at least 12 months	A regeneration of the complete shrub.
	Moderate clipping to shape	Good uniform growth	Very good	Can be nicely shaped by this method.
	Unpruned	Straggly form	Sparse	Old material shows poor colour etc. from insect attack.
Grevillea drummondii	Moderate clipping to reduce size of shrub	Good uniform growth	Very good	Confined flowering to inner section of the shrub.
	Unpruned	Straggly and untidy with extended time	Very good	Unpruned shrub tends to carry more flowers on the extremeties. Regenerates from seed on mineral soil without influence from fire.
Kunzea baxteri	Leaders cut back, laterals thinned	Good vigorous growth	Good	Control by this method is desirable.
	Unpruned	Good	Good	Shrub becomes very woody and straggly form with age.

SPECIES	TYPE OF PRUNING	GROWTH RESULTS	FLOWERING RESULTS	COMMENTS
Verticordia plumosa	Heavy clipping	Moderate growth	Very poor	Late March does not appear to be the time to use this type of pruning on this species. Late December after seeding may be O.K.
	Thinning of leaders	Good growth	Very good	Autumn pruning seems to be the thing for this method of crown reduction and flower heads are improved in form.
	Unpruned	Moderate	Good	Shrub has a long life, approx. 30 years and becomes straggly and extremely woody if left unpruned.
Adenanthos ieges	Unpruned	Good prostrate form	Good	Most of this specimen's growth is made in summer. Apart from control of size no pruning is necessary. Seeds in March.
Adenanthos cygnorum	Moderate pruning of leaders and thinning of laterals	Good	Good	A good method to maintain form and flower production.
	Unpruned	Moderate	Good	Shrub develops a straggly habit and large woody leaders.

SPECIES	TYPE OF PRUNING	GROWTH RESULTS	FLOWERING RESULTS	COMMENTS
Callistemon phoeniceus	Very heavy	Vigorous lush growth	Nil	Flowering set back up 2 years.
	Leaders cut back, laterals thinned	Good overall growth	Good	A good method of control with this shrub.
	Unpruned	Woody main stems and straggly leaders	Good	Unpruned specimens become unshapely. This shrub has a very long life approx. 40 years.
Cassia eremophila	Very heavy to base stems	Vigorous lush growth	Moderate to light	Shrub needs to be well established before very heavy pruning.
	Moderate clipping	Good growth	Very heavy	A good method of pruning for flowers and shape.
Acacia fauntleroyi	Very heavy	Nil	Nil	Heavy pruning responsible for death of tree.
	Moderate cutting of leaders	Very good	Very good	This shrub needs annual shaping and crown reduction for control.

SPECIES	TYPE OF PRUNING	GROWTH RESULTS	FLOWERING RESULTS	COMMENTS
Grevillea bipinnatifida	Heavily pruned to stem base	Very vigorous lush growth	Very poor Retarded for 12 months	Shrub is completely regenerated. Good expectations.
	Heavy thinning of leaders	Good	Very good	A good method to maintain form and flowers.
	Unpruned	Moderate	Good	Very straggly form develops with age and size of shrub.
Darwinia citriodora	Heavy clipping	Good and vigorous growth	Retarded light	Method O.K. for shaping better flowering in 2nd year.
	Leaders and laterals thinned	Good growth	Good	Good number of full coloured bracts
	Unpruned	Straggly and average	Good	Untidy straggly condition develops after 4 years. Pruning is necessary.

SPECIES	TYPE OF PRUNING	GROWTH RESULTS	FLOWERING RESULTS	COMMENTS
Chamelaucium uncinatum	Moderate thinning of leaders	Very good	Good	Plant becomes woody with age. This seems to be the best method on maintenance.
	Heavy cutting of major limbs	Rather vigorous	Rather poor	Better flower could be expected in the second year.
Calytrix angulata	Light cutting of crown, thinning of woody sections	Good	Good	Heavy pruning can kill. Regeneration after burn is good from seed fall.
	Unpruned	Short growth	Good	Eventually becomes straggly.
Grevillea endlicherana	Clipping of extended crown shoots plus thinning of woody sections	Good vigorous growth of flower shoots	Good	Regenerated from seed on mineral soil without influence from fire.
	Unpruned	Straggly, untidy	Good	Becomes tall and less attractive, but can be O.K. for a considerable number of years.

USE OF PHOS-CHECK FIRE RETARDANT

At a recent pine fire (Compartment 75, Section A, Gnangara) Phos-Check was used under actual pine fire conditions, for the first time at Gnangara, and the benefits from using the retardant were obvious.

The fire occurred in an area planted in 1942, reduced by a second thinning to 500 SPha in 1966 and further reduced to 125 SPha in 1973, with no pine burning since this latter thinning. Reasonably heavy needle fall and old tops still retaining some needles formed a very inflammable fuel which burned fiercely. The R.O.S. index at the time of outbreak was 54/h with a south-west wind of 30 km/h, and the R.O.S. becoming 118 m/h with the application of the fuel correction factor.

The small fire developed quickly from the southern boundary of the compartment for a distance of approximately 50 m, and was knocked down just as the first H.D. emptied its tank of water. Before a second H.D. could get to the head fire this had developed again strongly on the north east side on a narrow front of approximately 10 m and with flame height to 3 m. The third H.D. containing Phos-Check assisted to knock down the head fire and then immediately laid a swathe of Phos-Check approximately 4 m wide at the head of the fire and around both flanks for a certain distance. Numerous spots within 50 m of the head fire had been put out by this time.

The outstanding effect of Phos-Check was that where it was applied as a swathe flames did not subsequently appear, although debris continued to smoulder and strong winds dislodged smouldering duff and continued to start spot fires outside the Phos-Check swathe. Where Phos-Check had not been applied as a swathe flames continued to break out even at the tail of the fire.

The total area burned was .2 ha and the total volume of Phos-Check used was 900 litres.