

again. But if it meant cleaning the bush right out and making no provision for regrowth, he did not think there was any argument for hewers following the fallers, except to help the dividends of the company.

Mr. TURNER said in his district there were quite a number of trees left that the big mills would not take. Spot mills were coming into operation, and he thought that spot mills and fruit case mills on these areas would be more benefit, from the forester's point of view, than the hewers.

Mr. MACKAY said the spot mills would not handle the big logs.

Mr. TURNER said the big mills would not take a log under 16 feet as a rule. The spot mills did handle logs of big girth.

Mr. KESSELL asked were they carting the logs in on large whims or splitting in the bush?

Mr. TURNER replied both. Then there was a lot of undersized timber. If the spot mill came in after the big mill was finished, the Department should reduce the royalty.

Mr. KESSELL said their cutting might form part of the silvicultural operations.

Mr. MACKAY said the question of the fallers leaving logs for the hewers could be dealt with in the way of cutting the bush out under the block system. Confine the sawmiller to a certain area and only allow him to go on to the next area when he had cut No. 1 area out to the satisfaction of the forester.

Mr. KESSELL said that under certain forms of tenure—leases and concessions—there were difficulties, and it raised distinctions between sawmillers. One firm was put under obligation to restrict its operations in a certain way, and another firm was unrestricted. Consequently, there were questions of policy involved in general application of practices of that sort, although there was no question about the results that would be obtained.

Mr. DONOVAN said weather conditions might stop a sawmiller from cutting one block out before shifting to another. In winter time he might not be able to haul.

Mr. MACKAY said that might happen. But you could allow him to go on to another block—a higher block if the first was wet—on the understanding that he came back and finished No. 1 as soon as the weather was favourable.

Mr. RULE said there was one point he would like to bring up, and that was Mr. Sharp had mentioned that some considerable difficulty was found in getting forest workmen to distinguish the trees in the groups. That was a point that was rather interesting. You could hardly expect a forest workman to distinguish the trees in groups without any education in matters of silviculture. In this connection, he thought most people had found that forest workmen in the department were really very keen on knowing the work they were engaged in, and several times we had been asked very interesting questions about exact silvicultural operations that we were carrying out. With regard to ringbarking—he would here quote a little incident. During the war, the War Office decided to cut out the term "fatigue party" and substitute "working party," on the grounds that the term "fatigue" gave the soldiers the tired feeling, and he would suggest that the term "ringbarking" be cut out of the silvicultural dictionary, as it seemed to create in workmen a lack of interest.

Mr. KESSELL asked did Mr. Rule mean that the actual operation of cutting a scarf round the tree should not be called ringbarking, or did he refer to the general operation of ringbarking?

Mr. RULE replied that the forest workman tended to regard the whole operation as ringbarking. Silvicultural cleaning or something like that would be a better term to use.

Mr. KESSELL said in fixing terms regeneration operations were divided into two parts, one the removal of the mature crop by the sawmiller or forest worker, and the second part the "regeneration cleaning" undertaken by the Department. A good deal of thought was given to the choice of these terms, and foresters should endeavour to introduce the terms and have them accepted in forest practice, as suggested by Mr. Rule.

FIRST DAY—Tuesday, 17th July, 1923.

Afternoon Session.

(Paper by Forester L. N. Weston.)

"TOP DISPOSAL OPERATIONS."

Fire protection will, of course, remain one of the basic principles of forest conservation in Western Australia. To be effective, however, fire protection must be intensive.

It is hoped eventually to have a dedicated State Forest of some 3,000,000 acres, and during the interval which must necessarily elapse before such a large area can be placed under silvicultural treatment, much of our forest country will be at the mercy of those persons who, from various causes, find delight in seeing the fire fiend at play, callous as to the toll it is taking of the forest. Apart from acts of incendiarism, accidental fires arising in those forest areas not at present closely protected present a problem too great to be dealt with by our limited staff, and it is a full realisation of this

fact which is responsible for the apathetic fatalism common to those living in the timber country. These people know that unless *effective* measures for fire protection are instituted, fires are sure to run riot sooner or later, and a fire going through after a five years' interval will be more severe than after a three years' interval.

Until our organisation is perfected, therefore, it will be a decided gain if we can minimise the worst effects of these uncontrolled fires, by burning parts of the country at such times and under such conditions as will cause the least possible ill effect.

The most severe fires occur after the prime mature timber has been felled for milling, and the crowns and bark remain to lumber the ground. An uncontrolled

fire sweeping through such an area in the heat of summer will do incalculable damage to the remaining stand of immature trees, checking and stunting their growth, burning off the tops of saplings, and causing them to fork low down, and so become useless for producing timber of commercial value, burning off patches of bark, and allowing ingress to the borer, sometimes killing individual trees and (on rare occasions) killing sections of the forest on a face.

In order to obviate as far as possible such wholesale destruction, the tops of fallen trees will in future be disposed of under circumstances which will not be nearly so detrimental to the remaining stand. Work of an experimental nature has been carried out during the last few months with a view to testing the efficiency of such a scheme, and satisfactory results have been obtained. Experiments were first carried out at East Mornington, and there the results of various fires, controlled and uncontrolled, can be observed side by side. First can be seen the result of a very severe fire which went uncontrolled through the forest shortly after felling operations, in the month of December. In June the scene was still one of scorched boles, charred limbs, death and desolation. Most of the trees were then only just beginning to show green leaves once again, and many will never do so. In the night time this fire had died out upon reaching a creek. About a mile away a fire had run over a hill in the autumn, during a cloudy week-end. The effects were not nearly so severe, though, where the crowns of fallen trees had lain around the butts of poles and saplings, some of these latter had suffered the death penalty. Further along the local forest officer had chosen his time and run a fire through the forest before felling operations were commenced. This controlled fire had apparently done little or no damage to trees which had passed the seedling stage. After the fallers had cut over this area, forest workmen followed and cleared the debris for a distance of about three feet around such of the immature trees and saplings as it was considered advisable to protect. When sufficiently dry, the tops of the fallen trees were burnt.

The result of the protection afforded by clearing debris from around the trees was striking. The trees so protected are still growing vigorously, whilst the faulty trees, which of course were not cleared around, are in a few cases dead, and in most other cases so severely scorched that they have not yet started to put forth fresh leaves.

The work of disposing of the tops of trees in this manner necessitates the employment of two men to keep pace with fourteen fallers at East Mornington, and a similar number at East Kirup. This is fairly satisfactory in view of the results achieved, but is not likely to be satisfactory when small mills have to be dealt with, or where old bush is being cut over again and logs obtained here and there.

An alternative method of disposing of the debris would be to pay the faller to do the work.

One of the outstanding features of all felling in jarrah forest is the number of piles and poles irretrievably damaged, and much of this could be avoided by the faller were it to his interest to do so. Were a faller paid so much per load on all timber felled, on condition that he cleared the debris from around all valuable trees and poles, it would be to his advantage to see that his tree did not crash into them if it could be avoided. This system will be tried out at some of

the smaller mills and, if successful, extended as opportunity offers.

Burning the maiden bush prior to felling operations, and burning the crowns of fallen trees afterwards, is not an expensive proceeding. Figures available to date indicate that the cost will amount to approximately threepence per acre. This cost may be looked upon as a premium paid for protection against the possibility of very severe fires spoiling our second and third crops of timber.

In calculating the premium, the value of the humus and leaf litter destroyed in burning must not be included, for in any area not intensely fire-protected this litter would otherwise be destroyed by uncontrolled fires.

The protection of individual trees by removing debris from around them is a much more serious item of expenditure. This cost would nearly approximate the expectation value of the tree protected, were the value of timber *per load* to remain stationary. Even on this basis, the indirect gain to the country through increased production, and the duty of a forest department to provide for timber requirements would justify the expenditure. However, with the depletion of timber reserves throughout the world, and the inevitable increase in values which must result before our saplings are mature trees, the money now being spent protecting individual trees will undoubtedly return a high rate of interest.

This work incidentally appears to have the full support of all forest dwellers. Care must be taken, however, that the idea does not get abroad that this implies a reversal of policy, and that fire protection will be discontinued. Apart altogether from the areas being operated under working plans, it is highly important that such burning as must be done should be controlled by this Department. Otherwise we may, for instance, find the fallers operating in country which has been burned twelve months or so previously, thus rendering it impossible for us to run a fire through it owing to an insufficiency of leaf litter.

Normally, the removal of the jarrah crop is succeeded almost immediately by generous regeneration, and this is much more marked when the felling of the trees approximately synchronises with the burning of the area. If, therefore, there is a year's scrub and leaf litter on the ground at the time of felling, not only is the regeneration less general, but will be a year younger when the next fire goes through it than it would be had the felling immediately succeeded the fire.

In three years' time much of the forest over which this scheme will operate will doubtless be fire-protected. Where no working plan applies, however, it remains to be seen whether a certain amount of protection will be afforded the regrowth by burning as early as possible, and so forestalling the usual mid-summer fire.

Operations about to be instituted in connection with this scheme are as follows:—

The jarrah country will be cut into four divisions, each in charge of an Assistant Forester, and the whole in charge of a Forester.

Workmen will be placed at milling centres as required.

A light fire will be run through each cutting area prior to felling operations. This can only be done when the weather warrants, and will apply only to the area to be cut over during the current year.

The workmen will follow the fallers, and clear the debris for a distance of about three feet from around the trees and poles it is desired to protect. Limbs which stick up from the fallen trees and are likely to carry fire into the tops of adjacent trees will be lopped.

The crowns of fallen trees will be burnt as soon as advisable after the debris has been removed from around trees requiring protection.

Where convenient, it will be arranged for the fallers to clear the debris, at a rate per load to be fixed.

When the work has been placed on an organised footing, and uniformity obtained, it will probably be advisable to place under each District Forester the working of the scheme in his own district.

Considerable assistance has been given to us by all permit-holders on whose permits operations have been suggested, and in the case of Millars' Timber & Trading Company assistance of a practical nature is being rendered, in that they are providing a man at each of their larger mills to help the departmental employees in the work.

In conclusion I wish to read the following excerpt from a letter which I have directed to the Assistant Forester supervising operations:—

"Report to the local District Officer all breaches of Forestry Regulations within his district, or any other matter which may assist him in his work.

"In view of the extent of your division, the District Officers will possibly see as much of the top disposal operations as you will.

"I am, therefore, asking them to report to you or to myself any slackness they may notice amongst the men employed."

Mr. WESTON said he was instructing the Assistant Foresters to co-operate with the District Officers to the best of their ability, and he was asking for the same thing from District Officers. This scheme, when it was placed in uniform working order, would be handed over to the District Officers, so that in helping it along and getting it under way they were helping themselves, and he was just asking for all the co-operation and assistance in all branches that they could possibly get.

Mr. KESSELL, in opening the discussion on top disposal operations, stated that "To meet existing conditions, in all centres where forest work is in progress, operations akin to top disposal operations have been in practice for some considerable time. The possibility of applying similar measures to all bush where cutting operations are in progress was realised, and some twelve months ago the matter was discussed with the directors of Millars' Timber and Trading Company, on whose Mornington leases the practicability of the scheme was first tried, and when its efficiency was proved the details were further elaborated. Having reached this stage, it was decided to extend operations as rapidly as possible, and the method of control was considered for some time before it was finally decided to place this work under the control of a single officer. Forester Weston, who will be in charge of the work for the time being, was asked to read a paper explaining the details of the scheme."

Mr. KESSELL, continuing, said he wanted them to clearly understand the proposals that had been put forward, and the lines on which it was suggested the work should be started. There was no doubt of

the damage caused by fires which went through in mid-summer after the fallers, when accumulated tops littered the areas, and it was a matter of getting in ahead of these fires. The work had been tried out for a considerable period at Mornington Mills, and it was found that the most satisfactory method of working was to put a creeping fire through the bush before the work was started. That is, the sawmiller indicated the area over which he intended to work during the next six months, and as opportunity occurred the area indicated was burnt by a fire which must never be allowed to get out of control. The result was that when the trees were felled and the tops were dried and set alight, the fire from the tops would not spread but would in each case be strictly localised. The public had the idea that to secure regeneration the first thing necessary was to clean up the floor of the bush like an orchard. As long as the tops of fallen trees were rendered non-inflammable, by burning the leaves and branchlets, the branches did not interfere with our work.

The greatest work involved was the cleaning away of the inflammable portion of the tops from around good piles and poles, and the extent to which the fallers could help the Department by turning the tree away from groups of good piles and poles was a matter of considerable importance.

An important point involved was the possibility of subsidising the fallers themselves to carry out this work. It had its difficulties, of course. It was an innovation, and there was no possibility of introducing it on a large scale yet. If the fallers assisted the Department by cleaning debris away satisfactorily, we might do the burning. The amount of work for the faller could be reduced if he took care to throw trees in such a direction that the tops fell among the fewest piles and poles, and thus simultaneously eliminate to a large extent the damage which was done by haphazard felling of trees.

The method of control was discussed for some time before it was finally decided to place this work in hand. It must be carried on uniformly over the whole country. If it was under 12 or 14 men it was very difficult to secure the desired result in a short period of time, and we would have to modify our specification as we got further experience in the work. It was proposed first to divide the timber country at present being worked into several different divisions. There would be forest workmen employed in the fallers' camps, and one assistant forester would move constantly among the fallers' camps in each division. Mr. Weston would be in charge of the whole operation, and it would mean that both the assistant forester and Mr. Weston would be moving through your districts. The more officers of the Department we could have moving through the bush the more efficient our control should be, and the Department wanted the officers concerned to realise that they were all members of the same organisation with common objects; and because they did not happen to be attached to one particular branch directly concerned that was no reason why they should not seek to suppress forest offences or forest practices which they considered wrong. It was the duty of all to report to the officer in charge any irregularities in any branch.

Mr. DONOVAN thought the scheme was a really good one.

Mr. KESSELL said there was another point of interest, and that was what the attitude of the sawmiller and the bush worker was likely to be towards operations of this description.

Mr. PORT thought the scheme laid down by Mr. Weston was a really good one. A glance at the Mornington bush country that had been burned before top disposal operations were introduced showed the value of such work. We had started at East Kirup, and if we could get the fallers educated up to falling the trees away from the smaller poles and piles, there would be a great saving in the year. Some fallers were worth twice as much as others. Some felled the trees anywhere; others went in and looked where they felled the trees. The speaker was quite in accord with top disposal operations, and thought that in a few years the country would show a big difference in the waste of timber if this scheme was carried out.

Mr. MACKAY asked whether if this scheme was put into operation the bush cut over by sawmillers would then be locked up from any further operations? If not, the work would be duplicated. At Dwellingup the No. 2 Railway Mill cut over the bush (late Permit 114) some years ago, and left quite a lot of timber behind. A permit was granted to J. T. Holmes over this same area and they cut some 6,000 loads of timber off it. The work would be duplicated in such a case unless that particular bush was locked up.

Mr. KESSELL said that only emphasised the importance of controlling the operations of the sawmillers so that they had to work out a defined area and work it out properly before they moved on to another area. It was just a matter of policy as to how quickly we could introduce that control.

Mr. MACKAY pointed out that unless this was under control of the foresters, or whoever was in charge of the work, then the work would be duplicated.

Mr. McVICAR said in connection with that question of duplication, the whole point rested with this—the saving of the forest, and even if it was a duplication of work, yet, if we burnt to-day, we saved the timber that was left, and if we went through that bush in a few years' time and we burnt again, then we were saving still the timber that was left, whereas if we said we would need to do so until the bush was cleaned up altogether, we might have two or three fires through which might do incalculable damage. The ideal policy was a matter of one clear cut and then lock up. He did not mean on the face, but one clear cut of all marketable timber. That was the day we were striving for.

Mr. KESSELL said there was another point worth discussing, and that was the question of faking out damaged poles and piles after the fallers.

Mr. McVICAR said that if our scheme was carried out as we anticipated, then there should be no damage to poles and piles. They would then become our standard trees for future milling.

Mr. TURNER said though the poles and piles might not be damaged by falling trees, there were thousands which would never mature into milling trees. If those poles were cut to-day and stored we could sell them, and it would mean a fair amount of revenue. If we locked up the bush they would rot there.

Mr. McVICAR asked if Mr. Turner meant poles and piles that were damaged in some way or another by insects, etc. If we had the market it would be all right. At No. 1 Mill near Manjimup they were doing that and they could not get a market for them.

Mr. TURNER said he was afraid they never tried to. Thousands of these had gone out of the Bridgetown district.

Mr. SMITH inquired whether the general feeling of the meeting was that in clearing round the base of young trees, a distance of three feet was enough. He realised the further you clear away the debris from the tree the more expensive it was going to be, but the Conservator had told them about trees feeding on their fibrous roots and ironstone being a great conductor of heat. This debris when it was stacked would cause a pretty severe scorching. He would like to be sure that three feet was enough. Speaking as an old faller, Mr. Smith said he had often felled a big tree into another tree to turn it. As regards the poles and piles, he wondered whether it would pay the department to work in conjunction with the permit holders or concession holders to fall those poles and piles before the trees were felled. He knew there were thousands of saplings a month smashed down by mature trees, but some of them need not have been smashed down. Trees could be felled away, if we could get the faller to work in with the department on that work, and he thought it would be advantageous if we could organise the fallers to work in conjunction with us; he also thought paying the faller for doing the work was a good idea. If that could be done the faller would certainly create as little work for himself as possible, and a saving of immature timber would be the result.

Mr. WESTON, replying, said that the results that had been attained at East Mornington appeared to indicate that three feet was quite sufficient to clear away, because the trees that had had the debris cleared away for three feet were alive and growing vigorously. The matter of the burning of the roots was part of the penalty we had to pay as protection against a very severe fire. He thought the falling of poles and piles ahead of the fallers would mean very intensive work on our part. He thought the only way to get the faller to save these poles and piles would be to make it to his interest to do so. He had put the proposition up to about a dozen fallers and other bush workers at East Mornington, and told them that the idea would be to pay them on a loadage basis for all timber they felled, on condition that they cleared the debris from around the trees that were of any value. As Mr. Smith had noted, of course it would be to their advantage then to avoid falling the trees into a bunch of saplings if they had to clear around the saplings afterwards. The only difficulty to be found in seeking the aid of the fallers was that the scheme was new. The objections they raised were only trivial and were easily answered. Mr. Weston thought we could institute the scheme by paying them about 2d. per load, on condition they cleared the debris from around the trees, but it would be necessary to start at some of the smaller mills, because if we started at a big mill the majority of the fallers could not do the work effectively, and some would shun the work. We were trying the scheme at some of the smaller mills and would gradually institute it if possible throughout the mills. This would do away with most of this damage to poles and piles. As far as cutting the damaged poles and piles and selling them was concerned, the fact should not be lost sight of that unless there was a ready market, they would depreciate very quickly.

Mr. DONOVAN said that poles and piles which were cut at Barrabup lay there for a good while, split and went to pieces, and the Department got nothing for them.

Mr. McVICAR said shortly after he went down there the department seized quite a large number of

poles and piles that had been lying there for some years.

Mr. KESSELL, in reply to Mr. Smith, pointed out that there was an essential difference in burning the top and scorching the roots of a standing tree. When the top was scorched borers got in and the tree suffered. Scorching of the roots resulted only in a slowing up of growth, perhaps for two years, then the tree started off again without any damage to the actual wood tissue. In connection with saving of piles and poles, he would like to ask Mr. Smith what number of piles and poles he considered were damaged, and the use of leaving them until after the tree was felled. If it was to be decided before hand what were to come out, it was very difficult to know just how the individual faller that came along was going to decide to fall a particular tree. If the taking out of the damaged piles and poles was left until after they were damaged by the tree, were there many that were damaged so severely as to be rendered valueless?

Mr. SMITH said he thought there was an average of one or two piles or poles absolutely smashed to every tree that was felled in the bush.

Mr. KESSELL said he was trying to get at the difference between the number with the top crown knocked off, which could be used, and the number that were actually smashed to pieces.

Mr. TURNER agreed with the scheme of top disposal operations, with the exception of paying the fallers to do the clearing. He thought a better arrangement would be to arrange payment with the permit-holder, instead of paying the fallers direct.

Mr. KESSELL said it was suggested that, although the faller received the money, the payment should be made by paying, say, 2d. a load. The faller got 1s. 10d. a load at the present time. Supposing the department arranged with the permit-holder that, if the fallers did the work, they should be paid 2s. a load. We would have to supervise it, but the actual payment would certainly be made through the permit-holder. We would not pay the men direct; we would recoup the permit-holder 2d. on every load shown on his returns.

Mr. WESTON considered that when the scheme was well established, it should be possible to insert a clause in any permit agreement rendering it necessary for the permit-holder to have this work done.

Mr. KESSELL said the question of what royalty should be charged depended largely on the work and the extent to which the permit-holder would cooperate with us. If the permit-holder carried out practically the whole of our silvicultural work, as was done in France, then we were not particularly concerned with the question of royalty. In France, rather than maintain a big staff controlling labour in the forests, the department sold the trees standing, with provision that the forest must be left in a certain condition after marked trees were taken out. That meant that the whole of the silvicultural work was done by the man buying the trees, who with us was the permit-holder, and a reduction was made accordingly in the price charged for the trees. It was much more satisfactory, because the permit-holder had all the worry of labour troubles and the Forest Department was free to devote itself to problems of silviculture.

Mr. DONOVAN said if you paid the fallers their 2d. a load to clear away the debris, you would have to have a foreman over them, and he thought it was just as well to do it ourselves.

Mr. KESSELL said the department had to send a man round to burn these tops, and before he put the torch into the tops, he saw there were no good piles liable to damage. If there were good piles left without clearing he could see the faller's brand, and thus gain a good check as to who was doing the work satisfactorily and who was not. There were difficulties, and these difficulties prevented our going into the work on these lines on a wholesale scale immediately.

Mr. WESTON said that, even with our own men there doing the work, we had to employ a supervisor who had to go round and see that the work was done correctly. He would not have any more work supervising if the fallers did it.

Mr. MCCOY thought it was better to have the assistant forester doing the work, because he could look after other work in the bush at the same time, and see that the regulations of the Forest Act were kept.

Mr. KESSELL said he thought we could expect the faller to do the work sufficiently well. The supervisors of these operations were assistant foresters and would assist, if only by their presence in the bush, with the general work of control.

Mr. A. L. CLIFFORD asked in the event of the fallers not carrying out the work, what part would the department have on them?

Mr. KESSELL said that would have to come through the permit-holder. If his faller was not doing the work satisfactorily, and we were paying, we might reasonably expect him to get satisfactory fallers.

Mr. A. L. CLIFFORD said if he agreed to pay 2s. a load, and the department came along and said the work was not done properly, the faller would still want his 2s. a load.

Mr. KESSELL replied that the remedy was with the permit-holder.

Mr. PORT said he took it the officer in charge would know whether the man had done his work properly or not. In the event of the man not doing the work, he reported it to the permit-holder and the permit-holder got a man who would do the work.

Mr. WESTON said it was a full realisation of the difficulty mentioned by Mr. Clifford that was the reason we were only going to institute this business at the small mills to begin with, the mills where there were two to four fallers or something like that. It would be some time, of course, before we could get large gangs of fallers to do the work effectively. The question raised by Mr. Clifford was a vital one, and the Department would have to go very carefully into the matter.

Mr. KESSELL said if anyone had views on the best method of cutting and treating piles and poles, of actually stacking them in depots, and the time they could be held in depots without deteriorating, the officers present would be glad to hear them.

Mr. PORT said he had seen Millars', when he was in their employ years ago, cut piles months and months before they were sent away, and they used to have to keep docking and docking them all the time to get the split out of them. He did not think wire would stop it. He had seen wire on poles and piles. They opened out whether the wire was on or not. These were felled in the ordinary way and, when brought into the siding, they were rounded off with the axe, not sawn.

Mr. DOUST said *re* the storing of poles at Manjimup, the Commonwealth Telephone Department had had poles stored there for two years, and they were

wired and were quite a success. All sizes were there, from 6in. to 9in., and all lengths.

Mr. TURNER was of opinion that if they were wired you could store them for 10 years, provided they were kept off the ground.

Mr. McCOY said piles on the Bunbury jetty were generally seasoned four years, so that they would crack. When they charred them, they charred right into the crack.

Mr. KESSELL asked did they bind them to prevent excessive splitting?

Mr. McCOY said they wired them.

Mr. DONOVAN said a pole would hold together better if chopped than if sawn.

Mr. SMITH said if the bark was left on, it was an improvement too. He had noticed often in the bush that, if a tree had been down for years, and the bark was left on, it would not bend nearly so much as if it had been barked.

Mr. DONOVAN said if you chopped the pole off into a V, it would stand better than if chopped of straight.

Mr. TURNER said there were a lot of piles and poles at the Group Settlement at Manjimup. Perhaps Mr. Schock could tell them what happened to them.

Mr. SCHOCK said the ends were well covered up. It did prevent them from cracking. At Manjimup young timber was far more liable to split than timber cut further north.

Mr. KESSELL asked how long had they been in stock now?

Mr. SCHOCK said they were there before he went there, over 18 months ago, and there was no trouble from rot; only the ends splitting. When they got an order for piles, the lengths on the landing did not harmonise with orders, so a fair amount had to be cut off in waste.

Mr. TURNER referred to 700 poles in his district which the conservator had seen and had mentioned as being decent trees.

Mr. KESSELL said the two points governing the whole business were those previously raised: the question of there being an adequate supply for the time being on private property, and the difficulty, once the department started in a wholesale manner on Crown lands, of controlling certain concessionaires. He expected that the top disposal operations would be extended later, so as to include the taking out of damaged piles and poles, particularly if the companies would start and build up a market for certain standard poles, and would be prepared to hold them in depots. He thought the companies would gradually consent to do that. Each coupe would supply a few poles before the landing was pulled up. The last operation in the falling should be to haul in a few piles and poles from the area worked over from each individual.

Mr. PORT asked would it not be a good idea if a lecture or paper were given in the bush, right in the heart of the forest, on the subject of fires? The head forester or the man in charge of the burning off could give it. A lot of the men in the bush did not realise or understand the fire business at all. He thought the department should advertise it and make it well known among the fallers, and get their co-operation in the matter. It would be found to be of great assistance to the forester when working in the bush.

Mr. KESSELL said he would like to secure a railway coach run on the same lines as the Industries

League coach, and send it round as a travelling exhibition, particularly if we could get permission to go on the bush lines. Most of those bush lines were satisfactory for the haulage of a coach of that nature, and if it could be a travelling show accompanied by lantern lectures among the bush workers, he thought it should be an improvement on the suggestion of Mr. Port.

Mr. WESTON said that in asking for the co-operation of all officers he wanted the assistant foresters who were on the job to get into touch with the foresters as much as possible and get their advice on anything that cropped up, and any hints or ideas that were brought along would be welcomed. One of the instructions that were given to assistant foresters was that the amount of work to be done around a tree should depend on its value. For instance, the cost of such work would nearly approximate the expectation value of the tree protected, were the value of timber per load to remain stationary. Even on this basis, the indirect gain to the country through increased production, and the duty of a forest department to provide for timber requirements, would justify the expenditure. However, with the depletion of timber reserves throughout the world, and the inevitable increase in values which must result before our saplings are mature trees, the money now being spent protecting individual trees will undoubtedly return a high rate of interest. He just wanted to mention that so that they would be able to know what was going on, and, if there was anything about which they were not certain, he would be glad if they would mention it to the assistant forester in charge of the work, or to himself.

Mr. McVICAR said he thought the whole scheme was sound. It would save the forests of the country to a very great extent, and also keep the foresters and assistant foresters employed for many years to come, and he thought that every co-operation should be given to the men in charge by the district foresters, who should give all possible help to Mr. Weston in carrying out his duties.

Mr. MACKAY: said, speaking of co-operation, there was no necessity, he took it, to let your report go right through to head office before it reached the officer in charge of the work. The Conservator could deal directly with him or with the assistant forester who was carrying out the work.

Mr. KESSELL said local officers should be given every opportunity of investigating irregularities in matters under their control before such irregularities were reported to Head Office.

Mr. SHARP had handed in two questions on Mr. Stoate's paper. The first was whether Mr. Stoate considered it only necessary to make the opening in the forest, and that natural regeneration of jarrah would take place, especially in good seeding years. The second was, was he of the opinion that seed lies dormant in the ground, and that it was not necessary to fire the country to get regeneration.

Mr. STOATE, replying to Mr. Sharp, said in regard to the first question, all that was necessary was to create openings in the forest, or, in other words, remove the present standing crop, and reproduction to replace it would follow. That was merely nature's way. The whole of this work would be done by the timber-getter were all the trees useful. Owing to the present condition of the forest, however, the department had to supplement the work by the removal of

worthless trees, which hindered satisfactory regeneration, and were occupying ground which might be supporting valuable new growth. The second question was an interesting one and it introduced a point on which practically no information was available. To-day he could not answer that question with certainty, but there were many experiments he would like to carry out in order to investigate that and many other interesting problems. It gave an indication of what a lot of officers could do to help by making observations in the bush. However, although some seed in the ground may escape a fire, it seems scarcely likely that many seedlings would be secured from that source. It was most probable that regeneration resulted from seed falling or blown on to the burnt areas after fire. It must not be thought that no regeneration at all would result were the areas treated not burnt. Germination of the seed would take place in any case, but the "killing back" of the scrub on such burnt areas, resulting in reduced root competition in the early stages of the life of the jarrah seedlings, must help a greater number of those seedlings to survive the cotyledonary stage. There are no doubt many other factors, such as, for instance, insect damage, which firing influences, and reduction in root competition is merely one of them. While all these causes and effects, and factors which influence reproduction favourably and adversely, are being investigated, and the problem of the very best method of treatment to apply in all its details is being solved, regeneration operations along the simple lines already laid down by the department must be continued. For, after all, evidence is to be found anywhere in the jarrah bush to-day that such methods will give satisfactory results. It is most important that this fact be not lost sight of while we delve into the why and wherefore.

Mr. H. CLIFFORD said when he went down to collect seeds of Red Flowering Gum in its natural home near the Bow River in 1920 the only small area

he could get seeds from was just about 10 acres. Where the fire had been he could get none. Both there and in Albany he noticed a great number of partly formed seed vessels had fallen off and he would like to know why.

Mr. GARDNER said with regard to the falling of flower buds, it must be remembered that in the redgum there were several flowers on the one stem. It was only natural to suppose that you would not get thirty large seed vessels where there were thirty flowers. The result was that when the flowers started to fertilise it was a case of the survival of the fittest, the smaller ones falling off. The same thing applied to jarrah flowers—there might be only six jarrah fruits where there were about 30 to 40 flowers. There were cases where the rain had got in and destroyed the seeds, but in any case the method of redgum appeared to be that the vessels fell off on to the ground and the seeds were scattered. The same thing applied to a certain extent to the jarrah. The fruits blew off and the seed was scattered about.

Mr. McVICAR: You mean after the vessel had fallen. It does not open on the tree?

Mr. GARDNER replied only in a very few cases where the seed vessel was small and thin.

Mr. McVICAR: The natural consequence is that there is not a wide scattering of the seed?

Mr. GARDNER replied no, there was not.

Mr. McVICAR said his reason for asking Mr. Clifford were the buds cut off or did they wither off was because in the tuart plantation the insect laid its egg in the bud, then it nipped the bud off quite clean.

Mr. H. CLIFFORD said the only thing he could see was that the borer was found in the bottom of the seed vessel and the whole thing withered. It was not nipped off.

Conference adjourned until 10.30 a.m. on Wednesday, 18th July, 1923.

SECOND DAY—Wednesday, 18th July, 1923.

Morning Session.

(Paper by G. E. Brockway.)

FIRE CONTROL ORGANISATION AND FIRE-FIGHTING OPERATIONS IN THE MUNDARING DISTRICT.

Introductory.—The first measure necessary for the successful practice of forestry is protection from forest fires. The cost of successful regeneration, whether natural or artificial, is such that on no account should it be undertaken until adequate provision has been made to protect it from fire.

In certain localities in this State great progress in fire protection has been made during the last two or three years. Although the areas protected at present represent only a small proportion of the total jarrah bush, nevertheless results obtained are of great importance in that they have dispelled a large amount of the uncertainty which was felt at the inauguration of the scheme. We consider that now we will be able to embark on larger schemes of fire protection with the knowledge and belief that

bush fires in the jarrah country *can* be controlled, provided they are fought systematically. Were we not firmly convinced on this point, we would not have commenced either natural regeneration of jarrah or artificial regeneration of pines in the Darling Ranges.

My object in this paper is to deal with fire control organisation and fire-fighting operations in the Mundaring District.

Fire protection must be brought about in two ways, viz.:—

(a) Prevention of fires, *i.e.*, the elimination of the causes;

(b) Suppression of fires.

We will deal first with the subject of prevention of fires. We have as their chief causes the following:

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1923.

WESTERN AUSTRALIA.

REPORT of PROCEEDINGS
OF
CONFERENCE of SENIOR OFFICERS
OF
FORESTS DEPARTMENT.

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