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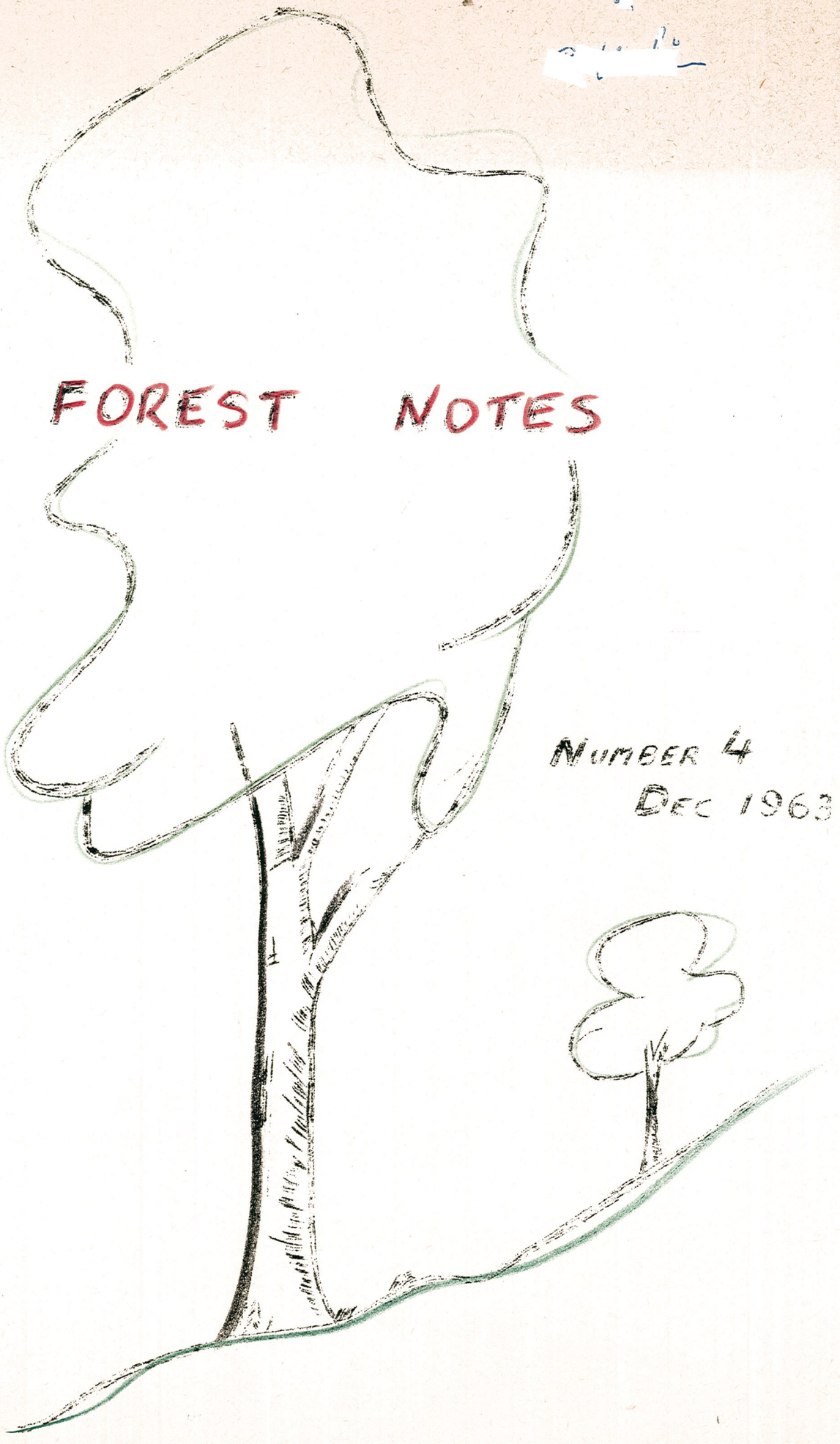
FOREST NOTES



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EDITORS' NOTE

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It has taken a long time to produce this issue of Forest Notes, and the editors have vowed to produce future issues on a fixed schedule. In their own defence, it must be realised that the new editors took over the task on November 8th, 1963, so perhaps the delay cannot be placed entirely at their feet. The letter to the Editor by Mr. T. J. Welch echoes many of the sentiments of the Editors and the following notes could be described as the Policy, for the time being.

1. ARTICLES -

should be between a half page and 3 pages of close spaced typing, and should include a minimum of detailed drawings and photographs since these incur printing problems.

2. REGULARITY -

it is intended that an issue will be made each quarter, i.e. March 30th, June 30th, September 30th, and December 30th each year, and publication will be made whether sufficient articles have been received or not.

3. TIME LIMIT -

articles for inclusion in Forest Notes will be received up to the 1st day of the month of publication, but contributors who include diagrams etc. should submit their work earlier than this if possible.

4. PUBLICATION NUMBERS -

this issue is Number 4, but next year's copies will start with Vol. 2 No. 1.

R E M E M B E R : Closing date for next issue is March 1st, 1964. So start work now!

P. N. Hewett

C. J. Edwards

JOINT EDITORS

PUBLICATION OF "FOREST NOTES"

To The Editor

Dear Sir,

It was interesting to read your comments in the Editorial of "Forest Notes" of March, 1962, whereby it was stated that, through lack of material submitted, it was not possible to produce more than one issue per year.

I would like the opportunity to put my views on this point, and to suggest that there may be others with similar ideas, and whose opinions may be sought through the channels of this same medium.

Firstly, it will be seen that the latest issue carried a total of 31 articles, and with descriptive drawings and photographs, covered 31 pages. It will also be noted that several officers contributed more than one article. Certainly these multiple contributions display the eagerness to participate, and in many instances tend to illuminate the many latent talents.

It is on this note that I now offer some constructive criticisms, which, if worthy of consideration, may lead to a review of present procedures, and culminate in streamlining the presentation of "Forest Notes", and also the work involved in it's preparation.

I believe, as experience has taught us, that in these fast moving times, no publication will attract attention, or more important, continue to hold interest, when it appears spasmodically or with long intervals between issues. For example, most of us can remember more than a few reputable weeklies and periodicals which have disappeared from the scene, through mainly, the inability to keep abreast with the times.

This view is intended to suggest that "Forest Notes" should be published on a regular cycle, probably on a quarterly basis, and that it should "go to press" with whatever material is at hand. In this way many aspects of good public relations would be maintained, viz., sustained interest by the predominant contributors, and at the same time stand to encompass gradually a greater field by virtue of its dependability; where possible, include not more than one article per issue by any one writer.

To support this contention, let us take a look at the principle behind the publication. It would appear to me that the title suggests that it is intended primarily to consist of a group of short notes or "letters", which can be produced and distributed speedily, to contain that news or information which is readily available, and which is mainly of interest value if it can be applied and disseminated before the theme becomes obsolete. In other words, as it would appear that the articles submitted are not intended to treat any particular subject to its fullest, then it would seem equally unnecessary and perhaps not in the best interests to attempt to amass literature to the extent of book proportions. Likewise, out of consideration for the Editorial staff, I would think that a smaller and less complicated volume could, no doubt, be produced while involving a much lower proportionate amount of effort and attendant delays.

The next point for consideration is the notification of "dead-line" for script. At present time the procedure appears to be to circularise, probably once only, and then, owing to the work involved, there is no follow up. For those who have missed this reminder, nothing is heard until the issue finally arrives without warning. It will be seen that, as stated heretofore, much of this frustration, not to mention lost opportunities all round, could be

easily eliminated. For example - with a quarterly issue "dead-line" for script could be on the 1st day of the third month, with that issue appearing at the end of that month. These dates would be readily remembered by all interested parties.

Last but not least, I would record my appreciation of what I believe to be a valuable link in this Department, and one worthy of furthering. In this light some thought may be turned to the possible needs of the Editorial staff in the manner of co-opting assistance in order that any desirable improvements in the publication can be brought to fruition.

Yours faithfully,

T. J. WELCH

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IS PLOUGHING NECESSARY ?

By D. Spriggins

Ploughing just prior to planting is an accepted practice in pine plantation establishment. Is ploughing necessary for successful pine growth? There are some who consider that the benefits are over-rated and in many cases pines can be established successfully without ploughing.

The reasons commonly advanced in favour of ploughing before planting seem to be based on one or more of the following points:-

1. The cutting action of the discs either kills or severely retards the growth of any native vegetation, thus relieving the young pine crop from outside competition for soil, water and nutrients. Also if killing of the native vegetation is a success, the pine crop is not likely to be overtopped by scrub.

2. The top few inches of ground is churned up, thus allowing the roots of the young pine to penetrate the sub-soil more easily. It is also sometimes claimed that by breaking the hard pan on the surface, more water will soak into the soil than on unploughed ground.

Comments

The first point lists probably the major benefit of ploughing, i.e. the killing of scrub, etc., so as to reduce water losses from the soil. The fact that scrub etc. removes a large amount of moisture from the soil was first strikingly shown by Veihmeyer, an early botanist, who demonstrated that a tubof moist soil lost twice as much water in three weeks through the growth of a single plant as it did in two years through exposure to the sun.

With regard to point 2., this may be true on poorer soils where a hard pan in the upper surface is quite common, but in the better soils sufficient loosening is usually achieved by the bulldozer during heaping up operations. It may be true that if a hard pan is present the soil is too poor for pine planting anyway.

Arguments against ploughing are:-

A. Cost. Ploughing costs are influenced to some extent by the type of soil and steepness of the country and range from £2. per acre upwards. In addition to the actual cost of ploughing there is the cost of cleaning the ground so that a plough can operate successfully.

B. In better soils the valuable "crumb structure" is partly destroyed by ploughing, thus making the soil poorer in physical properties, i.e. aeration and drainge, and thus less suited for pine growth.

C. When ploughing is done on steeper ground, even if on the contour, run off and erosion can be serious. On catchment areas where it is necessary that water purity and soil stability be ensured, this is an important point.

Comments

With regard to costs, if ploughing was not to be done the cost of picking up and cleaning the ground could possibly be cut by half. The area should then be clean enough for hand planting and the amount of debris left behind should not interfere with extraction of the first thinning.

If it is then possible for less than £2. per acre to kill the native vegetation by means of herbicides such as 245T instead of by ploughing, there should be a distinct financial advantage. This will be because the costs of picking up should be reduced if ploughing is not to be done. Using 2% 245T solutions in dieseline and at the rate of 10 - 15 gallons per acre, it is quite likely that an acre could be thoroughly treated for less than £2. These remarks apply, of course, to land previously carrying eucalypt forest. On reclaimed agriculture land where grass growth is prolific, ploughing may be the cheapest method of removing the effects of outside competition.

The idea of using herbicides instead of ploughing is not new and is practiced in some North American pine forests where scrub competition is a problem and the costs of cleaning the ground suitable for ploughing would be prohibitive. Total weed killers are also used in this State for control of grass on plantation firebreaks.

It is intended to start some trials at Harvey next year to test the possibilities of the use of herbicides instead of ploughing.

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THE SCRUB PROBLEM AT GRIMWADE PLANTATION

By D. R. Lejeune

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Species and History

In planting since about 1955, the presence of one or both of species Acacia pulchella and A. urophylla has been a serious and costly problem. Why it does not appear to have been a problem before is not known with certainty but possibly there has been a build up in seed supply on the large cleared areas. Hot initial burns could also be a factor.

Seriousness of Infestation

Our initial approach due largely to labour shortage and the opinion of an authority, was to take no action against the scrub unless it appeared that it would overtop the pines. In such areas we were eventually forced to slash lanes 2 - 3 ft. wide along each row at a cost of £3. per acre. In most areas this later proved insufficient because the scrub leaned into the land and where taller than the pine, physically suppressed it. A second slashing was then necessary at £5. per acre.

In order to prove that prevention or eradication was necessary, 2 sets of plots were established on 30th April, 1962. In each year's planting, one plot was selected as typical of bad scrub growth and the other on the same soil type and aspect within 2 chain was a control which had always been free of dense scrub.

Year Planted	Scrub species	Scrub infested Plot				Scrub Free Pl
		Mean ht. 100 pine	Mean Ht Scrub	% of Pines		Mean height 100 pines
				Suppressed	Dominated	
1958	Ac.pulchella	7.2 ft	7.3 ft	14	10	11.2 ft
1959	90% - Ac.urophylla 10% - Ac.pulchella	5.2 ft	4.0 ft	Nil	Nil	6.3 ft

1958 : planting had been row slashed, quarter June, 1960

1959 : " " " " " " Sept. 1961

In 1958 planting the suppressed stems would almost certainly die if not freed, and despite freeing would be lost in the race and later be cut down. The dominated stems could become suppressed by scrub, but if not suppressed would be of doubtful value.

In 1959 planting the scrub is not fully grown, but the eventual effect other than a reduction in pine growth would, judging by other areas, be similar to the 1958 planting.

Conclusion from Plots

It is imperative to find a cheap means of scrub prevention or early eradication.

Preventive Measures before Planting

A study of the time of the initial burn has given no correlation with scrub development.

Due to the large area (about 300 acres) in each year's planting and limited plant, most of the ploughing has been done prior to the first winter rains. Ploughing after these rains and after scrub germination does not solve the problem as it has been found that later germination can result in a dense scrub growth.

Eradication after planting

Methods tested over the last 3 years -

1. Slashing - generally two operations as previously mentioned. This is a most unpleasant job and the prickles are still in my trousers from measuring these plots. Besides being not fully effective it is intolerably costly.

2. Spraying with weedicide - On 4/4/1960 test plots were established where both pines and scrub on 1959 planting were sprayed with

2.4.5T 40% ester. Rates of 500/1 and 100/1 were used. Scrub was knocked back severely and most of it killed but the result on the pines was similar. Hence this method of scrub eradication is not favoured. Even if the pines were protected from the spray it would be more expensive than dozing or ploughing.

3. Hoe-mate Slasher - This implement is similar to a power circular saw but carries a rotary slasher instead of a saw. It slashed the scrub quite well but was far too difficult to handle on rough plantation ground.

4. Rotary slasher on tractor 3 point linkage - In tall scrub the tractor was endangered by hidden stumps. In any scrub it was difficult to control the slasher at a correct height and avoid excessive damage to pines. It was extremely tiring and also hazardous for the driver. A contractor after trial would not continue.

5. Cultivating one year after planting - a tractor with 3 point linkage cultivator was used and encountered no difficulty but the cultivator tended to run over the scrub without removing much of it.

6. D4 dozer with 7 ft. blade - This has proved by far the best method to date and large areas have been cleared at £2. per acre (machine and wage). It is, however, necessary to wait till the scrub is at least 2 years old so that the blade running along at ground level will push out the scrub and uproot it. One man with a slasher normally accompanies the dozer to slash scrub missed near the pines. Damage to pines has been negligible. Slashing has been found to be most effectively done during summer and the same should apply to dozing or ploughing. Trials are in progress to test the effect of leaving undozed or unslashed strips along the rows. These are those which are too close to the pines for the dozer to tackle.

7. Ro-tensor plough - Although only tests have been made, I am confident that this most adpatable implement is the solution to the problem.

The machine is attached to the 3 point linkage of tractors such as Ferguson 35 or 65 and consists of a set of 6 discs (scolloped for preference) which are driven off the P.T.O. Scrub of either species from 18 inches to 8 ft. high was rooted out of the ground. It will be desirable to plough when 1 year old and about 18 inches high. The cost of this operation is estimated of £1.8.0. per acre (machine and wages).

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SOME NOTES ON PINE BIN LOADS

By A. Kesners

The volume of short length pine logs obtained from first or second thinnings for use in departmental sawmills or for sale to private mills as a rule is not obtained by measuring all logs individually as set out in the provisions of the Forests Act and Regulations governing the procedure and method of measuring logs. A lot of time and money would be spent if each log had to be measured, numbered and recorded separately. Therefore, for the purpose of calculating -

Piecework fallers' pays

The intake of departmental pine mills

Revenue of pine log sales to private mills, etc.,

the volume of these logs is assessed by the "bin load" over bark.

There is no legislation covering the procedure and method of measuring and recording the dimensions and volume of such logs in this State and, to my knowledge, no detailed departmental instructions have been issued with a view to standardising this procedure. No doubt, the particular circumstances, species, available trucks and loading methods etc., would vary from plantation to plantation, and these factors would have to be taken into consideration to suit the requirements in each case when establishing bin measures. The following notes refer to P. radiata logs from Grimwade plantation carting 7 ft. logs with a minimum 4" crown diameter for the local departmental pine mill and to a private mill near Balingup.

One of the factors which had to be considered before fixing permanent bin loads was to decide on the most suitable type of vehicle to be used. The 5 ton truck was found to be suited best for this purpose being low enough for manual loading, short enough to manoeuvre between rows of pine trees, and with a maximum holding capacity for a quantity of logs which a pair of fallers can fall, load and deliver in approximately half a day.

Four different 5 ton trucks have been used at Grimwade to cart pine logs in bin loads, and the aim in each case was to fix a bin which would contain the maximum permissible weight (and most economical pay load) of the vehicle, i.e. 5 tons at approximately 25 cwt. per load = 4 loads in the round. Depending on the lengths of the loading space of the four different vehicles, which varies from 13'1" to 14' 10", the height of the bins was fixed at between 2'8" and 3' 0" for 7 ft. logs. These figures were established in a series of experiments by measuring all logs individually.

As a result of these measurements, it was found that on the average the "gross volume" (G.V.) in relation to the "nett volume" (N.V.) was found to be:

$$G.V. = \frac{138}{100} N.V.$$

OR

$$N.V. = \frac{72.5}{100} G.V.$$

For the purpose of these calculations all logs were measured by taking their O.B. centre girth. This, of course,

involved a fair amount of handling and measuring, and in order to find a method by which this work could be minimized, some "on the side" experiments were carried out by measuring the end of the same logs on a loaded vehicle with a rule. Since there is no uniformity in loading all butt ends on the one side and crown ends on the other, each side of the bin was measured separately. The results of these measurements showed considerable variation in the volume of the measured logs, the end measurements in each case resulting in a smaller volume. This method, therefore, was discarded as unreliable. A typical nett volume comparison between the centre girth (C.G.) and both ends (E_1 and E_2) measuring methods of the same bin load is:

C.G.	=	100%
E_1	=	96%
E_2	=	90%

It was further found that the nett volume of a bin load will vary with the number of logs in the bin, i.e. the size of logs. An increasing number of logs will cause the nett volume of the bin to decrease and vice versa. The upper and lower limits of this variation have been checked within approximately 10%. For practical purposes, however, it was considered unnecessarily complicatedto introduce a fixed formulae to relate the volume of the bin load to the number of logs it contains. For a basis in fixing the above-mentioned bin sizes a relatively average number (80 - 90) of logs in a bin was therefore used. In practice, when checking the level of a bin load containing a large number of small logs, we insist on a "full" measure, and will pass a "hungry" bin if it contains larger logs. Check measurements have proved this method to be quite sound, and with some experience an officer will soon find himself to be able to even estimate the volume of a bin load reasonably accurately at a glance.

The above notes apply only to millable P. radiata logs within the 4" - 12" diameter class where the contents are assessed by volume. Abnormally large logs from late second and subsequent thinnings not loaded to conform to a regular bin are measured individually in each case.

It would be interesting to compare this data from Grimwade with other plantations.

It also raises the question as to whether consideration should be given to amend existing legislation to provide for procedure covering the method of assessing and recording the volume of exotic species logs obtained from early thinnings. As the Forests Act stands (Regulation 60), each log - no matter how small - should be branded, numbered, measured (underbark) and recorded.

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OLD APPRENTICESHIP DOCUMENT

By D. H. Perry

To train men for service in the General Division of the Field Staff an apprenticeship scheme was instituted in 1917 by Mr. Lane-Poole, the then Conservator of Forests. Many of the senior men of this Division were trained under this scheme. It is thought that the apprenticeship document covering the indenture might be of interest to our staff.

A copy follows from which some of the official legalese has been omitted to make the document more readable:

INDENTURE OF APPRENTICESHIP TO CONSERVATOR OF FORESTS

The indenture made the 17th March, 1917, between Mrs. Smith in the State of Western Australia, of the first part, Bill Smith son of the said Mrs. Smith of the second part, and the Conservator of Forests in the State of the third part:

WITNESSETH :

1. The said Bill Smith of his own free will and with the consent and approbation of his parents (testified by his execution of these presents) doth hereby bind himself apprentice of the said Conservator of Forests to serve him from the 17th March, 1917 during and until the full end and term of four years.

2. The said Bill Smith doth hereby covenant and agree with the said Conservator of Forests that the said Bill Smith to well and faithfully and diligently serve the said Conservator of Forests as an apprentice in the trade or business of a Foresters during and until the full end of the said term of four years.

3. The said Bill Smith shall not at any time during such term cancel, obliterate, injure, soil, destroy, waste, embezzle or make away with any of the books, paper writings, plans, tools, documents or other property of the said Conservator of Forests or the Government of Western Australia or knowingly suffer the same to be done by any other person or persons whomsoever, if within his power to prevent it, without giving speedy notice thereof to the said Conservator or person appointed in authority over the said apprentice.

4. In case the said Bill Smith shall act contrary to the covenant contained in the last preceding paragraph hereof he must indemnify the Conservator within one month for damage committed.

5. The said Bill Smith will at all times during the said term readily cheerfully and diligently obey and execute his lawful and reasonable commands and conform to the rules, regulations of the Conservator of Forests now in existence and which from time to time may be hereafter made during the term of his said apprenticeship.

6. The said Bill Smith shall not depart nor absent himself from the service or employ of the said Conservator of Forests at any time during the said term without his consent first obtained and shall from time to time and at all times during the said term acquit and demean himself as an honest and faithful apprentice ought to do.

7. The said Bill Smith agrees to serve the Conservator truly, honestly, and diligently for the full term of his apprenticeship.

8. The said Conservator of Forests will during the said term by the best ways and means he can and according to the best of his power and knowledge instruct the said Bill Smith or cause him to be instructed in the said trade or business of a Forester and all and

everything pertaining thereto.

9. The said Conservator of Forests will pay the said Bill Smith the sum of 12/6d. per week during the first year of his apprenticeship, the sum of 17/6d. per week during the second year of his apprenticeship, the sum of 22/6d. per week during the third year of his apprenticeship, and the sum of 30/- during the fourth year of his apprenticeship. The said Conservator of Forests shall pay the said Bill Smith a subsistence allowance of 10/- per week to cover the cost of his board and lodging during the period of his apprenticeship. It shall be lawful for the said Conservator of Forests to withhold any increase in wages from the apprentice if he fails to satisfy the examiners.

10. If at any time during the said term of four years the said Bill Smith shall from sickness or any other cause whatsoever absent himself from the service of the said Conservator of Forests he the said Bill Smith shall not be entitled to receive any wages during the time he shall be absent as aforesaid and shall not be entitled to receive any annual increase in pay until he has completed the full yearly term unless the said Conservator of Forests in writing waives the same.

11. Any breach of the foregoing conditions on the part of the apprentice shall render the indenture null and void at the will of the said Conservator of Forests.

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THE CONTROL BURNING SEASON SPRING & AUTUMN OR AUTUMN & SPRING

By S. J. Quain

With the proposed introduction of strip burning, I consider we should alter our burning season and submit a separate control burning report. The closer study of the underlying principles of control burning and the attempts to mechanise the work should lead to an improvement in both quality and quantity of the burning.

I consider the control burning season should be Autumn and Spring with the control burning report and plans prepared to cover the calendar year.

The following reasons for these proposals are -

(a) With the introduction of strip burning on a rotation, it is the easiest method of making the most effective use of the burnt strips for fire control, e.g. it is no use having a proposed burning strip of Spring and Autumn as a fire control measure for the Summer because it will not be complete until the fire season has ended.

(b) The bringing up to date of the control burning plans at the beginning of the fire season impresses upon the officers concerned both the strengths and weaknesses of the control burning carried out that year. This should be more effective than at present when these facts are brought to mind during mid-Winter when generally the warmth of a fire would be much more appreciated.

(c) The system of calendar year burning will greatly simplify the preparation of the fire year burning plans. This is readily apparent to those officers who have to draw up and check the plans.

(d) Drawing up the necessary plans will provide those officers on early season fire duties an alternative occupation to cleaning the car or digging the garden.

Comments (not facetious) from some of the general staff both for and against may prove enlightening.

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THE JARRAH LEAF MINER

The following notes are a condensation of a report by M. M. H. Wallace* on "The Jarrah Leaf Miner in Western Australia - Miscellaneous Notes from a Preliminary Survey".

The detailed work was carried out at Nedlands during 1960 and 1961, with field reconnaissance north to Murchison River and south to Albany and Denmark.

1. Name

Originally identified as a species of Tinea, the moth is now believed to belong to an undescribed genus of the family Incurvariidae. Other moths with rather similar habits are known in this family, both in Australia and overseas.

2. Life History

The adult moth is rather inconspicuous, darkish-grey in colour, 3 - 4 mm. long, with a wing span of about 7 mm. When at rest, the wings are folded together in a more or less tent shape, but some long scales near the tips of the wings give the moth the appearance of having a large "tail-fin".

The adults are very active on the foliage and branchlets of the trees and run along the branches very rapidly so that at a glance they can be mistaken for ants. They may also be seen flying in and around the foliage.

The eggs are laid in Autumn - April and May - by piercing the lower epidermis of the leaf and inserting a very thin-shelled and delicate egg just under the surface. The eggs are very small, ellipsoid in shape and about 0.3 mm. long and 0.2 mm. wide. A flask-shaped swelling containing the egg forms under the leaf, and frequently all, or most of these swellings, point in the same or nearly the same direction.

Young larvae appear about 6 weeks after emergence of the adult moth, and reach maturity some 3 months after hatching, when they cut themselves out of the leaf.

The leaf cell, containing the larva, is formed by the top and bottom layers of leaf epidermis being sealed together with silk. On reaching the ground, the head of the larva appears out of one end of the cell; it then pulls itself along and into a suitable crack in the ground, where it comes to rest half-an-inch or so under the surface. Here it remains in the larval stage until the following Autumn, when the larva pupates.

The pupal period if very short, possibly only a few days, but emergences continue for some weeks. It is suggested that variation in the times of pupation and emergence may be due to a response to temperature decrease in Autumn.

3. Intensity of Infestation

(a) Number of Larvae per Leaf : Newman and Clark state that

* An officer of C.S.I.R.O. Division of Entomology, Nedlands.

the number of mines in a leaf varied from 10 to 50. However, in E. Rudis, over 100 small mines on a single leaf were frequently counted, the maximum recorded to date being 178. In the latter case, the leaf was unable to support so many larvae and only 64 reached maturity. It is suggested that a large leaf could possibly support 70 or more larvae.

(b) Variation Within Trees : Although practically every leaf on a tree may be severely damaged, it is probably more usual to find some portions of the crowns more severely affected than others - for example at Nedlands the incidence of attack was almost invariably greatest on the south east side of the crown, away from the prevailing north west winds of April - May.

Although severe damage occurred to the topmost branches of some trees 40 feet or more in height, foliage near the ground suffered most.

(c) Variations Between Trees

The intensity of attack on different trees varies enormously. However, there are strong indications that odd trees are resistant to attack at least to some degree. In view of the number of times in which resistant and susceptible trees are found growing side by side (sometimes with intermingling foliage), it seems more likely that the continuing resistance to attack of some trees is through an innate quality of their own, rather than from some special characteristic of the site.

It seemed also apparent at Nedlands that the trees which were more heavily infested in 1960 again suffered damage in 1961, and those suffering only minor damage in 1960, again contained only small numbers of leaf miner in 1961. With odd exceptions the correlation between attack in 1960 and that of 1961 was highly significant.

(d) Variations Between Years

Further information is required on this aspect. At Nedlands and north of Perth the damage was less in 1961 than in 1960. In the Albany-Denmark area the reverse was the case, suggesting a fluctuation from year to year in each of the affected areas - possibly depending on weather conditions etc.

4. Species of Eucalypts Attacked

The two species which support the heaviest infestations are Jarrah and Flood Gum. There seems to be no difference in susceptibility between Flooded Gum and River Gum (E. camaldulensis). Leaf miners have also been found in small numbers on York Gum and Coastal Blackbutt near the Moore River. None, as yet, have been collected from Karri, Marri, or Tuart, although Newman and Clark reported them on the latter as well as on E. salubris (Gimlet) and E. transcontinentalis (Boongul).

There is no proof that the same species of leaf miner is responsible for all these infestations - see Section 9.

5. Distribution in Western Australia

No attempt has yet been made to follow the leaf miner to the limits of its occurrence. It is known to occur as far north as the Murchison River; south to Augusta and east to the Stirling Range. Newman and Clark recorded it as far east as Merredin and Westonia.

6. Parasites

Dissection of several hundred mines in which larvae had failed to reach maturity, revealed the presence of at least one and probably two species of parasitic (?) wasp - yet to be identified.

A most interesting point, based on, as yet, inadequate data, leads to the possible conclusion that open areas (and perhaps coastal areas) are unfavourable for the natural parasites, enabling the leaf miner to reach higher densities.

7. Effect of Fire

The behaviour of the leaf miner larvae of burrowing into the ground about ½ in. or so during the summer, protects them from all but very hot fires. A hot burn in a small area near King's Park early in the 1960/61 summer had no effect on subsequent infestation. This may have been due to moths carried in from adjoining areas.

8. Other Leaf Miners

Two other leaf miners with rather similar habits have been collected on Jarrah. These could be called the "Marginal leaf miner" and the "mid-rib leaf miner".

"The Marginal leaf miner" always occupies an area on the margin of the leaf affecting a half-moon portion of the leaf. On maturity, it cuts out a hole as does the Jarrah leaf miner, but it is present the whole year round. The adult moth is smaller, and has 2 distinct white or silver patches on its wings.

"The Mid-rib leaf miner" invariably occupies an area surrounding the mid-rib and frequently towards the distal end of the leaf so that the end portion of the leaf dies off. Some curling of the leaf usually results. It can be found at any time of the year and seems to prefer the new and more succulent leaves.

Both these miners could easily be confused in the field with the Jarrah leaf miner.

Another miner which usually seems to occupy the terminal portion of the leaf and is very similar to the "Mid-rib" type, although smaller, is found in the Peppermint, Agonis flexuosa.

9. Control with Systemic Insecticides

Some preliminary experiments with stem injection or trunk implantation of a systemic insecticide (phorate or "Thimet") were carried out at Nedlands in 1961.

On June, 13th, about a fortnight after the hatching of the leaf miner eggs, eight trees with stem diameters ranging from 3" to 9" were each infected with 8 g phorate active ingredient. Within 3 weeks, virtually complete control of leaf miner was obtained on trees with stem diameters up to about 5 in. The results were erratic for larger trees.

The method shows considerable promise and may be useful for shade and ornamental trees - and perhaps the control of pysllids.

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POLLEN DRIFT STUDY AT MUNDARING WEIR

By Gerald W. Van Didden

* * *

A seed orchard consisting of elite trees is one of the most important factors by which the future pine plantations can give an increase in the timber quality and yield.

To select suitable locations present several difficulties when dealing with Pinus radiata:-

Rainfall should exceed 30" per annum

Soil should be a well drained basic loam

The site should be at least 20 to 30 acres in size and within easy distance of H.Q. to facilitate administration.

Finally the orchard should be in an area free from cross pollination from established plantations.

Selected possible locations at Mundaring Weir were tested during the month of August, when at the peak flowering of Pinus radiata.

The traps consisting of a guard to keep out rain, but permit a free flow of air, were placed 2'6" above ground level in clearings.

Pollen was caught on an aluminium slide with 5 x $\frac{3}{8}$" holes giving a receptive area to pollen of approximately .55 inches. Slides were covered on both sides with protective cellulose adhesive, to protect the entry of dust particles during transport from and to the site. On arrival at the site one layer of adhesive was removed and the slide left in the trap for a period of one week. At the end of the week the slide was covered with a layer of cellulose adhesive and a new slide was placed in position. These tests were repeated four times, after which the slides were sent to the Research Branch for a count of pollen grains attached to the adhesive.

Results are given below:

Trap No. 1 - 40 chains on S.S.E. side of pines
Trap No. 2 - 120 chains on S.E. side of pines
Trap No. 3 - 40 chains on E.S.E. side of pines

Date When		No. of Pollen grains			Prevailing Wind
Exposed	Covered	No. 1	No. 2	No. 3	
7/ 8/63	13/ 8/63	1,325	327	99	North Westerly
13/ 8/63	22/ 8/63	111	46	83	Westerly
22/ 8/63	29/ 8/63	15	Nil	5	West-South-West
29/ 8/63	4/ 9/63	92	14	19	South Westerly

It is apparent that an increase in pollen grains during the last week of the test are caused by the flowering of the Lieira strain of Pinus pinaster.

A FOUR LOAD PINE

Although not the biggest Pinus radiata yet, a tree recently felled during thinning operations at the Harvey Weir Plantation does give a measure of the growth to be expected from the better class areas of this plantation.

Vital Statistics are as follows:-

Location:	Harvey Weir Plantation, Compt 3
Age:	36
S.Q. III	
Total Height:	127'
G.B.H.O.B.	6' 10"
Merchantable Volume (actual)	76 cu. ft. peelers 133 cu. ft. mill logs and casewood
Total :	209 cu. ft.

The tree was removed from an area that will be submerged when the level of the Harvey Weir is raised, probably within the next 4 years. Present policy is to reduce stocking on the areas to be submerged to 100 trees per acre, so as to obtain maximum growth in this short period. It is, therefore, expected that there will be trees larger than this one when final felling is done.

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SALESMANSHIP AND FIELD DEMONSTRATIONS OF PLANT AND EQUIPMENT

By T. J. Welch

Throughout a lifetime of active participation in many branches of the Engineering trades, no doubt one must automatically become exposed to not only the declared or accepted hazards of such calling, but also to those pitfalls which are ever so frequently disguised under other titles. Those disguises are mainly in the form of salesmanship, sometimes tinted or flavoured with a certain amount of joviality, so-called good fellowship and, of course, lighter vein.

In this article it is intended to treat the basic subject and including some of the main features of the present day approach made by many Agents and their representatives towards the marketing of mechanical plant on the basis of buyer reaction through field, or similar demonstrations, or possibly the showroom burlesque.

Whether the item of plant offered is of the magnitude of the largest crawler tractor or other earthmoving unit, the medium class motor vehicle, or the diminutive chain saw, nevertheless, the principle governing the presentation and testing remains fundamentally the same, or at least it should be considered so in the eyes of the potential purchaser, if he is astute in his search for the greatest value from his investment.

All too often we have received the salesman who, unannounced and without appointment, as "dropped in, in the hope that he will

find someone", is armed only with a single leaflet, of which 50% is taken up with elaborate photographs, or which has been printed for conditions other than our own. Worse still to come may be the fact that it is in a foreign language, with little or no attempt at offering even a reasonable amount of translation or technical interpretation.

This type of situation is bad enough, but, however, when the acid test is applied and the salesman has expended his coffers of knowledge, which after all were limited to the scope of the said pamphlet, and he then enlightens us with such as - "well we haven't received any more information from the makers yet" or - "this is really not my line, but the firm asked me to fill in while the other man is away", then perhaps only an electronic computer could come up with the precise answer as to the potential losses, not only in terms of sales, but in the interests of the industry for which the benefits as claimed were intended.

More than a few salesmen encountered, have no real knowledge of their product, and it would appear that in some instances the firms themselves prefer to foster the psychological approach of the well groomed social line, in the hope that sales can be made amidst a setting of serentiy. Another view may be that whilst the salesman may not be in a position to discourse fully on technical points of his product, he therefore is not placed in the vulnerable position of having to answer embarrassing questions, the obvious exit being - "we will have to refer that to the Head Office" etc.

In the field of motor car sales, we already know of the "tones" of colour and trims to suit the fastidious and delicate tastes (or more subtly aimed at the female element in order to pressurise the deal) the "more than adequate" glove boxes and ash trays, the "full X cubic feet" of boot space (either it is or it isn't X cubic feet, the "full" being added for padding. From this the next dramatic step in announcing heavy industrial plant could well be "the family economy size model" and close on it's heels could follow "the enclosed plastic toy gift".

If these are to be accepted as true symbols of the traits of the industries, then it is evident that unless the potential buyer is prepared to demand much more than he now receives in the form of data and technical information, genuine admissions, facts and fair comparisons regarding the plant, then he will continue to be compelled to accept plant along the lines of policies of the marketers which, after all, are designed primarily for the monetary benefit of those few.

There are many reputable firms in our midst which have, over a great many years, contributed considerably to the betterment of industry and the community in general, due to the fact that they had a proven product and at the same time the "know how" to back it. But with the changing times thrusting the responsibility onto young shoulders, no doubt there may be a lesson for them to pass on to those who are inclined to take the line of least resistance in an attempt to "get figures".

It can be fairly safely stated that in the present era goodwill ceases to exist in commerce. This should be a warning to both parties, to the buyer that he can expect, in some cases, little after sales backing, and definitely no sympathy for financial failures, and, on the other hand, to the seller, that he must expect to extend himself in order to prove that his product is of the class as claimed by him.

Let us take a look at the events as quite often encountered in the course of many attempts to stage a field test or demonstration.

It is often possible to sense the outcome of most demonstrations, as the symptoms usually become apparent in the very early stages and what was intended to be an industrial debut occasionally culminates in a retreat of crestfallen exhibitors and disgruntled audience alike.

Problems arising very early in the programme can invariably be traced to one or more of several points which, had any one of them given a second thought, would never have presented itself. Setbacks can stem from such as lack of attention paid to invitations to those most concerned, uncertainty of times, or no strict adherence to any published times, delivery to the scene of only some of the equipment ("it was thought that some items were not really needed"), plant not thoroughly prepared in advance, no specialised service tools to carry out any adjustments, no skilled operators available at the last minute. In these circumstances it may be presumed that all that is necessary is "a quick run through the familiar routine" and then everyone will be eager to join in at the "refreshment bar".

The trend in sales today leans more towards the principle of "acceptance on the showroom floor", and although this may be to a degree satisfactory for some purchases such as household appliances etc., the capital cost of modern field plant is such that the buyer needs to assert himself if he is not to be coerced into embarking on the proverbial and somewhat uneconomical "ride".

For those potential purchasers who may not be in the position to take advantage of many of the facilities for executing searching tests, it may be well for them to reflect awhile on the old axiom - "Know your Diamonds, or Know your Jeweller".

Whether the item of plant is to be exhibited to only one firm or organisation, or to several independent bodies, the Agent would be advised to make actual contact with the most senior or responsible head of each and every interested party and to ascertain that those who are to make the final decisions as to probable purchase, are well represented. Failure to be this is ever recurring and can result in an overload of insignificant onlookers, who may possibly retard progress and crowd the issue to the detriment of valuable contacts.

Selection of a location conveniently suitable to all can be most difficult, particularly where firstly, the practical application of the plant is paramount, seasonal or other requirements must be met and the fact that easily obtainable sites are rare in any crowded metropolis.

Precise timing of any meeting depends on accurate information as to the programme and no doubt if parties are to arrive at the scene in a good frame of mind, some clearly defined road directions will have been worthwhile.

Delivery of a large and varied amount of plant to any point has it's own problems and so special treatment must be administered by the service staff to ensure that every section has been prepared. It is seldom considered that this aspect has any real connection with sales, but, it may be worth a reflection as to how many sales are lost before the plant leaves the works for the field demonstrations. All points of the plant which are required to be altered or adjusted in any way during the normal working life, must be given a thorough lubrication and manipulation, so as to avoid a combination of embarrassment, criticism of the staff and firm, and perhaps nullification of the whole aim of the tests. Likewise, all service tools normally required for such adjustments and running maintenance under normal working conditions should be on the site if full advantage of the adaptability of the machine is to be observed and also to provide a true indication of the capital outlay.

Beware of the highly attired operator who has been sent along to "show how easily it can be done". It is important that operators of industrial plant should be attired and otherwise equipped in a way so as to allow for complete freedom of action and thought, and so be literally and psychologically unencumbered if the best is to be got out of the machine. The nuisance of gold wrist watches, fountain pens, colourful neckties, and uncontrollable tobacco packs do not impress the spectators, quite the contrary should the demonstration not be working out to schedule or expectations.

The aim of any demonstration should be to cover as complete a cross sectionof work as possible and this is best achieved by mapping out a specific project, in lieu of just using the machine aimlessly or, as in the case of earthmoving, where "dirt is pushed around until it is lost". This will ensure that the plant has the capacity to perform the duties to at least a fair standard of accuracy and reliability measured over a given unit of time, and also be a pointer as to operator reaction.

Most plant designed and built overseas can be economically applied to meet the needs of our industries. However, there is always the rare item which is said to be equal to the task, but which could become a costly experiment for the unsuspecting in the event of failure in early life, or the necessity for modifications. Equipment such as this should definitely be by-passed, knowing from experience that the lowest priced plant is not always the best investment.

The average user cannot afford to become the "guinea pig" in taking on prototypes or other untried machines and so should be guarded against tempting offers of large discounts or attractive trade-ins.

Reasonable intervals should be allowed for discussion and, if necessary, a further coverage of the technical aspect of servicing and adjustments. Remember, no new item of plant is seen in true perspective until it has performed considerable service and so one must look very closely to be able to form any sort of an opinion in the short duration of a nominal demonstration.

By now it is necessary to summarise the approach to the problem of assessing the potential of the various equipment, with the view to making the necessary reports or perhaps contracting to purchase. In other words, whilst the operations have been under way, what have we been looking for?

These points may be itemised as follows:-

1. A machine with adequate power for the purpose and still have a healthy reserve for all emergencies.

2. Simplicity and ease of operation, together with the minimum requirements of time and effort for adjustments, lubrication, and alterations to equipment.

3. Operator comfort as an essential in this modern age and this can be affected by numerous disadvantages. Apart from seating as in the case of motor vehicles and accessibility of controls, there is to be considered, good vision, ventilation, rain or sun pro-tection, control of fumes, etc.

4. Observe any good "built in" safety features, such as access to the machine by way of good steps or footboards, starting devices interlocked with controls, parking locks, etc.

5. On the other hand watch for hazards in the form of components minus adequate guards or covers, risk of starting fires, either on the ground or within the machine, risk of explosions, close proximity of heated parts, units under pressure which could cause injury by bursting.

6. Inadequacies must also be taken into account, for example, badly positioned openings for replenishing fuel and lubricants, and also for recurring adjustments, insufficient instruments and indicators, required for both the efficient operation of the machine and perhaps to meet the requirements of local laws.

7. Simplicity of body styling, with emphasis on the absence of superfluous features unsuitable for rough bush or similar conditions.

8. Suitability of power units for your particular work, where "high torque" slower speed models may give better performance and longer life, than high speed and so-called "high efficiency" models.

9. Query all points where dimensions or capacities have been reduced over previous models of similar rating. These changes, it may be claimed, are in the interests of reducing unnecessary weight or production costs, but in the long run may have a definite adverse affect on the quality of the machine.

10. Investigate all guarantees and warranties and do not necessarily accept the statements of salesmen as to such guarantees or warranties, technical specifications or performances, unless they are conveyed in writing, or per medium of printed literature presented by the firm and be said to represent the equipment. It may be well to remember that, under common law, no firm or employer can be held liable for claims arising from verbal statements made by their representatives.

11. Do not necessarily accept the sales angle often put forward that "so and so firm has purchased several", as this may only be intended to infer that unless you do likewise, then you may be judged as one who is not up to date with the latest trends in industry and so risk the associated criticisms. Likewise, the claims often made that the same plant performs satisfactorily in other environments or industries considerably different from those immediately concerned, cannot be accepted in their entirety, as cannot many elaborate photographic representations.

12. Investigate all aspects governing the introduction of the equipment into the local scene, viz. whether it complies with Police or other local traffic laws, is acceptable to the property owner with regard to fire risk, or damage to property by virtue of size or weight, acceptable to all parties on the project in the interests of personal safety, acceptable to insurance bodies (at a reasonable premium).

13. The background of the Agents may need a search into, if there is to be an assurance of reasonable after sales service and parts supply, together with staff who are fully conversant with the maintenance.

14. Consider closely whether the new model warrants immediate adoption, or whether it would be more desirable to continue with models in current use in the interests of standardisation, or at least until the new unit has been proven by larger organisations which can afford to take the risks.

15. Actually sight workshop and field service manuals, and specialised service tools, in order to ascertain their true value and availability.

16. In passing, it may be well to observe an attitude of non-committance in opinions expressed during or immediately following such demonstrations, thus allowing freedom to carry out comparison tests on other plant or research at other levels.

And finally, if after the most intensive research of this nature, the item is then purchased, previously unseen and unexpected problems and failures continue to dominate the scene and as sometimes is the case, to succeed in turning the salesman's "excursion" into the industry, into a "nightmare journey" for those left "holding the candle".

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OBSERVATION OF BROKEN TIPS ON PRUNED P. RADIATA

By A. Kesners

During first operation low pruning in four-year-old Grimwade Pinus radiata last year, it was observed that a considerable number of the tree tips snapped off as a result of jarring the trees with the axe blade. In order to ascertain whether saw pruning would have the same effect on breaking the tree tips, an adjoining area of the same age, serial number, and aspect was pruned with hand saws, and a count of the broken tips then was carried out over both these areas.

The result was quite staggering - in the axe-pruned area 58% of the trees pruned had their tips broken, whereas in the area pruned with saws only 4% of the pruned trees had lost their tips. As a result of this, all low pruning at Grimwade is now carried out with saws. This phenomena, however, does not apparently apply to all Radiata stands: in the Nannup plantation for example, similar observations revealed that the tree tips withstand the jarring caused by axe pruning much better than at Grimwade.

To see how the tree crown develops after the tip has broken, a further series of observation tests was carried out at six monthly intervals. Twelve trees with broken tips were picked at random and numbered. A 16 ft. aluminium ladder was used mounted on the back of a jib crane vehicle enabling close inspection to a height of 23 ft.

It was expected that these observation would show:-

(i) To what extent and how new shoots develop around the break, and whether any of these new shoots take over leadership.

(ii) Whether the most vigorous branch from the next whorl below becomes the new leader.

(iii) Whether a bushy top develops from either the new shoots or the limbs of the whorl below.

(iv) Any trends towards developing forks.

After three inspections at 6 monthly intervals, the following conclusions have been reached.

1. Following a break of the tree tip, in most cases a set of new shoots develop around this break. Of the twelve trees under observation, eight trees developed new shoots around the break, three did not, and one was not definite.

   Observations from top of the ladder, however, generally indicated new shoot growth on most trees - estimated at 80%.

2. Where a set of new shoots start growing around the break, invariably one or two originate from the surface of the actual break itself, and in each case these are the most vigorous shoots, one of them developing into the new leader.

3. Where no new shoots have developed following the break of the tip, one of the limbs of the next lower whorl takes over as leader. In one case, where all these limbs were of equal vigour, a bushy top developed.

4. Where one of the young shoots is in competition for leadership against an old lateral from the next whorl below, the young shoot will emerge as winner, even against heavy odds at the start. The exception to this is where the development of the new shoots is suppressed by dense needle growth surrounding the young shoots.

HOW OFTEN SHOULD A FOREST TRACK BE GRADED?

By D. R. Lejeune

In Forest Notes No. 3 an article was submitted entitled "Tracks Can be a Wasting Asset". In this the importance of drainage was stressed. In the last winter most of us have had this brought home with a vengeance.

Despite this, there is a very big mileage of our Forest Tracks which have been well drained and because they carry no regular traffic require little attention in the way of grading to improve drainage or to restore an even surface. However, we still tend to grade these tracks to remove the leaf litter or knock down the scrub.

Since 1954 two things have occurred which could have an important bearing on the treatment of these tracks:

(1) We are now control burning all the forest at regular intervals.

(2) Hormone sprays have found an important place in our work.

Because of (1) the leaf litter on one side of the track is burned whenever the forest on that side is burned. Mr. Peet has advocated the use of a marker such as a truck drawn scraper around the perimeter of each area to be burned. This scraper also makes a break in the left litter on the track. In the Kirup Division where we practice early edging of all proposed burns with flame throwers, it is found that a very rough trail will do to contain the burn. In many cases all the litter on the side of the fire is burned. If it doesn't burn we are no worse off.

This demonstrates that there is no need to carry out a full scale grading or even use a grader for fire control reasons.

If tracks are not treated in some way they will all ultimately become overgrown to the extent that traffic is impeded or prevented. 245T spray has been proved effective on most forms of scrub. Why not use it on our tracks? It would be much cheaper than grading. Some trials on this are being planned. The use of a torch to scorch the scrub in winter might also be tried.

If these trials are successful it will indicate that there is no need to use a grader for reasons other than restoring the surface or the drainage. Longer intervals between grading will:

(a) Reduce a departmental cost which is so large that some of us may be bashful about seeing it on paper.

(b) Allow the surface to become harder. In this state it will not wash so readily.

(c) Allow scrub to become established and further assist to bind the surface. It will only be removed when the scrub becomes too large.

When you are sending a grader to work in a certain area, how often does an officer who really understands the requirements actually inspect each track before it is graded and give specific instructions?

Because of the points made in this paper it becomes even more important that this be done.