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Forests Department Perth Western Australia

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Editor: C.J. Edwards

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EDITOR'S NOTE

In the absence of the Editor of these notes on long service leave (currently travelling in places east of the Nullabor), I would like, on his behalf to extend appropriate Seasonal Greetings to all our readers and to their families.

Now that the New Year is rapidly approaching, may I remind all those contributors who haven't put their thoughts in print in these pages for some time, and all those potential contributors who haven't yet got around to submitting their first effort, that New Year is the time for good resolutions, and to resolve to submit an article for Forest Notes is, in my opinion, a very good resolution indeed.

C.J. Edwards
Acting Editor

TABLE OF CONTENTS

Forests Department,
KIRUP. 6251

The Editor,
"Forest Notes",
PEMBERTON

Dear Sir,

SPRAYING OF GRASS WITH VOROX AA

This note is directed at young officers to indicate that good ideas can come from any officer or employee and can alter our techniques with considerable cost savings. The expense of implementing the idea may be very small.

1. As the Forests Department plants P. Radiata on more re-purchased farm lands in the Blackwood Valley the problem of grass competition from old pastures in spring and early summer has become greater. Pines are killed if the competition becomes intense.

2. The grass is controlled by applying Vorox AA at the rate of two pounds per acre. Pines are not affected by Vorox during the cooler months. The areas have been sprayed using aircraft, a "conomist" and boom sprays in previous seasons. Boom sprays give the most positive application and aircraft the least. However by using a boom spray, the total area to be treated must be traversed. This can become somewhat expensive.

3. Forester J.A. Dearle reasoned that if spraying was done at the time of machine planting the need for a special coverage of the area for spraying would be eliminated. A 44 gallon drum filled with Vorox suspension was mounted on the front of the tractor and connected via pipes and a pump attached to the power take off to two small jets mounted on the rear of the planting machine. This took a mechanic about half a day to rig up and perfect.

4. Results: A three foot wide strip of sprayed area with a row of pines in the middle free from grass competition. With rows nine feet apart it can be seen that only 1/3 of the area being planted is actually sprayed instead of totally using the previous method. In effect the time and expense of spraying is eliminated save for 1/3 of the cost of the chemical applied.

   The weight of the drum mounted on the front of the tractor also gave greater stability on the steep slopes. The contents of the drum lasts for the same length of time as the number of pines which can be carried on the planting machine. Both Vorox and pines are replenished at the same time.

5. In a 1500 acre planting programme which will take place mainly on old paddocks the cost saving is considerable:-

2000 lbs Vorox at $1	= $2000
Aircraft Use	= $2500
Wages	= $ 300
	$4800

All ideas for new techniques should be brought forward for discussion with your divisional officer. Your idea may result in a change in the Forests Department's procedures.

Yours,

D.J. Keene
Divisional Forest Officer

Forests Department,
COMO. 6152

The Editor,
"Forest Notes",
PEMBERTON

Dear Sir,

Fuel provides energy and heat and one is always on the lookout for a replenishment to maintain hot water and heating requirements. So much so that I feel it may well be of interest to list species used, bearing in mind that sections from the root system to the leaves are all included as fuel. It is really surprising what is available when you apply yourself to the task.

Among the Eucalypts used - Euc. accedens, astringens, calophylla, citriodora, camaldulensis, diversicolor, leucoxylon v. rosea, loxophleba, erythrocorys, lane-poolei, cornuta, caesia, megacornuta, ficifolia, gomphocephala, patens, todtiana, marginata, wandoo, torquata, rudis, sargenti, botryoides, lehmanni, polycarpa.

Other species - Acacias cyanophylla, acuminata, pycnantha, longifolia, cyclopsis, Chamaelaucium uncinatum, Ceratonia siliqua, Hakea multilineata, H. laurina, Casuarina fraseriana, glauca and huegeliana, Melaleuca pubescens, Callitris robusta, Leptospermum laevigatum, Tamarix ariculata, Banksia grandis, menziesi, attenuata, illicifolia, Tristania conferta, Melia azedarach, Popular deloitodes, P. yunannensis, Pinus species, Cupressus arizonica, C. sempervirens, Agonis flexuosa, Araucaria excela, Cytisus proliferus, Citharexylum subservatum, Xanthorhea preissii.

Yours,

David Watson

THE KARRI FLORAL CYCLE

by

P. Christensen

The annual karri seed and floral sampling has now been completed. It was somewhat late this year as we struck a problem not previously encountered. All the mills, nearly without exception, were cutting on seed tree areas. As the floral components are usually lost after fire these trees are of little use for estimates. Consequently all sample branches had to be shot down using the rifle, a laborious method when a lot of samples are involved.

Capsules from this year's seed crop are still present but it is not expected that there will be much seed present this season. There may be enough in some areas.

The fairly reasonable bud crop which was initiated in 1971 has entirely disappeared. It is thought that the long dry summer may have had something to do with this. However, a new good bud crop has developed in 1972. This could still lead to the flowering forecast for 1973, resulting in a seed crop in 1974/75. But in view of the failure of last year's bud crop it is now considered more likely that another bud crop may develop this year leading to a good flowering in 1974 and a good seed crop in 1975/76.

SIREX NOCTILIO - SEARCH & DESTROY

by

Roger F. Burke

The life of a Sirex Woodwasp in Victoria is a far cry from the peaceful existence the species knew in Europe. A wasp grub may be barely hatched from his egg when he is confronted by a predator which proceeds to devour him. If he escapes this fate he may be but a month old when another parasite inserts a long sting, with unerring accuracy, into his body as he quietly chews through a tree. This sting lays an egg which hatches into a hungry larva which proceeds to gnaw at the vitals of its host until it kills the unfortunate Sirex.

Even if he survives this perilous infancy there is still a good chance of a tiny worm entering his body and sterilizing him - depriving him of any joy he may have derived from his short two weeks of adult life!

ORIGIN & HISTORY

Sirex noctilio is originally a native of Europe, where it is a comparatively uncommon insect and is not regarded as a threat to forests. In this climate its life cycle is 2-3 years. About 1905 it appeared in New Zealand but caused no alarm in the following years as it was generally held to be an attacker of only weakened and dying trees.

But in 1946-50 it reached epidemic proportions due to several years of high summer rainfall followed by a series of droughts. In the overcrowded P. radiata forests the mortality was high with a proportion of the dominant trees being killed as well as the suppressed trees.

In 1952 Sirex was found near Cambridge Airport in Tasmania. It appeared to have been present for several years and there were reports of wasps "buzzing around the tops of trees like bees...." From Tasmania it was only a short step to Victoria and this occurred in 1961 with Sirex being discovered in a suburb of Melbourne. This led to the setting up of the National Sirex Fund in 1962, financed by contributions from the Commonwealth, State Forest Services and private forestry. The contributions were in proportion to the area of Pine Forest and were matched pound for pound by the Commonwealth.

THE WASP

As well as P. radiata, Sirex has been found in Pinus taeda, elliottii, patula, echinata, muricata, ponderosa, nigra, canariensis and pinaster, also Larix decidua and Picea sitchensis. It has been observed ovipositing into Rimu, Miro, Kauri, Douglas Fir, E. globulus and farm gate post!

The insect is primarily a secondary attacker of weakened or suppressed trees but healthy trees can be killed if the attack is heavy or consistent. Sirex seems to be able to detect by some means the trees which will be satisfactory for oviposition; resin smell is one method in the case of damaged trees and broken branches, the latter being a frequent object of attack.

Tops left from logging can be attacked after a couple of days when the moisture content drops to between 70 and 100 per cent; also trees pruned during summer by virtue of the resin smell and the slight weakening of the tree.

The urge to lay eggs is exceedingly strong in the adult Sirex, hence the recorded oviposition in the gate post and in E. globulus. A wasp may lay up to 400 eggs - depending on its size, and with each oviposition, spores of a symbiotic fungus are injected from a sac near the base of the wasp's ovipositor.

Frequently 3 punctures in the wood are made through one bark puncture by altering the angle of the ovipositor; with an egg being laid in only one hole. The other two punctures are thought to be for the injection of fungal spores only. Wasps will rarely drill through more than 4 mm of bark.

The egg may take from 2 weeks up to 2 months to hatch - depending on temperature. The larva then starts to tunnel upward or downward and toward the centre of the tree and then outwards again early in summer. When the grub is within a couple of inches of the surface it pupates and rests until late December or early January when the weather is hot enough and then it tunnels the remaining distance and emerges.

Emergence takes place from December to about May, depending on the rate of development of the grubs. If a grub does not emerge in this time it remains in the wood until the following summer. Mating takes place as soon as the Sirex finds a partner and the female then begins her search for suitable trees. It is thought the wasp can fly up to 15 miles in its short 2 week life after emergence. The size of an adult Sirex varies from .5 inches to 1.5 inches long.

THE FUNGUS

Sirex Woodwasp can only survive through an association with a symbiotic fungus - Amylostereum chailletii. Fungal arthrosphores are carried in a sac near the base of the ovipositor and injected with each oviposition.

It is this fungus that actually kills the tree, by causing a rapid moisture content drop and its conditioning of the wood for the grub to eat. Fungus infected wood is usually very white, pulpy or brittle and has a M.C. of around 25-30%. Also it loses most or all of its pine smell.

If the wood around the oviposition tunnel becomes infected with blue stain before the Sirex fungus gets a hold, the blue stain can overcome the Amylostereum and the larva dies. However if the Sirex fungus is established well first it will win the battle.

Similarly if blue stain is in one part of the tree and Sirex in another, the larva will die if it tunnels into "blue" wood, although after pupation a couple of instances are known where adults tunnelled through a couple of inches of "blue" wood - one assumes they grimaced all the way!

CONTROL

Control measures of Sirex in Victoria are twofold; a) physical search and destruction and b) biological control, with the former gradually being phased out by the latter.

The search is carried out continually on the fringe of the known infested area, and involved personal inspection of all pines on private property, farms and plantations. When Sirex is found the affected trees are felled or limbed and burnt, and the remaining trees are quarantined for three years.

BIOLOGICAL CONTROL

This is being achieved by the use of insect parasites and a nematode worm. Parasites are bred at Melbourne and Traralgon for release in Sirex infested areas.

MEGARHYSSA NORTONI NORTONI AND RHYSSA PERSUASORIA

Originating in North America and Europe, these insects are larval parasites. They operate from September to November by locating the Sirex grub and inserting a long ovipositor through the wood and into the grub and laying an egg into it.

This egg hatches and the parasite grub kills the Sirex and emerges after about 12 months. Mating then takes place and the cycle begins again.

IBALIA LEUCOSPOIDES AND IBALIA ENSIGER

These two parasites are from Europe and North America respectively; they are very similar and are closely related - probably both having descended from the same forbears in Europe.

The Ibalia species are one egg parasites - as distinct from larval parasites like the Rhyssenes. They are active at the same time as the Sirex; the female Ibalia locates the fresh Sirex oviposition - inserts her own ovipositor down the same tunnel and lays an egg into the Sirex egg or sometimes the grub.

The Ibalia egg hatches and the grub actually lives inside the Sirex until just before the Sirex pupates. It then kills the Sirex, pupates itself and bores its way out. When a Sirex grub has Ibalia inside it - the parasite can actually be seen moving inside the Sirex, and can be separated on bisection of the Sirex.

The parasites used in Victoria have been selected from about 22 species of insects in the world which parasites the Siricidae family. They parasitise that family exclusively and as the Sirex population diminishes so the parasite numbers follow on down in a smiliar curve.

THE NEMATODE WORMS

These show the most promise in ultimate Sirex control. In areas of New Zealand they are claimed to have been 98% effective in eradicating the wasp.

Nematodes used are 4 strains of Deladenus siricidicola, originating in Europe; they take the form of tiny worms, barely visible to the naked eye. The worms live on the Sirex Fungus (Amylostereum chailletii) and in this way move right through the infected trees. When they encounter a Sirex grub or pupa the nematode enters the Sirex and attacks the testes or ovaries, causing sterility but otherwise not affecting the Sirex.

In due course the Sirex emerges as an adult and in the case of a female lays eggs containing nematodes, or in a male when mating takes place he affects the "clean" female with nematodes.

Both cases results in nematodes being laid into trees with each new oviposition by the female, and in this way the larva of uninfected Sirex, which have laid into the same tree, become sterilized by the insidious worm.

Nematodes are bred by the Forests Commission and Sirex infested trees are cut into short billets and inocculated with nematodes by making small cuts in the wood and adding water containing nematodes.

The billets are then placed near trees discovered by the search parties to have Sirex in the larval stages. Sterile wasps emerge from the billets and mate with wasps emerging from the trees, as well as infecting most of the trees suitable for the following summer's ovipositions.

The 4 strains of Deladenus used have been selected because they do not sterilize the other insect parasites used in the control programme as many other strains do.

THE FUTURE

It would appear that the main threat to our forests from Sirex is past, as the parasite and nematode population increases, but this increase will reach a high point and then take a downward turn as the wasp population is decimated.

Thus it follows we will always have a small population of Sirex being preyed on by a small population of parasites. The best insurance against Sirex is healthy, vigorous forests and as long as these are maintained and isolated patches of trees are not allowed to build up a Sirex population, the wasp will never become a real problem again.

VOICE FROM THE PAST

A Government order printed in N.S.W. in 1822 concerns pitsawn timber cut by convicts. It gives the official price of the finished product as "7/6 per 100 feet" and goes on to say:

> "Any ticket of leave man who shall exact higher payment shall forfeit his ticket of leave. Anyone refusing to work at such payment shall be placed in the penitentiary".

This advice is passed on for the benefit of DFO'S who may wish to employ a similar line of persuasion when discussing piecework rates with their pine mill crews.

REPORT ON SYMPOSIUM ON AIR POLLUTION UNIVERSITY OF W.A. - 21st MAY 1970

by

A.J. Hart

SUMMARY

1. The problem generally lacks recognition.

2. A cheap method of desulphonisation of pollution gases required at the refinery.

3. Trapping of pollutants associated with buildings and topographical features. Design of buildings could possibly mitigate this cause.

4. CO is the most serious hazard in pollution because of effect on haemoglobin and insidious immobilisation thereof.

5. True physical data on smoke stack design seems lacking and misleading: a dumping spot inevitable at a distance from stacks and hence emission precipatators essential.

6. Particulant pollution serious because of assistance in SO_3 production and hence H_2SO_4 acid mists.

7. No mention of salt water in water catchments.

INTRODUCTION

The members of the Symposium were addressed by the following speakers:-

1. Mr. D. RIGDEN - "Industrial Sources of Air Pollution" (B.P. REFINERY of W.A.)

2. Mr. C.W. MACKEY - "Meteorological Factors in Distribution of Pollutants". (COMMONWEALTH METEOROLOGICAL BUREAU)

3. Dr. D.P. LETHAM - "Medical Aspects of Air Pollution" (P.H.D. PERTH)

4. Mr. CARGEE - "Problems and Methods of Detection and Measurement of Atmospheric Pollution" (RESEARCH DEPARTMENT OF UNIVERSITY OF W.A.)

5. Dr. H.H. MACEY - "Prevention and Control of Air Pollution " (SENIOR ENGINEER P.H.D. CLEAN AIR DEPARTMENT?.

6. Mr. P.F. BRINSDEN - "Air Pollution and the Law"

7. Mr. K. ADAM - "Air Pollution in Relation to Town Planning and Urban Geography" (PLANNING OFFICER T.P. DEPARTMENT).

At the conclusion of each address brief questions were invited from the audience.

To set down in detail, the full content of each speaker's talk is not considered warranted - rather, it is felt that the main conclusions as to:

1. Nature of the problem as it effects the community (city and rural).

2. How the problem can be overcome (if at all).

3. Detection problems.

4. Aspects of law associated with pollution.

5. Some of the medical aspects of results of pollution.

6. Possible future planned avoidance or diminution of pollution.

Professor Bayliss, as Chairman made the following points at the commencement of the Symposium, drawing listeners' attention to:

1. Recognition that a problem is in existence in relation to air pollution.

2. The quantitative measurement of extent of the pollution and methods of control.

3. Contemplation of control involves value judgement as to the amount of control needed by the community and.

4. A legal problem follows in that having made judgement, social legislation is required to implement measures.

MAIN POINTS FROM EACH SPEAKER

Mr. RIGDEN

1. The problem with oils is one of phytochemical smog e.g. Los Angeles.

2. Desirability of high level effluent stacks to avoid visibility of NO_2 gas which can be seen at 20 ppm.

3. Hydrocarbon vapours cut down by use of floating roof tanks: Cost of waste gases equal to $50 - $200 per day.

4. A cheap method of desulphonisation required with recovery as acid or sulphate. For every ton of fuel at $3 treated, $2 can be recovered as SO_4.

5. At an output of 6 ppm. of CO_2 per month half this amount is removed by natural processes.

6. Los Angeles smog problem not likely in Perth because of favourable climate. Smog caused by SO_2.

7. Diesel units emit little smog if <u>properly operated</u> less than petrol motors.

8. Dried aluminium mud used as catalyst in control of smoke emissions.

TABLE OF ENERGY USED IN W.A. AS % OF MILLION OF TONS OF FUEL USED

FUEL TYPE	TONNAGE USED	AUST. %	W.A. %
Fuel Oil (ex Refinery)	25.5	14.8	15.5
Refinery Fuel & Gas	9.5	5.8	21.6
Coal	17.6	48.0	2.6
Wood	6.5	2.4	19.2
Bagasse	-	1.8	-
M/Spirit	22.2	17.9	8.7
Dist. and Diesolene	16.6	8.3	13.9
Kerosene & H/Oil	1.7	1.5	8.1
L.P. Gas	0.4	0.7	4.1
Natural Gas	-	0.1	-
Hydro Electricity	-	1.7	-
TOTAL	100	100	70

Mr. MACKEY

1. Sources of pollution are: people, radioactive material, dusts, volcanic explosions and ozone from lightning discharges.

2. Air constantly in motion vertically and horizontally cooling with height (35-40,000) is zone of major pollutants.

3. Energy balance arrived at by short wave radiation heating the earth with a balance achieved with long range radiation: maximum CO_2 or moisture in the air affect this balance and tend to make earth heated similarity to a heat engine.

4. Los Angeles smog condition aggravated by the inability of smog gases to rise over the mountains and hence is in an unstable condition over the city, moving to and fro from sea to mountains with concentration of pollutants in a particular area. Small scale effects; behind buildings and in hollows, etc. caused by air flow swirls.

5. Jet stream air flows 60 - 200 mph speeds.

Dr. LETHAM

1. CO contaminates O_2 and is picked up by blood haemoglobin becoming fixed there and disallows O_2 to go to body tissue.

2. Incapacitation occurs in a person when ½ the haemoglobin is so immobilized - referred to as an "ANOXIC state".

3. With 2% carboxy in the blood impairment of normal behaviour.
   5% (30 ppm.) - impairment of vision and less efficient exercise.
   5% - 10% - hearing and circulation affected.
   10% - 20% - 1st symptoms of CO poisoning headache (in some people)

4. Smokers normally have 4 - 5% CO.

5. Sulphur oxide - parts of this are oxygenised to SO_3 - H_2O - H_2SO_4 acid mist, using ferrous metals as catalyst and therefore more potent than SO_2.

6. Metal particulants - smaller than particles are worse because of surface area involved capable of producing SO_3.

7. 5 ppm. seems normal for healthy persons i.e. SO_3.

8. There is a correlation in world figures between SO_2 levels and respiratory troubles.
   (after correction for smoking etc.)

9. Lead - pollution of the order of 25 microgrammes per day but CO considered worse than lead.

Mr. CARGEE

1. Detection and measurement - 20% of SO_2 is produced by man - 80% by biological decay.

2. 15% of global hydrocarbons are made by man - the rest from trees, methane gas etc.

3. Portions to be measured - gaseous pollutants, particulants and pollutants
   (gaseous - organic and inorganic)

Inorganic	Organic
Fly Ash	Aerosols
Blasting Coal etc.	high molec. wt.

4. Principle of detection

   $SO_2 + H_2O_2 - HSO_4^- + H^+$ (increase of elect. condictivity to give SO_2 quantity)

5. Items checked O_3 (no specific tests)

   SO_2 CO, NO & NO_2 & O_3 - the latter measured by rates of production of cracks in rubber bands.

Dr. MACEY

1. Smoke stack design and consideration.

2. Noted that various heights of chimneys are illogical according to tables and various formulae - ignorance of true facts evident but not stated.

Mr. BRIMSDEN

1. No definition of which Minister is responsible.

2. Regarded as a somewhat unfinished Act.

3. Penalty provisions should be tidied up.

4. No specification as to who enforces the Act, anybody in the community can lodge a complaint - if successful pocket the fine!

5. Apparent lack of will to control pollution - Local Government reluctant to do so - Minister can insist on them doing so.

6. Law of nuisance is also involved.

A LETTER FROM NEPAL

by

A.D. Mather

The following letter from Alastair Mather is reprinted here by kind permission of the recipient John Smart.

It is now history that, despite Alastair's forebodings in the first paragraph of this letter, his previous report was duly received by the Editor and incorporated in the last edition of Forest Notes.

AUSTRALIAN AID PROGRAMME

Nepal Forestry Project
Box 208
KATHMANDU

3rd September, 1972

Early after our arrival I wrote to Roger in the hope that he would put the letter in Forest Notes and so let most people know how we had fared. I haven't heard from him and I must assume that it never arrived but I don't really know, so if I repeat myself you must forgive me. I recall that it was one letter that I simply stamped and put in the post box - soon afterwards I was told by the more experienced inhabitants that the letter would probably be stolen for the sake of the unfranked stamp!! That just about sums up the postal organisation in Kathmandu, and not only the Post Office but most of the public services! Of course one always learns of these things by bitter experience and by the time one passes the information on to the next unsuspecting foreigner the situation has changed again after a short purge in the offending office and everything runs smoothly for a while.

Well we have been here for most of monsoon and the rains have been pretty light, up to yesterday this is, because for the past 36 hours the rain hasn't stopped and we will start to feel the effects of the down-pour in the next day or two. The main road, in fact the only road, from Kathmandu to the outside world will be blocked for sure by landslides and we'll be out of petrol for one thing; not that that will be much of a hardship because the minor roads will be blocked or impassible in any case. The roads here are really something; you'll remember the Devil's Elbow, well imagine a whole road system stretching for mile after mile just like that, actually the gradients are good but the twists and hairpins are interminable and its tiring work getting a Land Rover around.

The planting season is over and the Afforestation Section did well to complete the target of 4,000 acres spread over 15 planting sites mainly in the hills around Kathmandu, but with about 800 acres in the terai (the lowlands bordering India) which is an absolutely ghastly territory - hot and humid without any saving grace in the monsoon, but bearable, I am told in winter. I have made one trip down there to see some teak, sissoo and khair planting. Flew down to the border and then took the only road which went through India and eventually back into Nepal at our destination. I found the Indian minor officials exasperating and they were quietly being as unco-operative as they could be. At one check point one wretch kept us waiting for quarter of an hour while he read every page of my passport -

he was obviously trying to rile us and was hoping that we might lose patience and start an argument which only he could win on Indian territory. He didn't get the satisfaction - if I've learned anything at all it's some degree of patience, but by god you've got to summon every ounce of sense of humour!

Work-wise this is the worst time of year because everything clams up with the monsoon and the impossible travelling conditions - you've just got to wait until the rains end before you can move around the country. This period of inactivity affects the whole population and everyone gets very frustrated and short-tempered. I couldn't go into all the details of the job because there are so many facets, but briefly, the main job is to do as much afforestation as possible. Communication is a limiting factor so most work is being done around Kathmandu where the roads and tracks are. I have read numerous early reports of the '50s and 60's and the situation then seemed quite impossible - no staff, no proper Forest Department and no will to do anything about the problems of overgrazing and illegal cultivation and general encroachment of the forests. Since 1966 the Department has really changed its image in the afforestation field at least, and they are capable of an annual planting programme of 4,000 acres which is really something. Of course there are hundreds of shortcomings which would shock Australian foresters. Field staff are grossly underpaid and can't afford to work for the Department only, so they have more than one interest (sometimes the interests conflict!) The Department is not self autonomous and is subject to the sometimes ridiculous whims of non-technical red-tape clerical types. For instance there was a purge on the use of Govt. transport and all vehicles from all Departments were drawn into one massive pool. That happened just after the planting and it's just as well that the operation had been completed because our section hasn't been able to get a vehicle since the purge, and that's some five weeks ago! If it hadn't been for the one Australian Land Rover, which they couldn't touch, we would have been completely immobilised. There's no sign of the embargo being lifted because the Departmental Secretaries haven't got round to a meeting to sort out the problems which have arisen. In any case the Secretary of the Forest Department was sacked because "he was showing too much interest in the issuing of Forest Licenses, and not enough in development work" and you can read that how you like. The King takes an active interest in these matters and has an effective anti-corruption section. To get back to some of the technicalities, Chir pine (P. roxburghii) is the main species because it's safe even if it is slow-growing; then Blue pine follows on the higher altitudes, and in between on special sites come Alnus nepalensis and Fraxinus spp. The planting is of a pretty low standard because it is done with unskilled child labour - the adults are too bush planting the paddies which is a much more lucrative job. Pine planting commands three rupees a day (that's about 27 cents Aust. a day) and paddy planting gets

three times that amount, and of course it's more important because rice is the staple diet - only the cattle can eat pine trees! Every plantation must be fenced to a very high specification because of the danger of cattle getting or being driven in. This is a major problem and it's going to come to a head in a few years time because, with a fairly high planting programme, the grazing lands are being diminished and at this stage there's no hope of combining forestry and grazing as is done in Switzerland. I think they'll end up chasing their tails because the cow-boys will be forced to destroy the remnants of native forest for grazing, this will lead to over-grazing and the Department will have to follow up behind with the planting to avoid total destruction of the soil. Eventually the cow-boys will get into the early plantations and the whole cycle will start again. This is always assuming that the concept of the holy cow will never be eradicated, and I think that's a fairly safe assumption for the next couple of centuries. The effects of over-grazing have to be seen to be believed. The ground cover is utterly destroyed and huge landslides and slips occur on the very steep hillsides. By golly they are steep - if you put a wrong foot down on the planting sites you could land up dead a thousand feet below. After my first day on the hills I thought I'd never stop aching - knees were like jelly! But like everything else you get used to it and I might be able to beat Bill Simmonds up Alco by the time I get back.

The Nepalese are great people - terrific sense of humour, especially when you get out of Kathmandu amongst the villagers. My halting and stumbling Nepali is a source of tremendous amusement - I could swear they come for miles just to get a laugh. Next month is a time for general festivities and by then the weather will have cleared and the real Himals will be out from the clouds in all their majestic glory. Then I hope to get out on a trek to the Annapurna range. It's a 12 day hike through the most spectacular gorge in the world with Annapurna in the East and another mountain called Dhaulagiri on the West. Both mountains are over 26,500 feet and the gorge is 8,000 ft. The distance between the two peaks is only 21 miles so the gorge is literally 17,500 ft. deep, just imagine that between Manjimup and Tone River!!

On the other extreme the social life in Kathmandu is hectic. The foreign population must be in the thousands and most people are connected with Aid projects of one sort or another. There are four other Australian families most of whom are connected with a Civil Aviation project. Masses of Americans, Swiss (who seem to do the best work here) Japanese, Koreans, French, Brits, Indians, Hungarians, Russians, and even Arabs. There is one British Embassy Club which is a glorified pub for Saturday nights, and the American Club which has a good restaurant and bar (duty-

free prices) and has the occassional movie. The golf course is a nine-holder and tests accuracy if not long hitting. The S.S. is 60 and the handicapper is a real tough case. He awarded me with a 9 handicap, Steve will enjoy the joke! Mind you, that was after a lot of practice and one card of 68 which could never be repeated - I suspected the caddy and ball-boy (and I've never come across a course where you get two blokes to look after you) of kicking the ball out of the rough patches; they probably had a side bet on. Anyway I'm stuck with this ridiculous handicap - I'm told that the handicapper considers it 'infra-dig' to raise a handicap in under six months. The company on the course and clubhouse is as wide as you could hope for and although the membership is small at 25 or so, it's not exclusive. I can't resist a bit of name dropping, but you can be playing with a Prince, Foreign Minister or even an ex Prime Minister of Bhutan who's a hell of a hard case. I think he milked that little State and got out just in time after his brother was assassinated. I hasten to add that I get a game most days with an American forester, whose name happens to be White which reminds me that Barney promised me some karri seed and I never got it. Could you send me about 4 ozs. with another 4 of marri?

The Eucs. have been a resounding failure when taken out of the valley floor on to the hills but I would like to try these two. There are no quarantine regulations here so you could send them direct.

On the home front, we have got a magnificent five bedroomed three-storied house on the banks of the Bagmati river. The only drawback is the awful odour from the river bank - it's used as a public lav. and when the wind is just right the smell is something terrible. The children are happily settled into the Lincoln School which is an American International school and very advanced. The staff is mostly from the States and so the overhead costs are high, but the teacher:pupil ratio is excellent at 1:15 so individual attention is almost assured. We will have a problem with Elaine next year because she is in the highest grade at present, but we'll get over that somehow even if it means a correspondence course. The cost of living is high and contrary to our first intentions we have had to import a lot from Singapore and we are now looking at prices in Copenhagen. Would you believe it, but we can import from Denmark or U.K. at cheaper rates than we can buy locally. The amount of paper work to do so is a bit off-putting but it has to be done if you want to eat a decent meal now and again. The climate, apart from the rain is ideal. Mid 70s and reasonably low humidity with plenty of fitfull sunshine even at this time of year. The rain usually comes at night.

Like anywhere else in Asia, this country is not without it's trouble spots. Last week some insurgiants from India (ex Nepalese Congress Party) attacked a police post and one policeman was killed and several others wounded in the melee. As far as I can make out there is a troublesome band of ex Congress Party together with some Communists stirring up trouble in the terai, but the monarchy is pretty popular and I think it is a phase which will be squashed from time to time. The King is young and progressive but there are other members of the royal family who get their fingers in the juicy and lucrative pies. The oppulence of the former regime - the Rana rulers - has to be seen to be belived. Enormous palaces decorated in French style with all the trappings of the West. They held absolute power until 1952 and it was only from the date that the country has been opened up to the outside world.

I don't know if Fred Skeet ever got my telegram and I would be grateful if you would let him know that I sent one to mark his retirement.

I can't possibly write to everyone in Manjimup so I would also be glad if you could pass this letter round to anyone who might be interested in reading it. I hope Wes is in good nick and Jack Mac has left some fish in the briny! I would be interested to hear how the karri thinnings stood up to the winter (down Pine Creek Rd.) and how well that patch of karri was regenerated in Gobblecannup. In fact any news would be more than welcome.

BIG TREES

Over the years since "Forest Notes" first began, dimensions of many Big Trees have been published. Most of these have been within the bounds of imagination, but the following staggers the credibility of the most ardent karri forester.

This is a copy of a letter found in Pemberton Office Files recently:

"Mr. Stewart,
MANJIMUP

KARRI TREES

Mr. J. Valentine, who was on the Classification Camps in 1921, informs me:

(a) The biggest girth he measured was 72 feet. It was near the Shannon River; stores were obtained from Pemberton. The Chainman was F. Balcombe.

(b) The greatest length he measured was 330 feet. The tree had just fallen and covered the 5-chain steel band.

Forester C. Ahern and several others were taken out to see the tree which was near a camp.

This tree was possibly between the Gardner and Shannon Rivers.

The tallest tree found standing was about 290 feet.

T.N. Stoate,
CONSERVATOR OF FORESTS

Perth
22.9.49"

HARVEY REGION

Sorry you've been so long without news of this Region - the reason - John Robley has been on Long Service Leave to the U.K. and on his return has been seconded to the Bush Fires Board for five years - good luck John.

We are expecting Alan Hill in Harvey in December to take over the reins. Other recent transfers were Phil Shedley from Collie to Harvey, Don Spriggins from Kelmscott to Collie, Bob Brierley from Pemberton to Collie, Ross Mead from Collie to Dwellingup and Bob Hingston from Collie to Manjimup.

Ian Watson has left the Department from Harvey.

Alan Briggs from Dwellingup is now in National Service.

Only one new appointment - Miss Merryln Kearney in the Collie Office.

This programme is continuing in Collie (19 men), Dwellingup (6 men) and Narrogin (4 men).

One notable project is that performed by well known Dwellingup identity Dick Phillipson. He is producing excellent routed tourist signs.

DRYANDRA FOREST LIONS VILLAGE

The old Dryandra settlement is now leased to the Lions Club, who are developing it to a vacation village. The Minister for Forests, the Hon. H.D. Evans officially opened the village on Sunday 29th October, 1972.

A feature of the Dryandra forests and arboreta are the Dwellingup routed signs.

REGIONAL NOTES

BUSSELTON REGION

Staff

Inspector Hill has been transferred to Harvey and will take up his position as from the 1st December, 1972. F/A Bean has just returned from hospital after undergoing nose surgery.

F/G Terry Maher has been transferred from Walpole to Nannup.

T/A Banks, representing Pine Marketing and Harvesting, has been attached to Busselton Division.

F/G Mac Intyre has resigned.

Congratulations to Brian Fitzgerald on his recent selection in the State Skeet Championship to be held in Adelaide shortly.

Planting Techniques

Kirup recently carried out a trial with a four wheel drive tractor pulling a planting machine. It gave outstanding results, being able to plant up-hill on a slope of 1 in 4. This should enable more machine planting to be effected in the Blackwood Valley in future.

General

Recent visitors to Kirup and Nannup were the Tasmaniun Chief Commissoner for Forests, Mr. Paul Unwin and his wife, who were conducted on a tour of the Grimwade and Blackwood Valley plantations.

Mr. Unwin was particularly interested in the drought effects on pine and in jarrah die-back rehabilitation.

Numerous over-the-counter enquiries have been received at Busselton over the last six months. Those which are worthy of note are as follows -

(a) Gentleman wanting a 'Black Gin'. (Mr. Cracknell was asked to find one).

(b) Mr. Robin Swift from Alahbama, U.S.A., inquired as to possibility of investing in a sawmill in W.A.

(c) Gentleman asking to licence his fish net.

(d) Two ladies inquired about a bug they had with them which was making the leaves on their trees 'curl up'.

(e) Gentleman asked "Have you any literature on how to cure sheep skins?" He was directed to the Agriculture Department.

(f) Visiting couple of Oriental origin enquired why locals do not keep the sand crabs they catch.

(g) A Mr. Lepidi wanted to renew his cattle brand.

SOUTHERN REGION

Staff: Steve Quain has been appointed Superintendent South, Jim Edwards appointed Inspector, Manjimup and John Smart promoted to Senior Divisional Forest Officer.

Roger Underwood represented the Department as an official observer at an advanced Fire Control course held by the Victorian Forest Commission at Lorne Victoria during August and John Smart will be representing the Department at a similar course in November.

Rick Sneeuwjagt will be leaving for the United States in early December for a period of study leave. Paul Jones will replace Rick in fire research and is already learning the ropes.

Tom Leftwich and Jenny Musulin joined research.

David Ward transferred to Research, Como.

Frank Vince was appointed Forester at Jarrahdale.

Karri Regeneration

As reported in earlier editions of these notes, very extensive areas in the Pemberton, Northcliffe, Shannon and Walple areas were burnt for regeneration during last spring and autumn. The results of sequential and more detailed grid sampling has shown that the regeneration generally varied between excellent to very fair. There were two or three areas where lack of seed resulted in apparent regeneration failure, and in these places planting of nursery grown open rooted stock was carried out to make sure that adequate stocking was achieved.

The next comprehensive regeneration burning programme will be in the summer of 1974/75 or 1975/76 - when the next good seed year is expected.

Anyone for Cricket!

Some of the more energetic officers and employees of the Department at Manjimup hald a meeting several months ago, and as a result entered a Forestry Cricket Team in the local competition.

So far their cricketing ability has not caught up with their enthusiasm and in their first encounter they came a close second.

We wish them better luck next time.