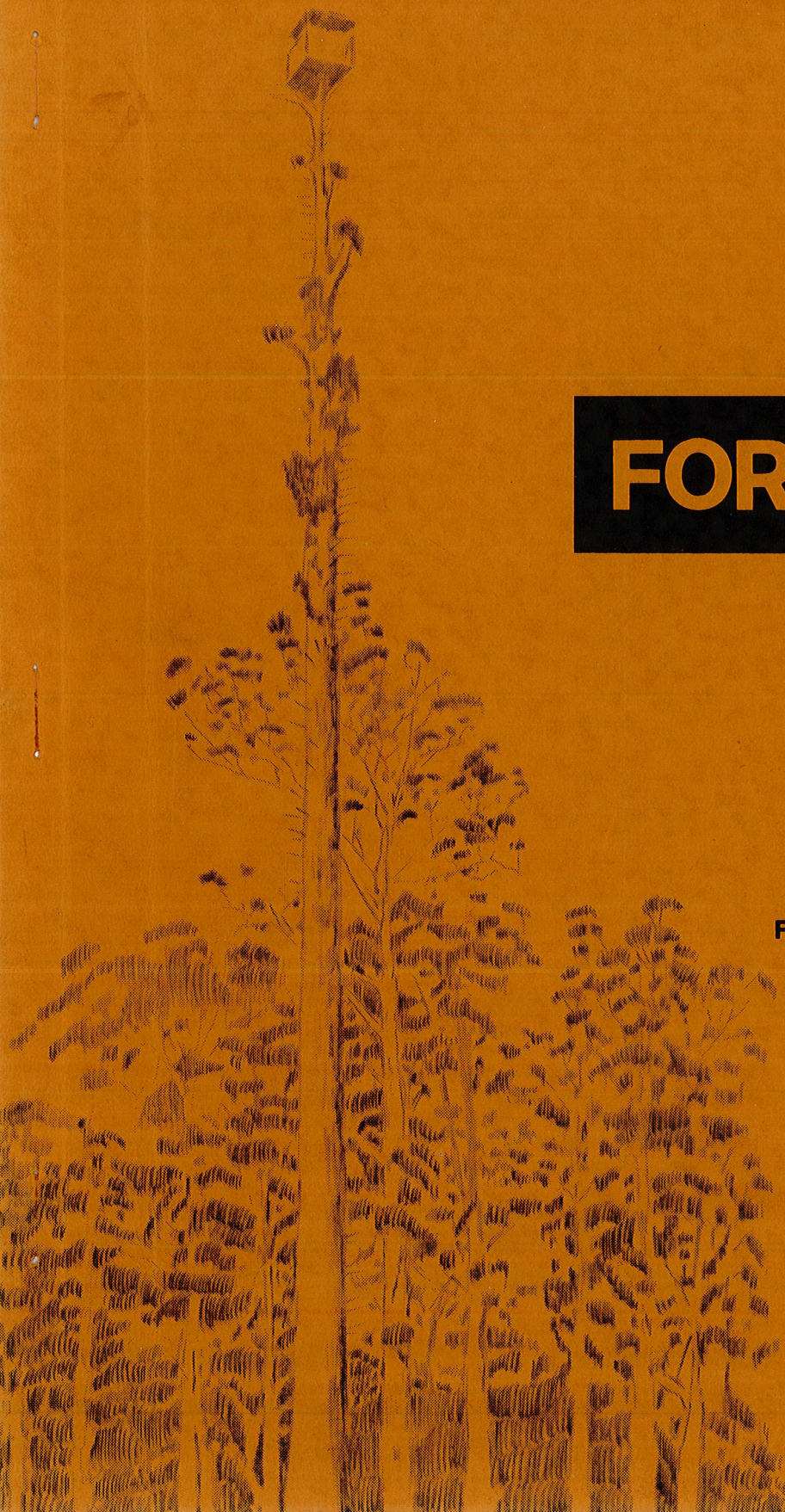

FOREST NOTES

Forests Department Perth Western Australia

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Forests Department,
KIRUP. 6251.

The Editor,
"Forest Notes",
PEMBERTON

Dear Sir,

On a recent clean up in the Kirup Office the following letter was unearthed. It is considered appropriate at present as Mr. Stewart has recently retired as the Conservator of Forests. It shows that even future Conservators have their problems. As a background to the letter, there had been considerable prior discussion as to the position and ground plan of the proposed Kirup Office shortly to be built under the supervision of Mr. Arthur Kelly and directed by Mr. Stewart.

Yours,

D.J. Keene
Divisional Forest Officer

Forests Department,
PERTH.

2nd July, 1953.

Mr. D.W.R. Stewart,
Forests Department,
MANJIMUP.

Dear Don,

The Kirup Office is still a shuttlecock apparently.

I have suggested that instead of building it back to front, you might consider putting 2 EC's upside down in front and lining the cloakroom with Kelly's rampant or a Stewart tartan.

Yours,

G.W. Nunn

PLANTING KARRI WILDINGS III

by

P.R. Skinner

This is the third article in a series dealing with the planting of karri wildings on failed regeneration burned areas. The first two articles described previous experiments which indicated that karri wildings could be planted successfully. A lightly trimmed 2' - 3' plant was the best size to plant, though smaller plants are more successful later in the season; and best results are obtained with earlier planting. It also appeared that for later plantings nursery stock hardened off by root pruning was easier to establish than wildings.

In the 1970 planting season a trial was established to try to determine the best time of planting for wildings, incorporating four different sizes and two different treatments of plants.

Plant size - four sizes were tried, 1', 2', 3' and 4'.

Treatments - stumped and trimmed. In both cases the roots were pruned.

Planting times - six different planting times for all four sizes and two treatments of plants were tried, starting on the 30th April and planting on the 30th of each month until the 30th September. In addition four plantings of 2' wildings only were made on 15th April, 15th May, 15th June and 15th July.

The combinations of planting time, treatment and size totalled 56 different plantings of 20 plants each, which were randomized within a block. The trial was replicated on two different sites. Unfortunately one replicate on a difficult site gave such poor overall results that for statistical purposes the trial here was abandoned. The pattern of survivals in the few remaining plants confirmed the results from the other site.

Table 1. 1 (a)

Percentage Survivals at the end of the first Winter

Planted	Stumped				Trimmed			
	1'	2'	3'	4'	1'	2'	3'	4'
15th April	-	30	-	-	-	85	-	-
30th April	20	20	0	0	60	25	15	10
15th May	-	0	-	-	-	45	-	-
30th May	25	10	5	30	30	35	10	30
15th June	-	25	-	-	-	65	-	-
30th June	25	15	10	15	70	45	50	45
15th July	-	0	-	-	-	75	-	-
30th July	5	0	0	0	65	65	20	0
30th Aug.	15	5	10	5	50	20	25	5
30th Sept.	0	25	0	5	15	35	25	25

Studying the results, it will be seen that mid-June to late July is the optimum time for planting trimmed plants, though the highest actual survival in one planting is that of mid April. The 1' plants have shown a better overall survival than other sizes in the plantings to 30th August, though it is interesting to note that in the 30th September planting the 1' size gave the worst results.

With stumps the overall survivals are much lower than those for trimmed plants, and the optimum planting time appears to be earlier - late May to late June. The comparison of the total survivals over the six comparable planting times at the 30th of each month is:

	Stumped	Trimmed
1' plants	15.0%	48.3%
2' plants	12.5%	37.5%
3' plants	4.1%	24.2%
4' plants	9.2%	19.2%

In addition to the main trial, two smaller trials were planted. At intervals from April 15th to June 17th, batches of twenty 2' trimmed wildings were planted at Pine Creek and Stewart Road to test the survival percentage. Though planting dates differed slightly these small trials showed the same trend as the larger one, i.e. fairly good survival in mid April, followed by a drop in late April, a further rise in mid to late May, and a drop again until the main planting time of mid June. The comparative percentage of survivals for the 2' plants is set out in figure 1.

Also at Pine Creek, 22 acres of failed regeneration area was planted with 2' - 3' wildings from June 4th to 12th as a normal Divisional planting operation. At the end of winter the survival rate varied from 46% to 73% in different areas, those plants on the hill slopes appearing to be the most successful, the morality rate being higher both on the hill-tops and in the valley bottoms. The overall survival rate was 61%, which as can be seen from figure 1 was consistent with the survival rate for the various trial plots over the same period.

Throughout 1970, measurements were taken of the root, shoot and height growth of karri wildings.

Roots

Each month ten 2' plants were pulled up, roots pruned, and transplanted into plastic pots. After four weeks these were pulled out and the freshly-grown roots removed and weighed.

Shoots

Each month ten 2' plants were selected in the field, and cut back to 9" height, all side shoots being trimmed off. After four weeks any new shoots were measured to the nearest ¼", both the shortest and longest shoot being recorded.

Height Growth

Ten trees from 2' - 4' were selected and their height increase measured monthly over a 12 month period.

The above three trials showed that both height and shoot growth began in early October, reached a peak in January, then decreased until mid April, when growth was dormant over

FIGURE 1

PERCENTAGE SURVIVALS OF 2' WILDINGS PLANTED TO JULY 30th

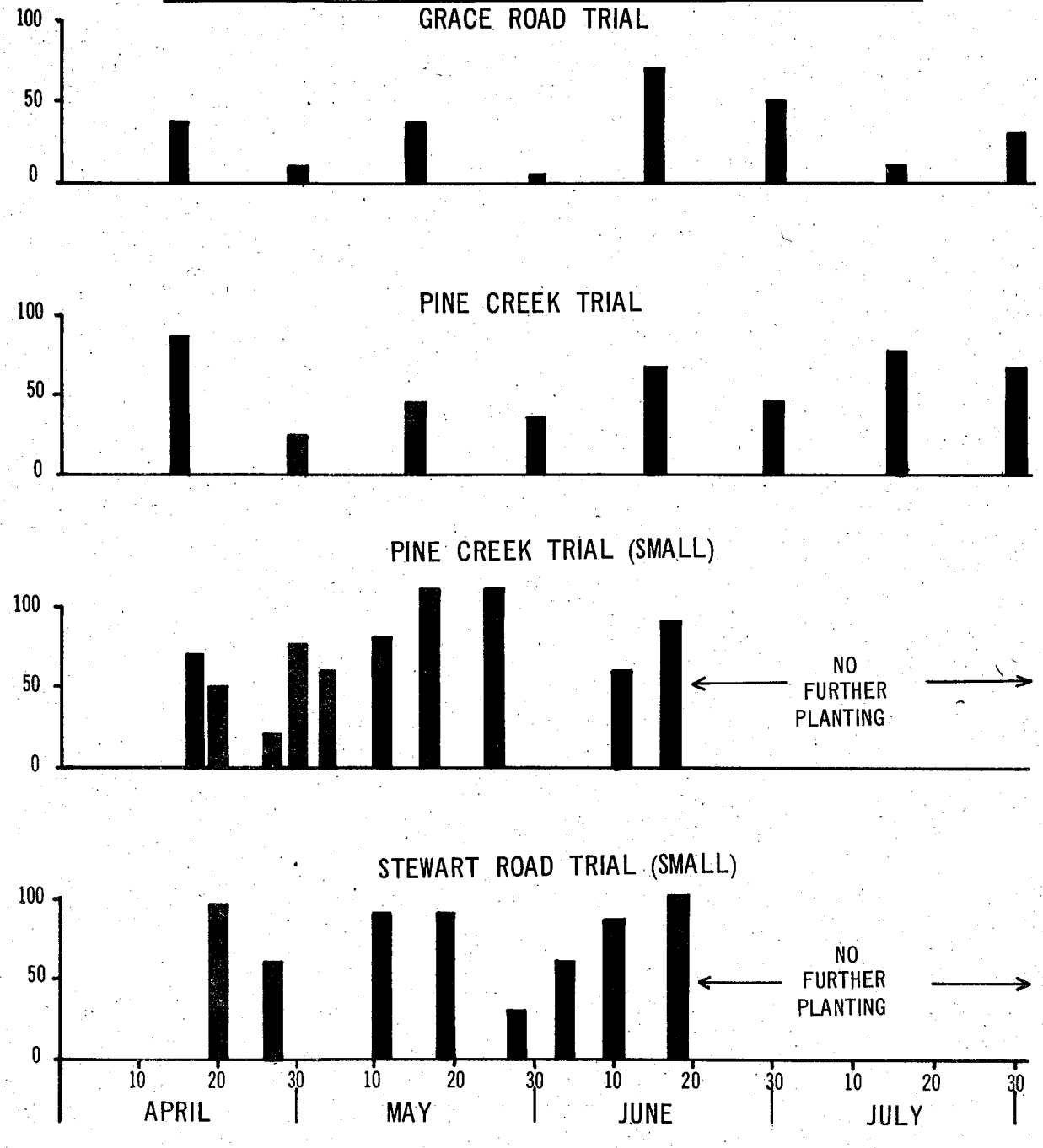
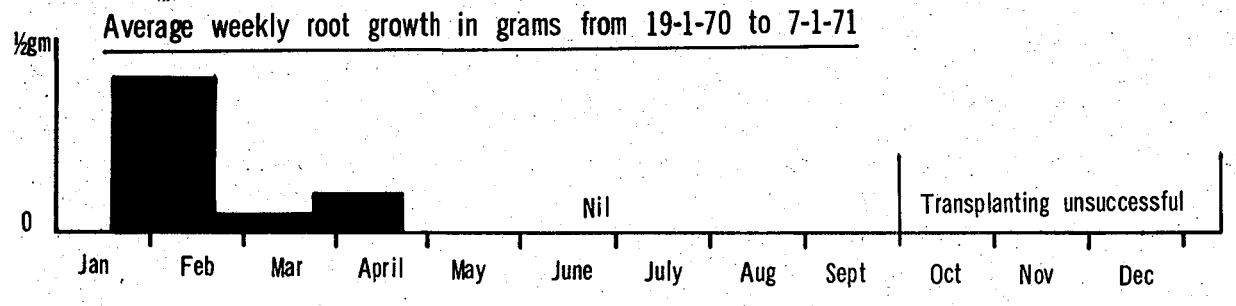
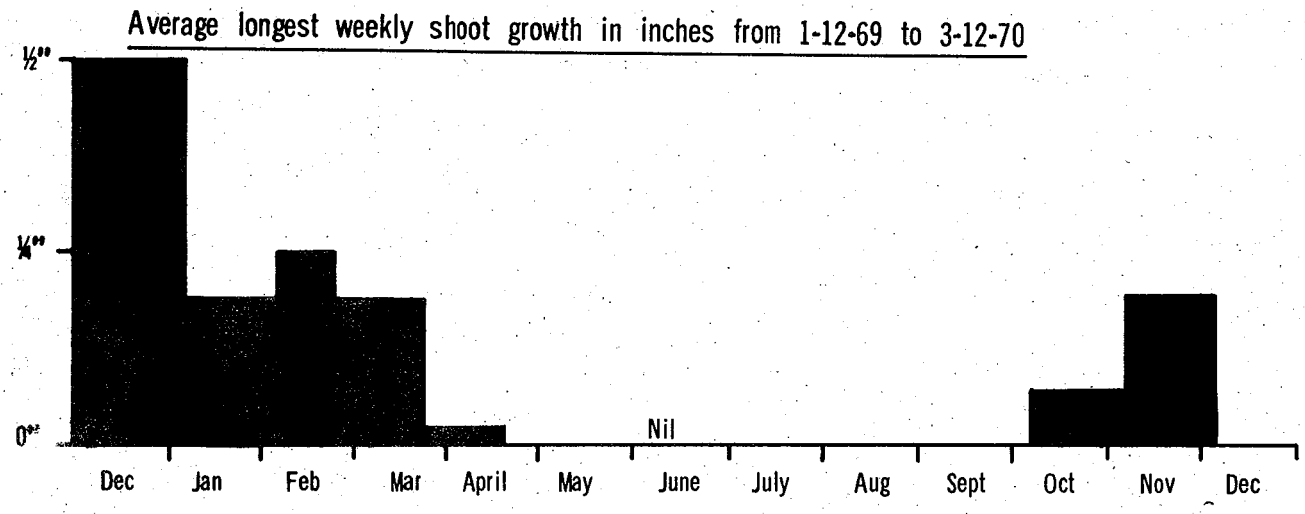
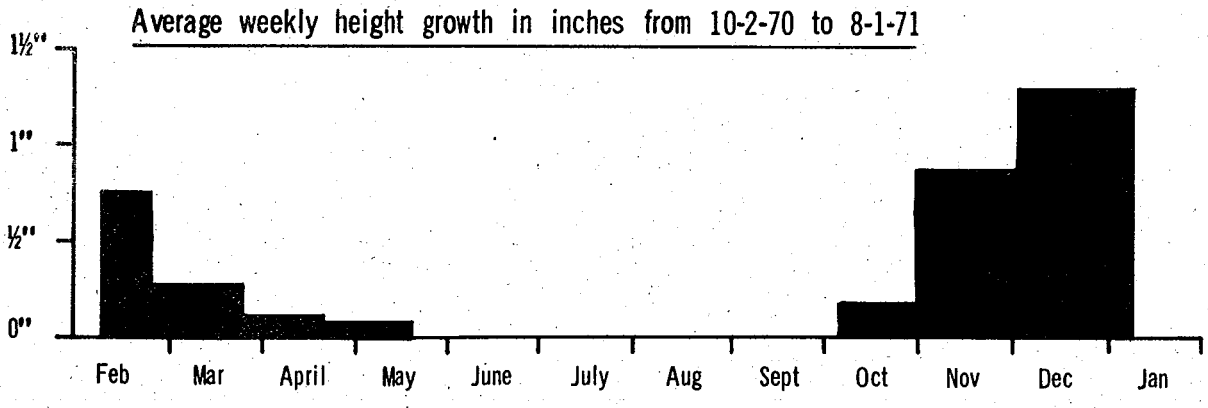


FIGURE 2


Average weekly root growth in grams from 19-1-70 to 7-1-71
½gm
0
Nil
Transplanting unsuccessful
Jan
Feb
Mar
April
May
June
July
Aug
Sept
Oct
Nov
Dec


Average longest weekly shoot growth in inches from 1-12-69 to 3-12-70
½"
¼"
0"
Nil
Dec
Jan
Feb
Mar
April
May
June
July
Aug
Sept
Oct
Nov
Dec


Average weekly height growth in inches from 10-2-70 to 8-1-71
1½"
1"
½"
0"
Feb
Mar
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan

the winter period. Root growth was high in mid February and then fell gradually until mid May, with a minor peak in April. There was no growth at all in the winter. The date when growth recommenced was unfortunately not obtained as all the wildings transplanted in the November to January period died before producing any new growth. (See Figure 2)

In an attempt to ascertain why the fluctuation in wilding survival rates, a "moisture build-up" was compiled. This is briefly a cumulative total of rainfall, less the loss by evaporation from the soil. Evaporation varies according to temperature, but if both daily rainfall and maximum temperature figures are known, a fairly accurate picture of actual soil moisture build-up can be ascertained.

It is clear that the build-up was between 3 and 4 inches by mid April, fell slightly by mid May, then rose sharply to around 5 inches in late May and 6 inches in mid June. It can be assumed that the soil moisture by mid April was sufficient for plant survival, and in fact the survival of wildings planted at this time is good. As there is no appreciable decrease in soil moisture after mid April, some factor other than moisture must be the cause of the higher mortality rate in later plantings.

It can be seen from Figure 2 that root growth is still active until late April, and as soil temperature and moisture then are both sufficient for growth, the plants are able to establish themselves and survive. By May soil temperature has dropped, root activity has reached a very low ebb, and it requires a high soil moisture content to enable the plants to survive. This high moisture content is not available until about mid June, but then is maintained throughout the winter. The rapid fall-off in survival of plantings after late July might be explained by the increased incidence of frost at this time of the year. Drying out due to the high winds may also be a factor at this time. This theory is consistent with the mortality pattern shown earlier in the Pine Creek planting area.

To summarize, two clear factors have emerged from the above trials. Trimmed plants are far superior to stumps in planting, irrespective of size, and the best time for planting is mid June to late July. Though wildings planted in mid

April show better survival, this is for such a short planting period that for practical purposes it can be ignored.

Acknowledgment

I wish to acknowledge the help of Mr. J. Mc Alpine, who planted and measured the trial plot on Stewart Road.

GROWING PINUS RADIATA FOR THE TRADE

by

A.B. Selkirk

Present trends in policy seem to direct all efforts into the channel of growing Radiata pine as quickly as possible to produce a volume in the log class that sits on the top of the price range. Considerable expense is incurred in the initial stages of management in this practice, and it would seem that if at the end of the rotation of these select stands there is no ready market for such logs they will be lost to a much lower price range offering at the time.

The purpose of this article is to suggest that a parallel plan could be put into practice with the object of producing a Radiata pine with a much lower individual annual increment, e.g. an annual ring width of 5 m.m. after five years. This could be attained by using our lower quality soils and planting at a 10' x 10' spacing to enable later cultivation and mechanical distribution of fertilisers, plus economical control of weed and scrub growths.

An ideal pine is a slender bole specimen of approximately 100 feet in height at 35 to 40 years producing over this period about 120 load per acre. This class of log is a very stable product for the furniture trade and laminated beams and trusses. In sizes and lengths varying from 7" U.B. Dia. crown to 12" U.B. Dia. crown and 7'0" to 16'0" in length there is a keen demand today and this will steadily increase with population growth.

In this class of production, pruning and thinning should be delayed until lower limbs have dried out to a height of 10 feet. Thinnings will then be done only as a control for stability and increment in conjunction with fertiliser application.

It is also essential that such stands be established within economical haulage distance of trade centres on country that has a reasonable topography for extraction.

Siting in relationship to topography is rather important if mechanical control of brush is forced on to the Forest

Department by such an authority as the Department of Environmental Control, which may at some future date be insturmental in bringing about a ban on the use of 2,4,5 T.

A planting space of 10 feet would also do away with some of the problems connected with second rotation.

PLANT SUCCESSION AND PAST AND PRESENT BURNING IN THE KARRI FOREST

by

P. Christensen

INTRODUCTION

The effect of fire on the vegetation has long been a subject of interest to the forester and the public alike. The reports of early explorers and settlers seems to indicate that the karri forest had an open understorey at the time of settlement. Many records suggest that one could ride through the forest on horseback. To anyone familiar with the present dense karri forest understorey these claims appear somewhat exaggerated. It is therefore of interest to examine the validity of these claims and to speculate on the apparent change that the karri understorey has undergone.

SUCCESSION

In order to gain some understanding of changes in karri forest scrub communities, it is necessary first to examine one of the fundamental concepts of ecology, the theory of plant succession.

An area of ground if stripped bare of its original vegetation, for example by fire, does not remain bare for very long. It is rapidly re-colonized by one or more species which will subsequently modify one or more environmental factors which in turn allows further species to become established. A subsequent development of the vegetation, by this reaction of the vegetation on the environment, followed by the appearance of fresh species, is termed succession. The concept was largely developed by Warming in 1896 and later by Clements 1904, who introduced the term sere to describe the developmental stages through which vegetation passes until it reaches an ultimate state of equilibrium with the climate and major geological factors of the area. This final stage of the succession is related directly to the environment and is referred to as the climax.

In other words, following a fire there is rapid regeneration of vegetation. This vegetation changes continually as it develops,

different species being dominant at different stages during development until there are no further apparent changes and the vegetation is said to have reached a climax state.

However even the climax state is not stable. Cooper in 1926, said: "The climax period comes into being insensibly, it is characterized by a gradual diminution of the rate of change. The climax itself being merely a continuation of the process it is not possible to mark it off absolutely from the period of more active succession."

Thus even seemingly stable vegetation types such as forests, grasslands, heathlands etc., are continually changing, albeit slowly. To illustrate this the major changes in vegetation that have taken place in England since the last glacial period, approximately 10,000 years ago, are illustrated by the tree-pollen diagram in figure 1. The information has been obtained from pollen analysis of samples taken from peat bogs. This is a recognized and reliable scientific method.

Immediately following the glacial period the dominant vegetation in England was open tundra of grasses and sedges with scattered copses of birch. Later mixed pine/birch woodlands replaced the open tundra and this was in turn replaced by oak, elm and hazel as the climate became warmer and wetter. Later during a drier period alder and lime appear and flourish at the expense of hazel.

Similarly, although little work has been done in Western Australia it has been demonstrated, using the same techniques, that karri was far more widespread in earlier times than it is at present. Thus there must have been a change along the fringes of the present karri areas from karri forest to jarrah or marri forest with an accompanying change in understorey species composition.

These examples serve to illustrate the fact that plant communities are not stable, they are continually changing and will continue to do so whether or not man interferes with them.

To return to the present, figures 2 and 3 represent a diagramatic conception of typical karri forest scrub community as it changes over approximately thirty years.

Fig. 1. TREE POLLEN DIAGRAM, HOCKHAM MERE, EAST ANGLIA (ENGLAND) 1940.

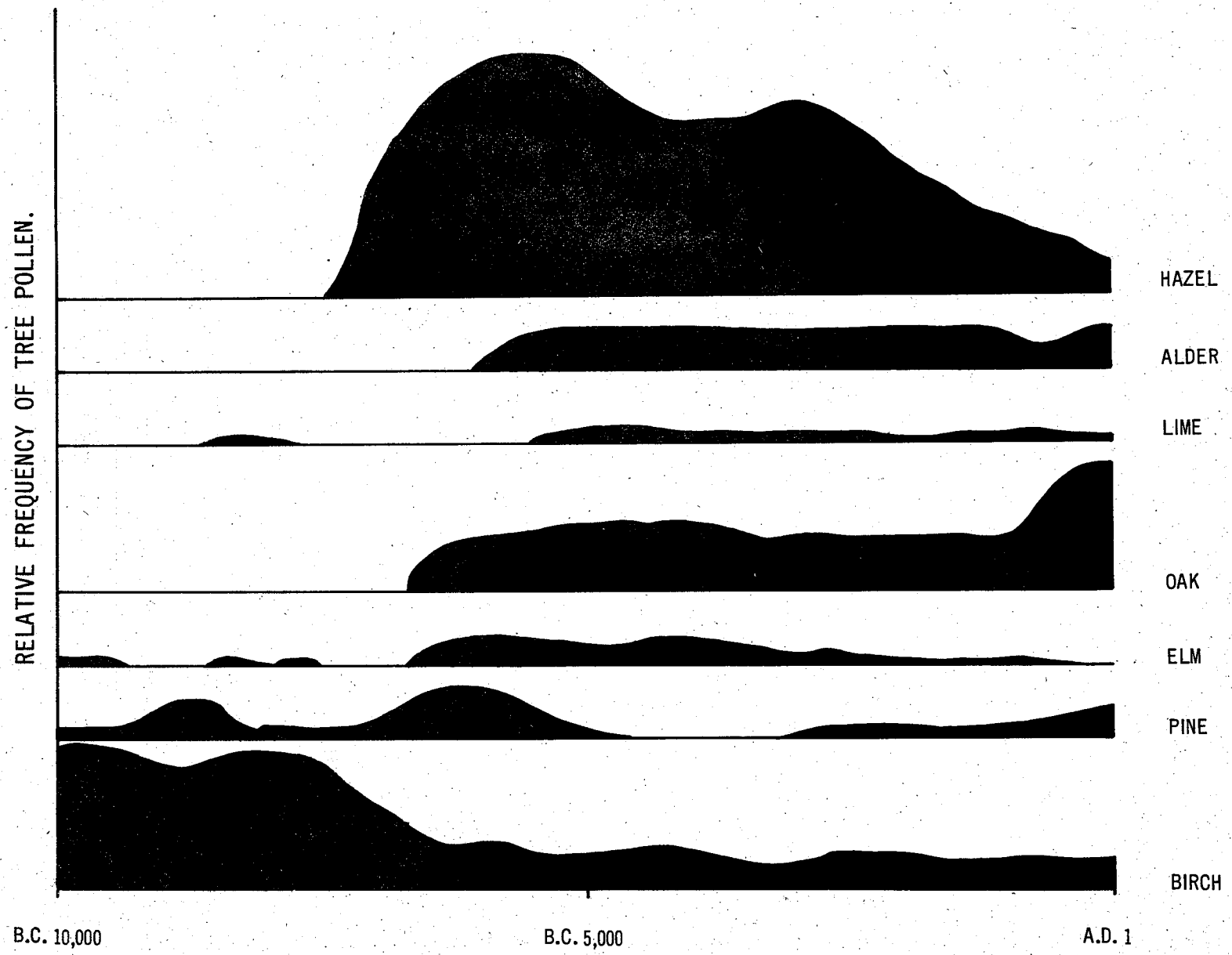
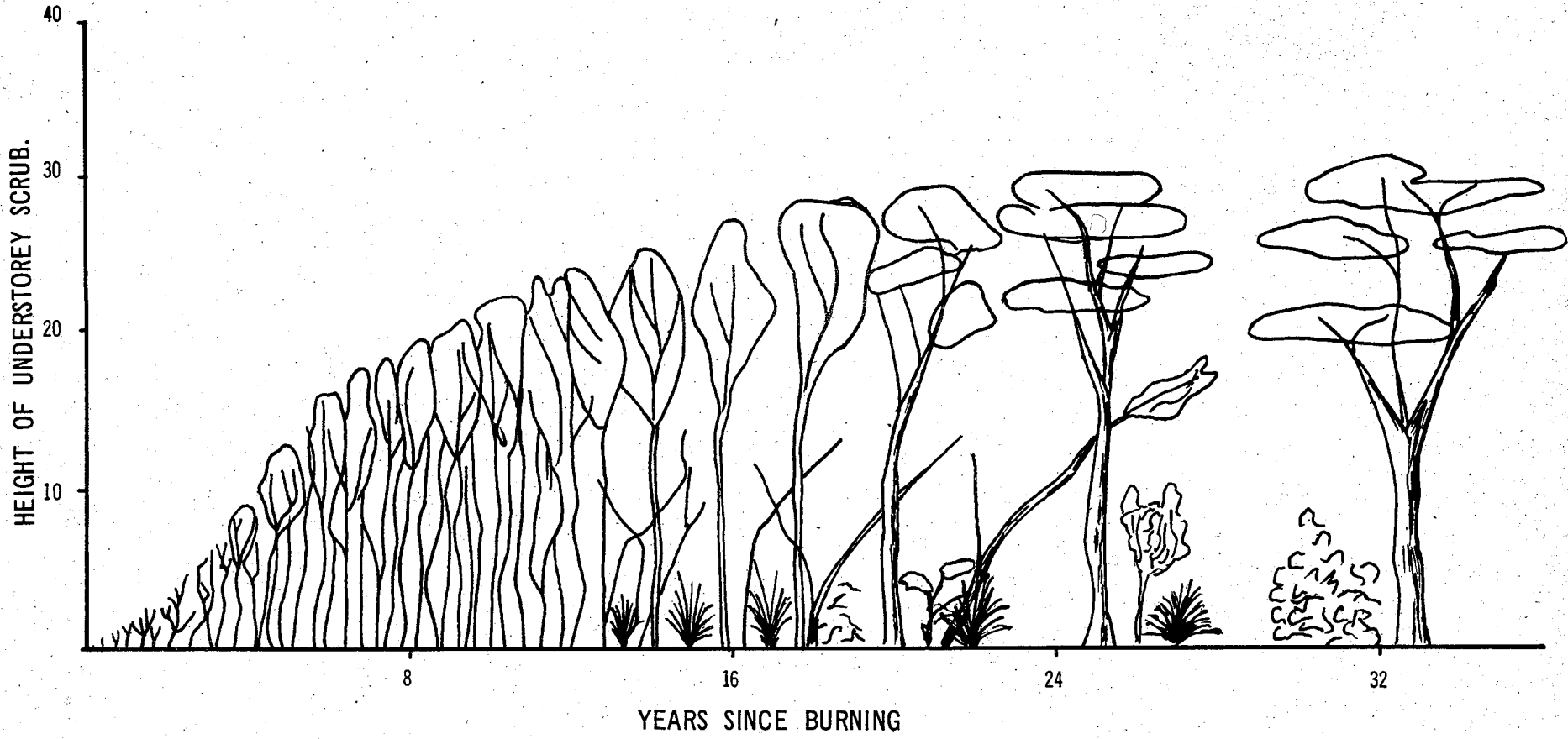
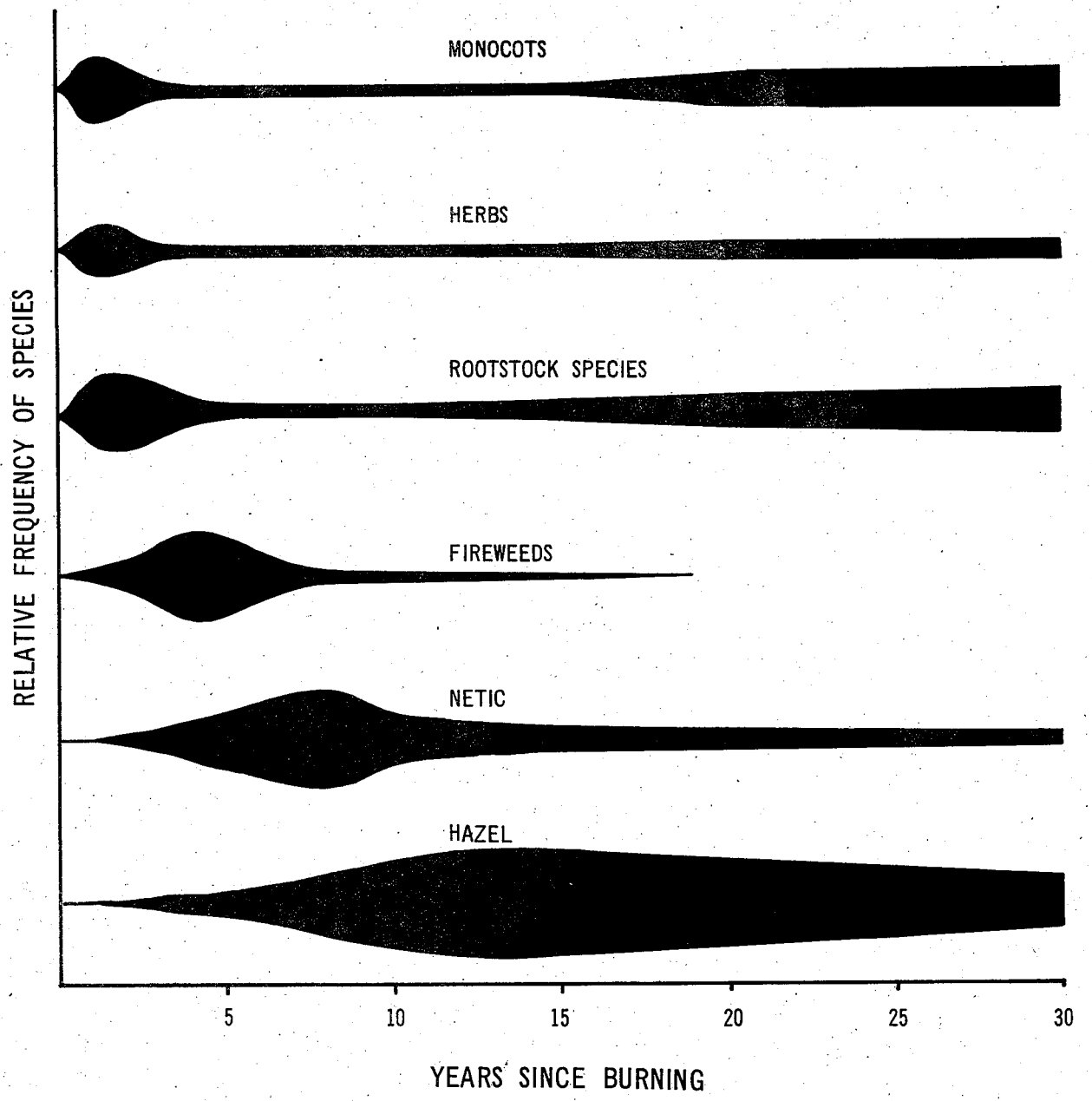


Fig. II DIAGRAMATIC ILLUSTRATION OF SUCCESSION IN A HAZEL DOMINANT SCRUB.



DECREASE IN THE No. OF SPECIES PRESENT.

Fig. 111 DIAGRAMATIC ILLUSTRATION OF SUCCESSION IN A KARRI SCRUB TYPE.



Immediately after burning the area is occupied by monocots (sedges and grasses etc.), herbs and species that regenerate from rootstocks, e.g. emu bush, blue bush, native buttercup etc. Later seedlings of fireweeds such as Acacia pulchella (prickly moses), Ac. strigosa and A. urophylla etc., become the dominants. These species germinate soon after the burn but take a few years to develop and assert their dominance. If larger scrub species such as Bossiaea aquifolium (netic) and Trymalium spathulatum (hazel), are present then these gradually assume dominance of the site by reason of their large size and longer life span. Hazel, if present, will eventually assume complete dominance of the scrub overstorey and at this stage in the succession the scrub tends to open up again and some of the smaller rootstock species return, e.g. Hibbertia sp. sword grass etc.

As far as can be ascertained from the few remaining patches of unburnt forest, the climax in typical Karri understorey vegetation appears to be a kind of relatively open 'parkland' with scattered large hazel and an understorey of various grasses, herbs, smaller scrub species and creepers. The species composition, including the hazel overstorey, may vary locally.

Relatively few wildflowers are present since many species such as Crowea, red creeper, the Acacias etc. require fire treatment for their seed to germinate. The few Hibbertias, native Wisteria, blue bush etc. that develop from rootstock are usually somewhat straggly. This may be partly due to the light intensity under the canopy, but it could also be due to the limited supply of nutrients. Most of the available nutrients are bound up in the few large understorey scrub plants and much is also bound up in the litter which forms a thick mat on the forest floor.

The community is also poor in species composition, the numbers present being only about one third to one half of those present in younger communities. Fire is necessary to 'liberate' this stagnant community, so that the succession can re-commence and each species be given a new lease of life.

At this juncture it might pay to digress a little in order to clarify an important point with regard to the season of burning. The seed of all fireweed species, and as far as we can ascertain the seed of many other local scrub species

also, will remain viable for long periods in the soil. Seeds of some American legumes have been found to remain viable for up to 90 years and it is likely that Australian species are at least as long lived.

Therefore, providing that a species has had time to seed a year or two before a burn it matters little whether burning is done during spring, summer or autumn. The seed is already in the soil and present evidence indicates that it will take several short burning cycles to reduce fireweeds for example. Other phenomena are associated with season of burning such as the rate of return of ground cover and the vigour of the plants etc., but the ripeness or otherwise of the current seed crop is of comparatively little consequence.

To return to the subject, there are only two possible ways in which one can achieve a relatively open understorey in karri by the use or exclusion of fire:

1. by not burning for very long periods.
2. by burning very frequently as often as fuel allows and thus keeping the succession at a very early stage, and the vegetation very low.

Space does not permit an extended discussion on the pros and cons of these two alternatives. However if the report of King (1963) and such books as Mitchell (1848) are read it is clear that fires were of frequent occurrence before the advent of Western man.

In many areas of Australia the aboriginals used fire whilst hunting as a means of flushing game. The new growth resulting after a fire also served to concentrate game animals such as the kangaroo in these areas. In some localities where the seeds of various grasses and reeds were used as food, fire was often used to regenerate them annually.

Burning was generally done in dry warm weather, and it is probable therefore that once a fire had been lit it would have continued to burn until such time as it met a natural barrier such as a river, or there was a change in the weather. Therefore it seems likely that the forest may have been

alight with numerous fires burning continually throughout the summer. As pointed out by Frank Quicke in a recent article, karri can be burnt on a very short rotation if fired during the hot dry summer months.

This would explain the open type of forest encountered by the early explorers and settlers, since the frequent burning would encourage herbs, sedges and grasses and restricts the development of the thicket forming Acacias and other large scrub species. Frequent burning also tends to encourage certain wildflower species such as Orchids, the various creepers, Patersonia, Pimelea, trigger plants etc.

On the other hand infrequent burning also results in a relatively open forest. As karri is comparatively poor in fauna in comparison with the more open jarrah/wandoo woodland the aborigine may have had little reason to frequent it, and it is possible that large tracts of the karri forest may have remained unburnt for prolonged periods. However it would need to remain unburnt for upwards of 30 years before it can in any way be described as open forest. How likely is this when most of the fauna-rich lighter forest types round about were probably fired continually every few years?

One fact is certain however, if horses were ridden through the karri forest in the early days, it could not have been burnt on anything like the present 6 to 8 year rotation. The current control burning cycle encourages dense thickets of Acacias and other large scrub species through which no horse, not even a carthorse, can be ridden.

A LETTER FROM INDIA

by

A. MATHER

Circling New Delhi Airport, at half past eight at night, the Japanese hostess flatly announced that we were about to land and that the "glound templature" was 102° - great news after travelling four days with a weary wife and a clutch of children. She was right too, and we sweated our way through Health & Immigration to our 'bete noir' the Customs Officer. He really wanted us to open all 27 pieces of luggage but after being roundly berated, he suddenly caved in and was satisfied with a list of what he considered important articles, and a detailed account of hard currency and travellers cheques.

Our approach to India, and particularly Customs Officers was not the best and it really took a whole day to recover from these two hours in Customs. The remainder of the seven days in India was a wonderful period. After reporting to the Australian High Commissioner I was handed over to the Aid Section and there, an Indian, A.K. (because his name was unpronounceable and because they like to be called by their initials) arranged a couple of worthwhile forest tours. The first, lasting 3 days, took me to Nainital and Haldwani. I had been warned that it was a six hour journey and I imagined that I might catch up with some sleep. Well for the first two hours I perched, petrified, on the edge of the seat. It was like being driven by our gracious, but nameless, superintendent, but with the added excitement of dodging enormous bullock carts, tri-shaws, 10 ton trucks (thousands of them), horses, camels, even an elephant, and the ubiquitous holy cow. After a couple of hours, I simply had to relax, and like the lady, lay back and enjoy it. After being struck by the enormity of the population (3 million in Delhi alone) I noticed how well utilised was every square metre of land - they have gone metric in India. There wasn't a piece of land in the 200 miles from Delhi that wasn't being used. Most of it was agricultural of course, but there were large numbers of secondary industrial sites ranging from engineering and steel works to Coca Cola factories.

At this time of year there is a country-wide dust haze and visibility was limited to half a mile. After travelling for four hours over the monotonously flat plains, I began to doubt the description which I had been given of Nainital. Then

suddenly, at Haldwani, through the dust haze, a huge range of mountains appeared. The sudden effect of these mountains rearing straight up from the plains was breathtaking, soon we were travelling through wooded country, green and lush in the valley floor. The relief from the century heat and the searing wind was immediate. From Haldwani we climbed from 1700' steadily for a further twenty one miles on a hair-pin bend road that did not have a straight for more than three chains - more excitement dodging down-coming traffic and passing slower vehicles on blind corners, horns blaring all the time. From 1700' to 3500' the forest vegetation is mixed hardwood of Hill Sal, Tun (Cedrela toona) Albizzia and Semal (Bombax), the Chir pine (P. roxburghii) begins to appear at 3500' and is dominant at 4500' when it occurs with oak (Quercus incana). Resin is still tapped from Chir pine and Indian production of resin and turpentine is about 18% of the world resource.

Nainital is a most beautiful hill-station at 6400', set around a lake with magnificent forested mountains on three sides. In the 1880's a landslide destroyed part of the town and the task of reforesting that landslide was very successfully done, using cypress (Cupressus torulosa), deodar, cedar and spruce. As one of the few hill-stations in India, Nainital enjoys a tremendous tourist trade. Most faces are of course brown, but the character of the place is very white and many of the stone buildings have a peculiarly Scottish air. The hotel where I stayed had only recently changed hands from a Brit. to a rich Bombay merchant who, mercifully, has retained the decor which is pure Edwardian.

After such an exciting journey into the hills I was in for a surprise. I had checked in, and was having a wash when there was a shout outside the bedroom. The accent was semi-Australian, and rubbing the soap from my eyes I was staggered to see an old friend, an ex-Kenya forester, George Fry! George had moved to South Australia in '64 and the last time I had seen him was in Mombasa in '63. When I visited Mt. Gambier some three weeks ago I had been told that George had moved to New Zealand. To cut a long story short, George was on a short term contract with the World Bank looking at a forestry development project which had previously been investigated by Chip Rowe (another ex-Kenya forester) in Nainital! My host for the day was an Indian Conservator, another friend from Oxford days. To shorten another story, there was very little productive work done for the rest of that day!

Next day, the 27th May was more serious and it included a visit down to the terai plains where I saw degraded woodland converted to productive plantation forests of hybrid eucalypt, (for pulp in short hopeful rotation of 10 years), Khair (Acacia catechu) to produce katha, Shishoo (Dalbergia sissoo) for quality timber, Semal (bombax) for matchwood, teak (Tectona grandis) for plywood, and so on. The hybrid eucalypt grows well at 10' per year for the first 2 years then it slows down to stagnate by year six. Spacing, fertilisers and strain are factors which the researchers are working on to keep the growth moving.

At the nursery at Pipal Paro I noticed that the eucalypt planted by Alan Harris in 1968 was growing well.

Grass is a big problem in the terai and controlled burning is in its infancy. The influence of British forestry has died hard; not a green leaf must be burned, not a single scorched stem. It is done well, but the production would make an Irishman baulk - it's about an acre per man day!

On the way back to Nainital, my Indian host was very proud to show me Jim Corbett's winter house, which is in a small village well off the beaten track. Corbett's adventures with the man-eating tigers and leopards of this area won him great respect and even today he is remembered with awe. His house has been beautifully and tenderly preserved by the Forest Department. His letters on display show a real affection for his Indian neighbours, and he was obviously a great Christian and gave much to the poor of his village. He never killed for pleasure, and one tiger, the first I think, had taken over 400 people before he shot it. A National Park has been named in his memory.

On the 28th May I visited the Chir pine forests near Nainital at Bhowali at 6000'. The form is very good and the new needles just appearing at this time of year are short and the tree does not live up to its former name of P. longifolia. Many small fires had been set alight by the cow boys of the area. They were hoping to destroy the thick needle bed to produce green weed growth. These cow boys show scant respect and had started a fire close by the Conservator's rest house! It looked as if the fires were doing very little damage, and in fact to Australian eyes they were doing a good job, but fire does adversely affect resin production, so wherever possible, the fires are extinguished. It is a herculean task because the 45° slopes prevent access. Great fire-breaks some three chains wide have been hand cleared along the major ridge tops but of course they are too few in number to stop the numerous small fires in any particular day. Logging and utilisation of the Chir pine is done by hand. Tree marking is strictly practised and lots are sold by auction. The buyers

contract hand falling. Twelve foot logs are adzed at stump into 10 x 5 sleepers. These are man-handled down the mountains to the streams and rivers where they are held until the monsoon is nearly over. They are then floated down to the plains by a complicated control system. If the 12' length is intact at its journey's end, three feet is cut off and used for box making while the main 9' length is used as a railway sleeper.

The visit to the Chir pine ended the first trip, and I returned to New Delhi to find that my beloved better half had been viewing a collection of diamonds, rubies, emeralds and pearls being sold off by the Maharajah of Lahore. Fortunately they were priceless, at least to a forester, yet I set off the following day on the next trip to Dehra Dun with some misgivings.

Dehra Dun was a mere five hours of hair raising hell and by this time I had come to realise two things about Indian drivers, firstly my man was extremely competent and his hair-breadth judgement was uncanny; secondly there is consistency in all drivers and a greater sense of courtesy and camaraderie than we find in Western Australia. The aim is to keep on the 20' wide bitumen, but if one is really pushed when overtaking three, yes three, abreast the oncoming driver will pull off to the brick paved verge. The final act in a tight situation is to flash the headlights but it must not be overdone otherwise respect is lost and then you can expect little mercy.

Dehra Dun is the centre for many organisations but the most famous are the Army Academy and the Forest Research Institute and Colleges. It lies at the foothills and the F.R.I. is housed in a most impressive colonnaded building. It must be one of the greats of the British Raj in India. It was built in the grand style in 1929. The campus is nearly 100 acres and is well laid out with magnificent arboretae. The purpose of the visit was to make contact with research officers before leaving India for Nepal. The visit was well worthwhile and great interest was shown in an adopted Australian visiting the F.R.I. That evening I was taken up to another hill station called Mussoorie where the mixed hardwood and softwood forests are particularly splendid on the North aspect. The most interesting feature of Mussoorie was the Tibetan settlement, where Tibetan refugees from the 1962 Chinese "grab" had been harmoniously accepted by the Indians.

Back to New Delhi on the 30th, two hours sleep then off to Kathmandu, Nepal at 7 o'clock in the morning by Royal Nepalese Airline Company, in a DC 3 on the 31st May. The general dust haze, even at 9000' was still there, but it was not enough to blot out the majestic snow-capped Annapurna Range. What a magnificent sight!

AERIAL RABBIT CONTROL

by

N.G. Ashcroft

LOCAL SITUATION

To date in Western Australia control of the rabbit population has been confined completely to ground methods. These include laying baited trails, fumigating, trapping, ripping and filling in warrens, and shooting. These methods however are laborious, and, unless a concentrated operation is mounted effectiveness is doubtful as is shown by annual mortality counts.

In the Department's case rabbit baiting is of utmost importance in the year of establishment of plantations. The problem is multiplied in the steeper areas of the Blackwood Valley where the country is often too inaccessible for effective ground control at an economic price when assessing pine mortality.

Because of the widespread range of the rabbit throughout State Forest and private property, total control is virtually impossible by existing techniques. However to allow for pine seedling establishment we are aiming at a severe set back in the local population. Most literature consider a 90% kill is required to cause enough shock to the population that it takes a long time to recover. A 50% kill will allow the rabbits to rebuild to their former numbers in a few months.

In the Blackwood Valley conventional ground methods of rabbit control do not appear to have given satisfactory results in all cases. Some years rabbits are held in check and pine mortality counts show damage at less than 5%. Other years deaths may reach 15% and even higher. Since deaths tend to occur in patches the problem is magnified.

A satisfactory level of control should be somewhere in the region of 1-2% pine deaths due to rabbits. This is the scale of control achieved by A.P.M. Forests and the Forests Commission in Victoria using aerial baiting techniques.

In the Blackwood Valley plantations, non-commercial thinning down to 300 stems/acre is being carried out under Silviculture 70. It can be argued therefore that a rabbit damage of 10% (which is a high figure) would be of value rather than

detrimental, and that we should offer little resistance. However this is not so and rabbits are an important problem for many reasons, namely -

a) deaths due to rabbits follow attempts to control them, no control could be disastrous,

b) rabbit damage tends to occur in patches,

c) a high stocking is required for future selection,

d) if the market for first thinnings pick up, non-commercial thinning may be discontinued,

e) we must undertake some form of rabbit control as part of our obligation as land holders,

AERIAL TECHNIQUE

For many years now Victoria has been tackling their vermin problem (rabbits, wallabys and rats) using aerial baiting methods. They have switched to aerial methods because -

a) it costs far less (in their case $1.00/acre for three flights i.e. approx. $0.33/acre/flight),

b) a better coverage is obtained especially in steep and inaccessable country,

c) less time-consuming,

Literature on aerial baiting claims a 98% (or better) kill and this appears to be a valid claim as both the Forests Commission and A.P.M. Forests consistantly report rabbit damage in the order of only 1-2%, a figure that would make us envious.

Many types of baits are suitable using ground control methods, for example, oats, carrots and apples. To date however aerial control has used only carrots as a bait. This is because carrots are known to be high quality bait and they are also fairly cheap in Victoria. Apples and oats could also be tried from the air, although they are of lower specific gravity and apples would tend to deteriorate fairly quickly. A manufactured pellet of an oats, bran and pollard mixture has been developed in Victoria for use either in place of carrots, or when carrots are in short supply. Literature quotes this to be as effective, if not more effective than carrots. This "Barastoc" pellet can be landed in Nannup at 6.5 cents/lb. (corresponding to $0.30/acre) and at that price could compete favourably with carrots. It has not been used too widely to date but is definitely worth a trial.

In Victoria the application technique used by A.P.M. Forests and the Vic. Forest Commission is as follows:

1. three flights are planned about 3 days apart. The first two flights are "free" feeds (non-poisoned carrots) and the third feed is poisoned with 1080 (sodium fluoroacetate),

2. carrots are washed and delivered to the airstrip under contract at $35/ton,

3. a mechanical cutter dices the carrots into sections of about ½" cubes,

4. the diced carrots are bagged, poisoned (if the third flight) and loaded into the aircraft hopper. This is simply a super spreading hopper and for a Piper Pawnee will hold ½ ton and distribute at approximately 1.3 tons/hour,

5. the aircraft drops the bait on a 2 chain swathe width at a rate of 5lb/acre/flight (A.P.M. Forests use 7½lb./acre). Over three flights this constitutes a drop of 2/3 ton/100 acres. (1 ton/100 acres for A.P.M. Forests),

6. this operation costs $1.00/acre in Victoria and is carried out in a) May prior to planting.
   b) September following planting.
   and c) May-June twelve months after planting.

A cost is split up and is given as follows (total for complete operation of three flights) :

carrots to airstrip @ $35/ton (contract)	= $0.35/ac.
aircraft hire (based on $54/hour and 15 minutes turnaround)	= $0.40/ac.
labour	= $0.10/ac.
1080 poison ($8.00/ton over 300 acres)	= $0.03/ac.
Total	= $0.88/ac.
Contingencies	= $0.12/ac.
Total	= $1.00/ac.

It must be remembered that these costs are only applicable in Victoria.

APPLICATION IN W.A.

Since the method has proved effective in Victoria and because it is cheaper and less time consuming than our present methods there is every chance that it will be applied in those planting areas in this state where rabbits are a problem.

In getting such a scheme off the ground however there are certain difficulties to overcome.

1. Firstly it would be the first time in W.A. any body has undertaken this form of control. The Agriculture Department has not attempted it as yet and would no doubt be interested. We would therefore be "feeling our way" to a degree.

2. Not being geared to large quantity supply of carrots from a local outside sources we would have to initially grow carrots in large quantities. To cover the 2,500 acres/annum planting programme between the Nannup and Kirup Divisions a total of 25 tons of carrots would be required. This will be no problem to raise but lifting a large quantity in a short time (carrots don't keep too long) would present economic problem unless it can be mechanised and for this reason the possibility of using a potato digger is envisaged.

3. Dicing the carrots will require a mechanical cutter as the aircraft is capable of distributing 1.3 tons/hour.

These problems will be overcome however and it is conceivable that aerial rabbit control will be part of our operations in the near future. It could be envisaged however that we would carry out the operation only twice on an area, prior to planting and the spring following planting. The pine should have beaten any rabbit problem within twelve months.

SUMMARY

Rabbits will always be a problem for pine establishment and some form of control will always be required. As in most operations the cheapest or the most effective method will take over eventually. Therefore on present indications from Victoria aerial baiting appears to have a future particularly in our steeper country.

BARK BURNING ON P. PINASTER

by

L.H. Harman

In August 1970, a series of hot experimental spot fires were run in a sixteen year old stand of recently thinned P. pinaster in McLarty's plantation. These fires resulted in a number of trees being severely scorched.

During the burns the average head fire intensity was 170 B.T.U.'s per sec. ft., with an intensity range of 100 to 250 B.T.U.'sper sec. ft. An average head fire flame height of 4.0 ft. was recorded. Normal prescribed burns do not exceed 50 B.T.U.'s.

The burned area, of approximately one acre, contained 477 trees, 66 of which were final crop trees.

Two trees died within two months of burning, their bark thickness having been reduced to 0.2 of an inch at one foot above ground level. Severe crown scorch and a severe attack of Ips grandicaulis were evident.

Between August and December, 1971 a further seven trees had died; the nine dead trees representing 1.9 per cent of the total number of trees. After burning, the mean green crown height was 11 ft., with a range of 6 to 14 ft.

The mean G.B.H.O.B. for all the trees was 20.1 inches as compared with 24.0 inches for the final crop trees only. The mean girth of the nine dead trees was 14.2 inches, none of which were crop or dominant trees.

Nine live trees in the burned area, selected to match the girth of the nine dead trees, were compared for bark thickness at breast height and at the one foot level. Nine trees in an adjacent unburned area, also with matching girth, were used as a comparison. The results are given in table 1.

TABLE 1

MEAN GIRTH AND BARK THICKNESS

	Girth			Bark Thickness		
	Breast height	One foot	Difference	Breast height	One Foot	Difference
Dead Trees	15.7"	14.6"	-1.10"	0.53"	0.21"	-0.32"
Live Trees within burned area	15.9"	17.5"	+1.67"	0.54"	0.54"	0.0"
Trees in unburned area	15.6"	18.0"	+2.44"	0.54"	0.81"	+0.26"

It will be observed in table 1 that severe bark loss has occurred at the one foot level for burned trees. (See diagram).

Assuming 0.81" to be pre-burn bark thickness of the dead trees, the reduction is 0.60 of an inch as compared to only 0.27 of an inch for the live burned trees. This indicates that the dead trees were subjected to intense heat as a result of close burned thinning slash.

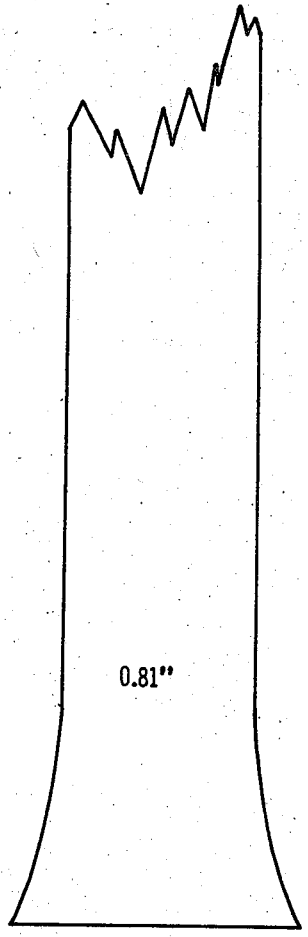
To illustrate bark loss through burning on final crop trees, nine trees were compared with nine trees of matching G.B.H.O.B. in an adjacent unburned area as shown in table 2.

TABLE 2

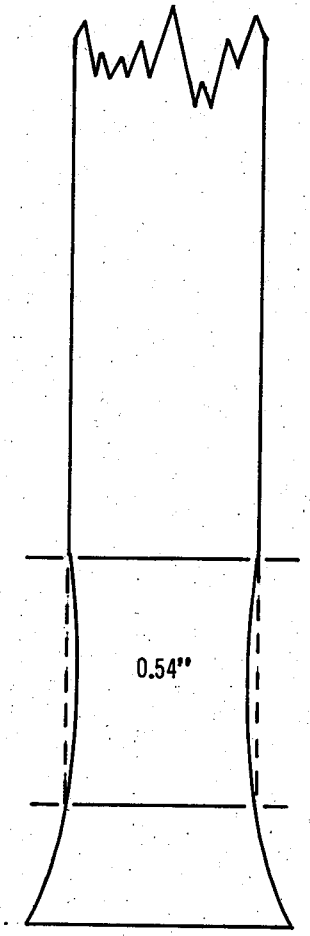
MEAN GIRTH AND BARK THICKNESS

	Girth			Bark Thickness		
	Breast height	One foot	Difference	Breast height	One foot	Difference
Trees unburned	20.4"	23.7"	+3.3"	0.66"	0.98"	+0.32"
Trees burned	20.4"	19.8"	-0.6"	0.69"	0.61"	-0.08"

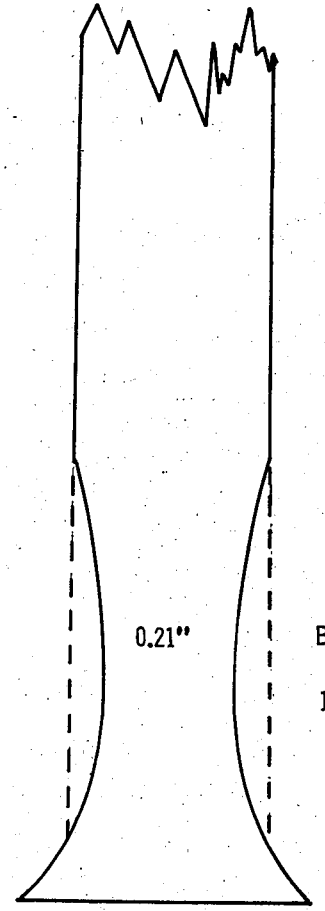
THE EFFECT OF BURNING ON BARK THICKNESS



UNBURNT TREES



LIVE BURNT TREES



DEAD TREES

BARK THICKNESS

1' LEVEL

Assuming 0.98 of an inch for the unburned crop trees to be the preburn bark thickness for the burned crop trees, (see Table 2) the remaining bark thickness of 0.61 of an inch is considerably greater than the 0.21 of an inch for the dead trees.

It would seem that when bark thickness is reduced to 0.21 of an inch, or less, this could be the critical limit at which P. pinaster cambium layer, cannot survive burning. It was noted that two of the dead trees with the greatest mean bark thickness remained alive until December.

It may be speculated that those trees which have suffered severe bark losses died from either one or a combination of reasons. Firstly the reduction in bark thickness has exposed the cambium to excessive and fatal heat, or the crown scorch observed has killed the growing buds and the upper stem cambium.

The mortality of the weak, suppressed trees is minimal considering the intensity of the fires were over five times that of a normal prescribed burn for a P. pinaster stand.

RAISING PERSONIA LONGIFOLIA FROM ROOT CUTTINGS

by

A.R. Annels

During the Spring of 1971 several unsuccessful attempts were made at Manjimup Research Headquarters to raise Personia longifolia from seed as it was desired to try these as an ornamental species. A small quantity of seed had been collected locally in the course of normal duties. This seed was sown in seed trays as fresh seed, stratified seed and also after treatment in hot water, but with no success. A visitor from King's Park Botanic Gardens who saw the seed boxes said that they had had very little success in raising this species from seed. Observations in the natural state suggest that it does not regenerate very readily from seed.

Having noticed that P. longifolia suckered freely from root stock cut off in quite deep road cuttings, it was decided to try raising the species from root cuttings.

Cuttings were taken from the roots of a small tree on 1st March, 1972. A range of diameter size cuttings were taken, approximately 3/8 to 1 inch diameter, and these were cut into pieces four to six inches in length. The top ends of the cuttings were cut off square while the lower ends were cut an an angle of forty five degrees. The cuttings were treated with hormone cutting powder at the lower end and planted in a 3:1 mix of sterilized sand and European peat in the glasshouse and kept moist. Cuttings were supposed to be planted with the top end level with the soil mix although several were up to one quarter inch deep under the mix, after watering, due to the uneven surface of the mixture in the pots.

Ten cuttings were tried and for several months no growth was evident, when several showed signs of bud development and after some weeks sent out shoots. The buds appeared first on an inner layer of bark and did not grow through the outer bark, but rather sloughed this away and grew up between the layers. By early June, six cuttings had developed green shoots up to one and a half inches in length.

The cuttings that have shown signs of growth to date are generally the larger ones although the largest was the last one to shoot, suggesting that a cutting of one half to three quarters of an inch diameter would be the most desirable size. Cuttings which were covered did not shoot and this appears to be undesirable. It is possible that other times of the year may be better suited for the striking of root cuttings of this species and it is also realized that root development may not be satisfactory but indications to date are most encouraging.

INSTITUTE GOLDFIELDS TRIP - JUNE 1972

I. TREES AND FORESTS

by

B.J. White

To most I.F.A. members the goldfields holds a fascination arising from its remarkable woodland, its colourful history and its undoubted "place apart" reputation. Most have travelled through it en route to the eastern states, and many have made private visits; - but the opportunity to be shown inland forest activity and have described the various vegetational types by skilled people was too good to be missed for the 16 I.F.A. members who made the trip there during the long weekend June 3-5.

The programme was smoothly planned and executed by Peter Richmond and his assistants Bill Brennan and Norm Capoun. There were visits to the various types of eucalypt woodland, the more arid mulga type, sandalwood areas and the Kalgoorlie arboretum.

Most impressive was the eucalypt woodland in its various forms growing up to 70 feet in height in an eight inch annual rainfall. That it is capable of utilization and management in the traditional forestry sense is demonstrated by the 80-year old regrowth stands surrounding the city of Kalgoorlie. These now comprise the "green belt" jealously preserved by the townsfolk. There seems little doubt that its utilization for mining purposes can proceed indefinitely without fear of ecological detioration. Despite a record four years drought vigorous eucalypt regeneration was evident in areas denuded by recent road and rail clearing.

Apart from local utilization the woodland has been useful to mankind in providing exotics adaptable to arid climates elsewhere. The demand for tree seeds remains constant both for production and amenity type planting. Some species (e.g. E. crucis, E. Brockwayi) are of limited occurrence, whereas others (E. Salmonophloia, E. salubris) occur over hundreds of miles. Opinion among members favoured protection of the limited seed source of the former and a wide genetic base of the latter by A class reserves for this sole purpose. The original occurrence of E. crucis could be wiped out in minutes by an unknowing bulldozer driver clearing a track.

Concern was felt particularly for sandalwood, which is still pulled in quantity over an ever widening expanse of country. Though its value is considerable, its management as renewable resource appears to be out of the question due to slow growth. The present girth limit (3" D.O.B.) is utilization rather than conservation oriented and is considered to be insufficient safeguard for its future survival. Prudent conservation requires that more generous areas be reserved unpulled as an example of the ecosystem in which it occurs.

A proposal to establish further arboreta on the lines of that at Kalgoorlie is supported. The suggested locations at Coolgardie and Norseman have the advantage of visibility to the travelling public. Some provenance testing of the more widely occurring species could be included perhaps with benefit.

Worthy of note are examples of amenity and ornamental plantings of indigenous trees in townships and around homesteads:- e.g. the E. salubris street trees at Menzies, the wide variety of species in parks and streets of Kalgoorlie, the drought defiant green of the kurrajongs transported mature and fully grown from woodland to street at Kambalda, and the astounding Tuart (E. gomphocephala) growing at Kookynie!

II. BEEF, MINERALS AND PEOPLE

by

S.J. Quain

Pastoral Industry

The visit gave members an extremely brief but interesting look at the pastoral industry of W.A. It came as a shock to realise that the pastoral industry is principally within the mulga vegetation zone of Western Australia or similar low rainfall savannah areas. The exception of course is the Kimberley region but this is a very small area compared to the low rainfall areas occupied by pastoral leases.

The area visited in the Eastern Goldfields is not a low rainfall area for the industry in Western Australia but more the average and with a better market outlet. The drought which is affecting the Eastern Goldfields area at the moment could just as readily occur anywhere else in the pastoral areas except the Kimberleys.

The pastoral industry is very different from the mining industry in that it covers and effects very large tracts of country and for a long period. Another major difference between the two large industries of the area is that the mining fraternity know that even the best mine will be worked out some day and the establishment will close up and move on whereas the pastoralist expects to remain in the area.

It is interesting to note that the pastoral industry in the Goldfields started with the goldrush to provide meat for the miners but remained to grow both wool and meat.

After the excellent talk by Mr. Tonkin at Menangina Station it is very obvious that the pastoralists have every intention of seeing out the present drought and returning once the drought has broken.

Mining Industry

Although most people in Western Australia know something about the goldrush period in W.A. it is doubtful if its rapid growth and decay could be fully appreciated without a visit to the Goldfields. It was a very brief period in our history spanning less than twenty years. That stretches of bush could become large towns with all amenities of the day and then revert

back to bush in such a short period staggers the imagination. It is probable that because a few mining towns have lasted very much longer this has disguised the fact that the majority had an extremely brief existence.

The effect on the landscape as a whole must have been like a natural disaster with any enormous change lasting for but a brief period. The present mining boom must have been a little the same but even briefer as once the pegging and testing was completed the activity has settled down in relatively few places scattered over a very large area.

The recent nickel field at Kambalda follows some of the early goldrush experiences in that a large modern town has been developed very rapidly. One very different aspect of modern development at Kambalda is the determination that the native vegetation shall be disturbed as little as possible in both the town development and in the mining activities. Perhaps there were no Jean Verschuer's among the early miners on the Goldfields. One could not but be impressed by the excellent planning and development in both East and West Kambalda. I noticed that the transplanting of large kurrajongs to give instant trees along the new streets adjacent to the Hotel in West Kambalda rival the operations of the Parks and Gardens Board in Canberra.

I could not let the opportunity pass without mentioning the sewerage works as they are certainly the only non-smelling variety I have ever seen.

Fortunately our visit to the crushing and gold treatment plant on Monday brought us back to reality. This visit was essential in that it renewed our vocation in forestry and sent us back home to our damp, dismal forests relieved to be away from the all-pervading noise, of metal hammering on rocks and of lethal chemicals, polluting not only the atmosphere but our ears, eyes, nose and lungs.

Scattered around the treatment plant were vast numbers of round iron balls about the size of a cricket ball. I could not make up my mind whether they were used for throwing at a person in order to attract his attention or to drop into the hammer mill whenever the noise level dropped below the lethal decibel range.

The gold mining industry is completely beyond me as it essentially appears to employ many people digging rocks out of the ground with a minimum gold content, crushing them up with a maximum of noise and treating the crushed material with vile smelling chemicals to extract gold to bury it back in the ground in bank vaults. Still I suppose the miners have got to

do something while the two up school is not in session and the Hay Street hostesses are resting.

Conclusion

While it would be presumptous of us to be dogmatic about what should or should not be done in the low rainfall areas we would be shirking our responsibilities as an Institute if we did not express our concern in what was happening over the majority of the area of Western Australia. The Institute should endeavour to have recognised as the prime object of management of activities in these low rainfall areas the continued existance of the native vegetation cover.

That such a policy is being actively pursued by Western Mining is extremely gratifying.

With the concern expressed by Mr. Tonkin and the presence of an agricultural advisor in the District acceptance of such a principle should be possible.

An appropriate ending to the trip would be a notice of motion at the next Institute meeting along the following lines.

"Any activity in the arid areas must be subject to the primary aim of maintenance of vegetation cover".

III. SIDELIGHTS

by

A. Anonymous

The I.F.A. Eastern Goldfields trip in June was certainly a corker. We got under way on the Friday night Prospector from East Perth Station. Most of us arrived at the station in an orderly manner, however, some were not their usual selves following an extended "session" with the Wesply crew (Dennis Hearn takes a bit of stacking doesn't he Steve?) The entry into the train was highlighted by Noel Ashcroft skilfully out flanking Steve Quain in the "Grab the Hostess's Hat Race".

Our sleepless night on the train was kept interesting by our travelling companions, the Riverdale and Mandurah Darts Clubs. We must congratulate the W.A.G.R. for the floor show. However in typical manner we foresters showed ourselves to be of the highest moral fibre, indulging only moderately in the antics of our dart club mates. Their performance can only be described as a "train stopper".

We arrived at Agricola College about 8 a.m. on Saturday morning. It was here that we were joined by the motoring members of our party; Messrs. Hopkins, Hewett and Grace arrived Don's Vee-Dub Comby. We believe they stayed the night in the caravan park and spent most of it between the Comby and the paddock - I think Don has a set of skeleton keys on order for next trip (locked ablution blocks certainly create somewhat of a problem.)

Lunch on Saturday at Kambalda was provided by the Western Mining Corporation. On top of four separate courses liquid refreshments were available (also tea and coffee). This brought out the scoffing ability in most, and stood us in good stead for the spread at the Kookynie Hotel on Sunday.

The day trips were highlighted by Steve's obvious lack of botanical knowledge. However, the law of averages as it is, allowed him to square his beer register with Noel by a well-timed guess at an unusual variety of Acacia aneura.

The trip to the gold crushing plant was particularly interesting although we are not sure if it was intended to be a thinning exercise on the foresters themselves. A noxious experience with sulphuric acid fumes sent many of us scurrying for fresh air. Their public relations officer had obviously been around that plant for some time. He'd be a high insurance risk with those lungs; at one stage I thought he'd passed away on his feet. The plant was dusty and the noise was deafening and it was noticeable only a couple of employees wore any sort of ear or breathing protection. With the recovery of only about 2 oz. of gold for each hundred weight of ore it makes you wonder if its all worth it.

Our hosts Peter Richmond, Bill Brennan and Norm Capoun did us proud and must be commended on their foresight to include the Hay Street Starting Stalls and the Two-up School in our itinerary. Speaking of two-up it would be worth asking Steve how he lost 60 cents. Like the locals we had a few side bets at twenty a time (only the locals meant $20). One old boy must have thought he was a bit of a spinner - he appeared to want to put pennies into orbit. Another bloke barely had the strength to make the wire.

As if they had not done enough for us we were invited to the Richmond's house on Sunday night where in keeping with the previous two nights, the festivities continued. Mrs. Richmond and Mrs. Brennan put on a very good spread of "Toasties" (this means savouries in English). Because Hay Street lies between Agricola and Richmonds there was a diversity of opinion as to why Don Keene and Barney White elected to walk home early rather than drive.

By Monday afternoon our sins were beginning to catch up with us and we felt rather the worse for wear until we saw our dart playing mates. Boy, did they look crook. It was to our (and their) credit however that the Prospector's beer supply ran out by Merridin and the scotch supply by Northam. Not to be denied, our dart playing friends had smuggled their own supply aboard and were just polishing the last of this off when we arrived in East Perth.

The weekend was an outstanding success (and wasn't bad from a botany and forestry point of view either). Our congratulations to our hosts. Commiserations to those who did not attend, but dry your eyes boys, there's no doubt we'll be holding similar trips in the future.

WORKER SAFETY 1971 - 1972

During the twelve month period July 1971 - June 1972, it is pleasing to record that further success has been achieved in reducing the frequency of injury accidents.

The entire work force of 962 staff and employees, working a total of 1,759,888 manhours, sustained 41 disabling injury accidents involving the loss of 275 mandays. There were a further 127 serious injury accidents - (medical expenses only). The frequency rate was 23 and the time lost per accident averaged 6½ mandays.

These figures compare favourably with 48 disabling injury accidents for a frequency rate of 27 and time loss of 458 mandays, plus 158 serious injury accidents last year.

Whilst this success has not proved as spectacular as that achieved during the previous four years, it is indeed satisfying to find that we are not only continuing to reduce the incidence of accidents that result in lost time but also markedly reducing our all injury accident frequency.

A number of divisions are enjoying excellent safety records and special mention must be made of those who are continuing to maintain accident free periods of more than twelve months - namely Collie, Kirup, Walpole and Research section.

Congratulations are extended to these groups and also to those who, by maintaining a satisfactory level of safety performance, are contributing to the overall success of the departmental accident prevention programme.

The attached safety statistics for the past five years reveal where progress has been made and maintained and where renewed efforts are required if we are to maintain our present excellent safety record or further reduce it to the level of which I am sure we are capable.

Since the implementation of the safety programme, there have been numerous examples of workers being saved from serious or possibly fatal injury by the wearing of items of protective equipment. This past year has proved no exception as an additional three cases have been recorded.

Overseer Jack Driver of Grimwade was enrolled a member of the Turtle Club, his helmet being the means of preventing almost certain death; whilst applications have been made for membership of Basil Hammond of Gnangara workshop to the Wise Owl Club following an accident in which his eye was saved by safety spectacles; and Bill Adam of Northcliffe to the Intactoes club as his safety boot saved a badly mauled foot when hit by a chain saw.

Although these examples are irrefutable evidence of the value of wearing protective equipment where required, the high number of accidents that are still occurring as a result of unnecessary exposure to the many hazards present in our particular occupation is a matter of grave concern.

Perhaps a greater appreciation of the seriousness of this problem may be gained by an examination of the following details:

INJURY ACCIDENTS FOOT AND EYE 1969/70 - 1971/72

COMPENSABLE CASES

	1969/70	1970/71	1971/72	TOTALS
D.I.A. (Foot)	8	6	3	17
Eye	7	6	4	17
S.I.A. (Foot)	7	7	4	18
Eye	12	21	12	45
TOTAL INJURY ACCIDENTS				97

To these of course we can add the countless near miss incidents, of which only the individual involved is aware.

Having examined this extremely important aspect of accident prevention, we may well ask ourselves why is it that we, being recognised as mature and responsible citizens, will continue to expose ourselves needlessly to hazards from which serious injury or possible death may result.

The foregoing evidence amply demonstrates the gravity of this problem and the need for a greater acceptance by all of us that accidents do not just happen, they are caused and they can be prevented.

Our accident experience during the past five years proves conclusively that this statement is true. True beyond doubt that human failure is the major contributing cause of accidents.

Fortunately we have not, as yet, had to face up to the horrifying experience of death, loss of an eye, or some other life long bodily incapacitation through injury resulting from failure to wear protective equipment where warranted. Let us hope that we never have to; but let us assist in minimising the risk of such an occurrence by doing everything in our power to safeguard ourselves and also our workmates from injury accident.

Since the commencement of the safety newsletter, it is somewhat disappointing to note the poor response from the field to requests for safety articles for inclusion. I am sure that many officers and employees are capable of interesting articles dealing with on the job, home or road safety that would prove of value. An example of this sort of thing, submitted by Gordon Hampel of Mundaring, appears on page .

In conclusion it is hoped that, during the coming year, we will achieve further success in reducing accidents and so continue to enjoy the countless benefits that accrue from accident free experience.

DIVISIONAL STATISTICS 1971-72

DIVISION	MAN HOURS WORKED	NO. OF D.I.A.	F.R.
BUSSELTON	133,377	2	15
MUNDARING	83,298	6	72
DWELLINGUP	109,096	3	27
COLLIE	113,192	-	
KIRUP	106,823	-	
MANJIMUP	149,751	2	13
NARROGIN	19,906	1	50
COLLIER-SOMERVILLE	83,141	3	36
KELMSCOTT	56,957	1	17
WANNEROO	129,004	8	62
HARVEY	173,592	3	17
PEMBERTON	106,019	4	37
NANNUP	105,771	4	37
WALPOLE	62,325	-	
KALGOORLIE	7,442	-	
TRAINEES	34,515	2	58
RESEARCH	89,894	-	
WORKING PLANS	47,226	2	42
HEAD OFFICE	148,559	-	

TOTAL MAN HOURS WORKED = 1,759,888

TOTAL D.I.A. = 41

F.R. $\frac{\text{D.I.A. x 1,000,000}}{\text{M.H.W.}}$ = 23

DISABLING INJURY ACCIDENTS

	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71	71/72	72/73	73/74
BUSSELTON	18	20	19	21	24	13	8	6	5	2		
MUNDARING	16	15	12	12	10	12	4	3	4	6		
DWELLINGUP	15	12	17	21	10	5	6	1	1	3		
COLLIE	24	7	17	9	17	2	7	4	2	NIL		
KIRUP	17	19	17	19	13	21	9	14	4	NIL		
MANJIMUP	16	12	10	12	20	8	13	4	4	2		
NARROGIN	2	NIL	1	3	NIL	1	NIL	1	NIL	1		
KELMSCOTT	7	9	11	7	2	2	5	6	1	1		
COLLIER-SOMERVILLE	4	5	8	5	7	4	5	3	1	3		
WANNEROO	14	17	17	9	19	10	12	7	7	8		
HARVEY	31	21	25	26	29	20	12	3	3	3		
PEMBERTON	17	13	14	13	14	5	1	3	4	4		
NANNUP	10	18	7	15	7	15	5	7	2	4		
WALPOLE	9	4	6	7	8	4	1	4	5	NIL		
TRAINEES					5	2	NIL	NIL	NIL	2		
KALGOORLIE							1	NIL	NIL	NIL		
RESEARCH							3	3	1	NIL		
WORKING PLANS							3	1	4	2		
HEAD OFFICE							1	NIL	NIL	NIL		
	200	172	181	179	185	124	96	70	48	41		

DISABLING INJURIES MONTHLY

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	TOTAL
1959/60	13	28	12	10	22	19	3	16	16	12	13	13	177
1960/61	11	27	12	14	18	12	29	17	10	7	13	18	188
1961/62	14	15	17	19	18	13	13	17	11	15	21	15	188
1962/63	16	18	12	8	14	17	21	18	17	21	24	14	200
1963/64	16	21	19	20	7	15	19	12	11	14	7	11	172
1964/65	16	9	13	8	10	9	16	16	29	19	21	15	181
1965/66	26	13	12	11	6	14	19	14	17	13	18	16	179
1966/67	17	20	18	13	14	20	17	13	18	10	15	12	187
1967/68	14	18	10	13	9	9	10	13	4	7	9	8	124
1968/69	11	7	11	9	7	11	7	12	1	6	10	4	96
1969/70	7	8	5	5	5	11	1	5	8	5	6	4	70
1970/71	3	2	5	4	12	4	2	2	4	4	3	3	48
1971/72	6	4	3	3	5	3	1	4	5	3	3	1	41

AGENCIES OF DISABLING INJURIES YEARLY

	MACHINERY IN OPERATION	VEHICLES	TOOLS HAND	TOOLS POWER	MANUAL HANDLING	PERSONS FALLING OR STRIKING AGAINST	OBJECTS FALLING OR FLYING	HARMFUL CONTACTS	OTHER	TOTAL
1959/60	1	1	26	NIL	30	53	55	3	8	177
1960/61	8	5	29	2	38	43	45	13	5	188
1961/62	2	11	14	10	46	39	45	13	8	188
1962/63	3	8	25	5	42	48	51	15	3	200
1963/64	3	4	18	6	29	49	38	17	8	172
1964/65	1	12	18	7	38	50	38	11	6	181
1965/66	5	7	28	7	25	62	34	6	5	179
1966/67	2	9	29	13	35	51	39	5	4	187
1967/68	3	4	14	7	30	19	31	14	2	124
1968/69	6	4	9	3	27	15	13	15	3	96
1969/70	3	10	7	6	17	10	10	4	3	70
1970/71	2	2	4	4	5	16	11	2	2	48
1971/72	1	2	6	3	7	13	8	-	1	41

"THE SKITE"

- by G.E. Hampel

The Skite stood up on the back of a truck
And said that 'Safety First' was muck;
The boys all thought "Well, strike a light!
This fellow is'nt very bright.
If he don't watch it, he'll - oh by heck!
The ass has got it in the neck."

A hanging branch had come too near
And fetched him one across the ear.

* * * * * * * * * * *

The kangaroos got fighting drunk
And all the emus did a bunk
When the Skite stood up on the back of a truck
And said that 'Safety First' was muck.

Came the First Aid man to do his stuff;
He said "This man's been treated rough."

* * * * * * * * * * *

The D.F.O. was seen to rock;
The Safety Officer did his block,
When The Skite stood up on the back of a truck
And said that Safety First was muck.

"Here's a fine thick ear and a broken jaw,
And of teeth there's missing half a score."

* * * * * * * * * * *

The pine trees withered at the tip,
And jarrah blocks refused to split
When the Skite stood up on the back of a truck
And said that Safety First was muck.

"And be it noted that His Nibs
Has also done at least six ribs."

* * * * * * * * * * *

Jack Marshall came up and was he wroth
Said he "I'll boil him down for broth,
This silly skite who stood on a truck
And said that Safety First was muck."

"Apart from a broken arm and knee,
There's no other injury that I can see."

* * * * * * * * * * *

The jibs broke down and firetrucks too;
Junior Officers sank from view;
When The Skite stood up on the back of a truck
And said that Safety First was muck.

We bandaged him up and sent him away.
He wont be back for many a day.
The boys relaxed but its a bet
The day is one they wont forget,
When the Skite stood up on the back of a truck
And said that Safety First was muck.

* * * * * * * * * * *

In case you still haven't got the message
The moral is plain, don't be showoff or skite;
Be safety minded from morning till night.
If you don't, you'll get hurt and, what's even worse,
You may well be the subject of some of my verse.

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