ALEXANDER EDWARD KELSO: Recalled and further examined.

WITNESS (Continuing): In giving my evidence yesterday in relation to the effect of forest litter, I omitted to read three extracts that I intended to read. Having looked them over, I feel that they are important and will be helpful. The first extract is from a book by Ralph C. Hawley, entitled "Forest Protection". He is a Professor of Silviculture at Yale University. While that extract refers to conditions in a conifer forest, and although I do not suggest that it should be wholly accepted for a eucalypt...
forest, it nevertheless does throw a light on the problem of forest burning for protective purposes, as it shows that it has been considered, practised and abandoned in America.

On page 193 of his book, Professor Hawley states:—

"Litter and undecomposed humus. Only exceptionally will it be justifiable to dispose of the forest litter and undecomposed humus as a fire protection measure. In the first place, this material, if possible, should be retained in the forest to conserve the soil. It is extremely important for this purpose, and its removal usually is justified only toward the end of the rotation, when for the purposes of establishing regeneration the seedbed may be improved by removal of forest litter and undecomposed humus. Its removal as a fire protection measure is in general too expensive even if it were not bad silviculture. Special conditions allow exceptions to this rule.

"Annual or periodic burning over of forest areas as a fire protective measure was used by the lumbermen and forest landowners, even before organised forest protection was initiated, for the purpose of protecting standing timber against fire. The name 'light burning' arose in connection with such operations and has come to have the meaning of an intentional use of surface fires allegedly to keep the ground free of inflammable material made up of the litter, undecomposed humus, ground cover, underbrush and reproduction. The original theory back of this operation was that, if a light fire could be run over a forest area at a favourable time, the ensuing fire would (1) do little or no damage to the forest and (2) at the same time would consume the inflammable material in the forest which might, if unburned, provide fuel for a more severe fire starting at a dangerous time. These premises, though plausible, usually prove to be unsound. Light burning certainly

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has an injurious influence from the silvicultural standpoint upon the productive capacity of the site.

However, at this point only the question of its usefulness as a fire protective measure is under discussion.

After the average light burn enough inflammable material is left to make possible a severe fire on the same area."

I submit that there is sufficient evidence before this Commission to show that that has occurred in our Victorian forests.

"Oftentimes trees are killed by the light burn and the amount of inflammable material is thereby increased.

If, however, the fire is so light that no damage results to the standing trees, then certainly an abundance of inflammable material must remain. Conversely, if the light burning is made heavy enough to consume all the inflammable material available, then appreciable damage results to the living trees and additional fuel is made available for subsequent fires.

"Theoretically, it should be possible to burn over a forest with a light fire and avoid injury to the trees. To do so requires so much time which must be repeated each year in order to prevent accumulation of fuel that the method becomes an expensive system of protection.

"Careful work in light burning usually requires that the litter be raked away from the base of the trees so that fire shall not come in direct contact with these trees."

Actually the Board of Works has practised that procedure.

"If only protection of the existing stand of timber is desired, then an annual light burning over the forest may prove satisfactory. Where continued production of forest crops is wanted, annual burning cannot be allowed."

It is only fair to state that he goes on to say that in some States of the United States light burning is still practised.

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He explains that it is chiefly practised in the forests of California, where it is continued owing to the sentiment of the people. He suggests that there it is undesirable. He finished by saying:

"Periodic burning to reduce the chances of disastrous fires has been practised successfully for many years with the Chir pine (Pinus longifolia) in India (Gorrie 1935) under conditions somewhat similar to those prevailing today in the longleaf pine type."

Your Honor asked me some questions about India, and, perhaps, information is available about that. The extract I have read explains the position as summed up by the author, who is an expert in forest matters. I would emphasize "If only protection of the existing stand of timber is desired, then an annual light burning over the forest may prove satisfactory. Where continued production of forest crops is wanted, annual burning cannot be allowed."

That is his opinion. I spoke yesterday about the "National Plan for American Forestry." On page 1395, in the section marked "B", it states:

"The destruction that follows a spectacular crown fire, which takes everything in its path, is readily recognised. The less spectacular light surface fire, if occurring frequently enough, may approach the crown fire in destructiveness to ultimate forest values."

I read that as completing my references, with the exception of one I hope to read shortly. There is one other matter that I forgot to refer to yesterday. It was stated by some witnesses that, if the forest was left in its natural condition, the debris and litter on the floor would increase indefinitely until they became dangerous. The fact that the ancient forests, in their virgin condition, as far as we can ascertain, had clean floors completely disposes of that contention, and it is easy to prove scientifically that it is quite wrong.

In a forest naturally balanced, there are agencies which
consume the debris, and, when the balance is reached, the rate of removal must be the same as the rate of deposition. Otherwise the forest would be smothered completely in thousands of years. The agencies of removal - such things as white ants and the ordinary processes of decay - do, in fact, convert the litter into humus at just the same rate as it is produced, except in so far as the balance is interfered with by outside agencies, such as human agencies, when there may be an extremely rapid production of forest litter, such as by falling trees. There is then some destructiveness by the upsetting of the natural balance, and that is fraught with risk. But in general it is certain that there is no tendency in a natural forest for a continual increase in the quantity of litter. In a similar way, but not with the same definiteness, the scrub also is controlled in a natural forest. The continuity of the canopy, the shelter provided by the grown timber, and the exclusion of light by big trees do control the growth of scrub. I have no doubt that that is the main influence in keeping down the under-storage of scrub in virgin forests. In a damaged forest, the scrub has an opportunity to flourish to a greater degree, and I will submit later the suggestion that that process can be reversed, that even though scrub has developed in a forest, the fostering of large trees will, in the end, bring about the degeneration of the scrub, just as fires will regenerate it. The reverse process is possible by the exclusion of fire, and I will submit evidence to show that, in my experience, it has actually been done. On page 316 of the "National Plan for American Forestry", it is stated:

"Fire is the most wide-spread and one of the most destructive disturbances of the forest cover. Even the lightest fire consumes some of the inflammable materials on the ground - the litter in all its forms. The extent of the destruction of these materials depends in the main upon their moisture content,
and the humidity and other climatic factors at the time of the fire. In many forest types, it is a common occurrence for the litter to be entirely consumed by a fire which does not do any spectacular damage to the standing trees. Thus is destroyed the enormously important protective soil covering, a chief factor in the forest's favourable influence on run-off and erosion. A fire which is hot enough to consume most of the litter ordinarily also destroys part of the humus in the top soil, thus damaging its loose, porous, granular structure, and making it less receptive to penetration of rain.*

That partly overlaps some of the other references, but between them they give a complete picture, in my opinion, of the value of forest litter in protecting the soil, conserving the water value of it, and, in the end, in conserving the forest value. I reached a stage yesterday when I had endeavoured to show that, although graziers have been burning and doing damage for many years, there were still extensive valuable forests. I submit that the reason for that is that the forests provided their own protection. Their continuance was, in a way, in spite of the graziers and not because of them. The forests themselves were naturally immune. They provide in a high degree their own protection from fire. Partly it is due to environment in relation to mountain ash forest, extra freedom from inflammable material - the scrub ordinarily will not burn - and the thicker bark species are not so readily destroyed. I submit that that has enabled parts of the forest in the more favourable locations to persist in spite of the burning which we know has gone on for many years. That brings me to a question which is worth looking into - what is the change that has now made it possible for the forests to be destroyed? To a degree, the forests have persisted after burning in the past. First, I have suggested that the burning of past days was light and infrequent. It was a persistent determined sort of burning, done by man to accomplish certain things. In spite of that, the forests in some places came through. Why have we lost them now? Why were they partly burned in 1926, and more severely in 1939? Can we rely on the conditions of 1926 and 1939 not recurring? We cannot.

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It is obvious this year, if it was not obvious before, that if the conditions now applying continue, we shall lose the forests. There are, I suggest, conditions that are fundamentally different, and we should know of them, if we are going to consider what should be done. There are several conditions, and/or them has already been put to this Commission. In January, the climatic conditions were probably much more severe than they had been for many years, probably as far back as 1851, if not further. I accept the statement that the temperature in Melbourne on Black Thursday, 1851, was 117 degrees. I have seen that stated elsewhere than in the extract read yesterday. As far as we know, the climatic conditions were then very bad. That is one of the factors which it is quite legitimate and proper to keep in mind. On these occasions, including 1939, climatic conditions were exceptionally severe.

(Continued on page 1808).
THE WITNESS (Continued): I do not think that alone is sufficient to explain the position. The second one, which I think is perfectly obvious to every one, is that there is a great deal more settlement. At the beginning of the danger period in this or any year, there is far more fire in the forests to begin with. Perhaps I should not blame settlement only, but I shall deal with that further. The fact that there is more fire in the forest may be queried, but my experience in November and December last, and in almost every year except in wet years, is that the forests are thick with fires, and I regard that period as the beginning of the danger era. There are fires everywhere. That is undoubtedly an increasing condition.

In the distant past, with only graziers operating, I have no doubt that there were fires as well, but nowadays the forest, in a sense, is permeated with fires. In many years those fires do not develop into bad conflagrations, but only because the rain puts them out. It is quite a common thing to have three inches of rain in December, and if we had experienced three inches of rain in December last year, we might not have had the terrific fires that occurred in January. Possibly those fires would have been put out.

I do not accept the theory that one or a few fires were the origin of that January condition. If we really knew the origin, we might find that it was as far back as in October last, that fires were lit in the ordinary course of burning off or burning heads, and, while they crept through the forests, the people looked at them and said that they were doing good. They accepted the fires as the ordinary procedure, and that is the attitude of the people in the bush. The fires crept around and possibly the rain came, or a cool change, and the fires seemed to go out. Actually they were burning in the logs or stumps. Again, in December, when the fires flared up, one man would say "The fire down in so-and-so's paddock has flared up again", and probably the
answer was, "Oh, let it go, it will clear out so-and-so and will do some good." Suddenly on the 1st of January last, under extremely windy conditions and heat, the fires were blown out of the trees or wherever they had been burning, and caused a major burn that in a day established a ten mile to 15-mile front. That was the actual start of the danger period. It was almost too late to do anything at that stage. I put it that that is the condition that is leading to big fires, and that is one of the conditions that did not exist to anything like the same degree in earlier periods, when the forests, as we knew them some years ago, persisted in spite of fire. On that point there has been a suggestion that the proclamation has had something to do with that state of affairs. Some witnesses before the Commission have said that before the Proclamation is issued, the settlers cannot burn off, and after the Proclamation they are not allowed to burn off. If that were really so, we would have the spectacle of the forest free from fire. They could not make a fire before the Proclamation, and righteously did not make it afterwards. I say that is not so. The forests are full of fire, and I do not feel that the proclamation has very much bearing on the matter. Attempts are made and fires are lit right up to the proclaimed period, and, whether or not more are lit later, I believe that the same fires are allowed to continue. Unless water is used, probably they will continue lying dormant just waiting for the day. In some years, the day comes, but in other years it does not come because the rain gets there first.

Another aspect of fire in the forest which I feel has an important bearing on this matter is the use of fire by industry in the forest. That use of fire, too, is increasing. I can produce no figures to show how milling in the forest has increased, but I feel that there is much more

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penetration of forests by milling now. It is only necessary to point out the extent to which fire is used in the ordinary and proper prosecution of milling to show that that also constitutes a potential danger. The mill engine, usually a portable engine, uses fire. We have heard about sparks from the engine, and that sort of thing. Fire is used to burn sawdust all the time in most mills, even right through the danger period. It is used to burn waste offcuts and is a common experience to see a great pile on fire alongside the mill on to which the offcuts are thrown. Most mills cannot use the whole of their waste, and in that way they dispose of it. Even under satisfactory conditions, there is an element of risk in the use of fire. The haulage winches or the ordinary bush logging winches which are in the forest use fire in some way. Fires have been started by exhausts of tractors. Fire is used to dispose of the heads, and a way that has not been mentioned to any extent before the Commission to my knowledge is that the men whose duty it is to get into the logs, the swamps who go in to get the log, once it has been felled, and to pull it out, as a common practice burn their way in.

I have had men working for me and they have said, "The easiest way to get the log out is to put a match into the bush". The outlook of men of that kind is, very often, that the easiest way is the best way. They feel that the fire is not particularly harmful to the forest, and that it makes working in the forest easy. It takes a great deal of restraint on the part of the responsible man to keep those men from lighting fires. Often I have been asked, and often not even asked, but it has been put to me as a suggestion that a match should be used. It is quite difficult for a miller, if he is a responsible man, to prevent that sort of thing being done. I have previously mentioned the ordinary firing of heads. Another source of fire is that right throughout the danger period, when the
forest is extremely inflammable, the men must and do boil
their billies in the forest. That procedure, even with
the greatest care, may sometimes lead to a fire. But
forest workers are not all of the type that exercises con-
tinual care, and that procedure is a source of danger. The
ordinary danger of smoking in the bush is also present.
It will be seen that the prosecution of industry in the forest,
even though it is well controlled - I shall submit that it
is not always well-controlled in our practice - is a source of
danger to the forest, and is another contributory factor to
the change that has come over our forests. The change which
I think is a most important one is even more widespread than
that. The forests have been immune because of their con-
tinuity, as because they have interposed themselves to fire
as an unbroken unit. When a fire has come to the
boundaries of a forest, it is a matter of my own experience
that where it has reached an undamaged fertile, virgin forest,
it has gone out, even though it was a fierce fire. I will
submit evidence about that shortly. The position is entirely
different if the forest has been broken open, if settlement
has occurred and places in the forest have been cut. Fire
has been used to dispose of the cutting, the wind and the
sun have access to the forest and have dried up the floor and
that process has formed at that point what I might call a hot
spot, or a spot where the forest is no longer immune. If,
in addition, you introduce fire in the ordinary course of
events, by introducing the milling industry which ordinarily
uses fire and produces large quantities of inflammable debris,
then you can see that the immunity of that forest is well on
the way to destruction, even though the industry be well
prosecuted. If it be badly prosecuted, if, in fact, the
industry leaves inflammable heads about on the floor of the
forest, the doom of the forest has been already sealed.
That is the reason why I feel that with the development of settlement and industry in the forest, as industry penetrates more and more into our forests and leaves them open - and sometimes leaves them in a bad condition - it is only by taking most extreme precautions that we will save the forests. That is the burden of what I am putting about the forests in its natural conditions and the forest in its unnatural condition as a result of the operations of man. If we have that point of view in our minds when we are trying to advise on what should be done - and that is what we are really here for - we will see at once that there are some things that we can do.

In relation to this matter of opening the forests and the generation of scrub, it will be quite clear that if the forest is opened, the more it is opened the more the scrub is generated, and even bracken. As a result, we get increasing areas of the more inflammable type, and that has a definite effect on the fire position, even in itself.

On Page 192 of "Forest Protection", by Hawley, there appears this statement:-

"Maintenance of dense forest will go far towards keeping the live and dead material within the forest so moist that it does not become dangerously inflammable. That is the ideal way of accomplishing reduction of inflammable material in many forest areas. However, it will not be effective everywhere, and, of course, cannot be used on areas where cuttings have been made. Here the forest has been opened up, although with light partial cuttings the openings may not be large and much can be done even after such cuttings in the way of retaining a forest cover which will keep down inflammability."

I submit what we have done is that we have burst into the forests and very often our aim has been to get rid of the forest,
particularly in places where settlement has occurred in the forest. On page 196 of the same publication, there appears the following statement:

"Furthermore, the cutting in itself causes a change in local climate towards a drier condition, and hence one which results in making the area more inflammable, entirely regardless of the presence or absence of slash". "Slash" is the American word for tops - that is, the rubbish produced by milling. This question of what has caused the change is incidental to the general question of burning and why the grazier's case is partly right, but in the main not right. The natural forests have persisted in spite of the graziers, but I submit that when the type of burning that the graziers practised has been applied to a damaged forest the forest was doomed.

Destruction of mountain ash forest that has been opened up for milling settlement, owing to fire lit by graziers or anybody else, is likely to be completed in the future, and survival of that forest depends on its chance of regeneration, together with the chance of saving that regeneration from other similar fires. That applies particularly to the mountain ash, but it applies in a similar way, although not quite so directly and exhaustively, to other types of forests.

I submit, then that neither the virgin forest nor the forest which as we know it in these days is more inflammable, can be saved by regular burning. It is more certain to be destroyed if it is inflammable, but neither type of forest will permanently resist regular burning, however light that burning may be. That brings me to the centre of the problem in relation to the general forests. If light burning will destroy the forest with certainty, and we know the type of violent burning experienced in January last will, what are we faced with, and what is the solution? If those were the only possible courses, I would say that in my opinion light burning should be tried. It is
practically impossible to light burn anything but a small percentage of the country. But if those were the only desperate remedies, both of them desperate, I should agree that we should consider light burning, because in those huge conflagrations human life is in jeopardy and a tremendous amount of property, other than forest property, is jeopardized. The whole burden of what I am putting is that there is another course. It is a course followed everywhere else; that we have not followed it already is to our shame. That is the course which must be tried because there is no way of proving that it will be successful. All I can say is it has been successful in other places, in other types of forests, and before we adopt either of these methods, each of which is destructive and dangerous, we should try and are bound to try the third method, namely, proper forest protection. I will suggest several things that we should do. It will be clear to Your Honor that I am going to suggest something about the forest industry, and I shall also suggest something about the settlers. The central idea I am submitting, however, is that we should and we must establish some system, elaborate and costly, a more effective and properly organized system of attacking fire and putting it out. That is not mere theory on my part. The organization that I represent here has been doing it, and it has been put to me that we are doing it successfully because we have areas which are protected. Actually, we have been doing it outside those areas, and not only inside. In the ordinary forest where fire is common and where scrub is , we have been putting out fires for very many years, and we have learnt that they can be put out. I suggest if all fires were put out in the same way, where and when they occur, the type of fire that we cannot put out, would not arise. At all events, we must try that. I cannot prove that that serious conflagration will never arise - maybe it
will - but it will much more certainly arise if fires are allowed to drift around in the forest. I believe that is what has happened in the past, and that belief is the result of my long experience and observation in the forest. I honestly believe that, if we do determinedly attack fire in a proper way, in the way in which it is done in other countries with success, we have a reasonable chance of success in this country, even though our forests are far more inflammable, which I believe to be the case.

The putting out of fires safeguards other important factors which arise, namely the question of erosion, water conservation and the maintenance of roads. That, of course in itself is a good reason for not turning our backs on that possible course until we are certain that it has no reasonable chance of being successful.

I now come to the consideration of what can be done and what should be done. I shall make four suggestions about that aspect. My first suggestion relates to the areas around the forests - settled areas I shall call them. It is clear that fire should be used, and it is reasonable that it should be used, for clearing purposes in land which has to be cleared. That is a legitimate use of fire. On the other hand, it should not be used in a way that will cause danger or loss to adjoining land, whether that land be privately owned or the property of the Crown. With those principles in view, I consider it is essential that the settler around the forest should be given a proper and reasonable opportunity to make his property safe. In addition, the neighboring forest authority, whether it be Crown lands or forest, should give to the settler that same assurance of safety. As to the burning of private property I am not at all in agreement with the view point that has been put to this Commission that the proclamation period should be moved forward to enable burning to be done in the way in which settlers probably want it to be done. In every one of those cases where
there is a difficulty, it is an economic difficulty. The burning of heads in the forest is an economic problem, and naturally the men economically interested will do it in the cheapest possible way. So it is with the settler. He wants to be able to put a match into the area and for it to cost him no more. I say that is not a reasonable proposition. He should do his clearing quite effectively and could burn it in the winter. I do not say that he should be made to burn it in the winter, and probably he could do it more cheaply later, but he should be prepared to cut some of it and burn it. If he cut in the late autumn, say at the end of April, there is enough drying still left for that cutting to be burned in the winter. That is not theory, I have done it, and it is the ordinary practice of the Board I represent in its clearing work. It will cost the settler more— it may cost a few pounds an acre more. I am not suggesting that he should fell all trees, but he will have to do some falling. The question of clearing and burning debris is not a costly matter. He should cut sufficient to make a safe break around his property and use that cutting as dry material to enable him to burn the rest. I submit that is a reasonable recognition of the rights of others. He should not be allowed to save a few pounds an acre at the expense of not only his neighbour, but also at the very great expense of the community. The first thing necessary is proper supervision of this clearing, and for the moment I do not suggest how it can be done. The provision of proper facilities and assistance, if necessary, could be made to help the settler do that work. He should be advised and shown how to do it where necessary, in an endeavour to get his co-operation rather than his opposition. The best way to do that is to show the settler that the owner of the adjoining forest is also concerned in the same way and is willing to do the same thing. In this relation I submit that in every organised settlement where

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it is proper to have settlement, there should be an effective area put right around that settlement and, if you so desire, it should be light burnt. From my point of view that is the same as the writing-off of the forests affected. It should be written off if necessary, and I believe it is necessary. Around each settlement there should be an effective area cleared if that is a proper settlement to have on the margin of the forest. Of course there are many proper settlements that must occur on the margin of the forest. In the end, it will be necessary to provide that some width to be dictated by local conditions will no longer continue to be forest after a certain time. But that width should not become settled land; it should be a buffer strip between a forest and a settlement for the mutual protection of both. It should be operated intelligently by the forest fire authority, whatever it is. If settlements were treated in that way, I feel that more than one half of the risk of fire would be eliminated, even without the suggestion that I shall make about the fighting of fires. I visualize this, that when the proclamation date comes, some authority will see that this work has already been done in every place where it is necessary for safety to do it. Of course, there may be some clearing on areas where the question of safety is not involved, and there the landowner can choose his own time to do his own work, but where any question of safety from either the forest or the settlement is involved, some authority must be established to see that that work is done at the right time. We have a precedent for that in dealing with noxious weeds and in other forms of community safety. I shall say something more about the question of authority later. As Your Honour has said, that bristles with difficulties, but it is a difficulty that must be met. I visualize that when the danger period in forests starts, settlements will have been already made reasonably safe, possibly for some months,
previously, by mutual co-operation.

The second matter is the question of grazing. I indicated yesterday that it is my opinion that the real grass lands should be used for grazing. Such of it as can become a danger to the forests - and that applies to all the high grazing as well as possibly to most of the low country grazing - should be under the proper control of an authority appointed for the purpose. That authority should see that any burning off undertaken is done during a safe period, with proper precautions. Some ranger service in the end would probably be sufficient. Graziers who were found persistently lighting fires - not once but persistently giving trouble - would be known to that Service. Even if that Service has no effective means of putting out fires, although the fires must be dealt with by the fire authority, the appointment of such a service would be the first valuable step. A full understanding of the position of grazing in the forests really requires the obtaining of statistics which are not available, at all events to me, to determine the value of that grazing to the community. In my opinion, it is not valuable, and I do not think it can be valuable. In my travelling through the bush, I have seen cattle in the bush often enough.

THE COMMISSIONER: Mr. Lawrence in your reports I have seen reference to revenue from graziers; what does that amount to annually, do you remember?

Mr. Lawrence: From forest areas, I understand the revenue is £13,000 annually.

THE WITNESS: That includes all grass land which is legitimate grazing land.

THE COMMISSIONER: Is that the revenue from all sources.

Mr. Lawrence: No, and I contend that Mr. Kelso's statement is hardly correct. It is purely reserve forest area.

THE WITNESS: Does that include any extensive grass land areas, or is it all timber country - picking for cattle in the timbered country?
MR. LAURENCE: It is all timbered country. There are certain types of forests, such as red gum forests and the country around the River Murray, which provide legitimate grazing. Mr. Kelso is familiar with the red gum country?—That is the kind of country I have in mind.

THE COMMISSIONER: That is one source of value to the State; what about the value of the industry from a general standpoint?—I am not prepared to make a statement about a matter on which I am not in a position to speak. It is questionable whether the value to the community is sufficient to compensate for the real danger to the forests—that is, the danger from grazier, who wants to graze, and who will, by some means or another, set fire to the forests.

MR. BARBER: Might I interrupt on the question raised by Your Honor. According to the last annual report, the grazing licences brought in an amount of £13,416/4/1, but that, of course, is as to reserve forests only, and the Crown Lands Department would get all the revenue from places Mr. Kelso refers to, such as the high plains.

MR. GOWANS: I am instructed that the revenue from Crown lands is £17,000.

THE WITNESS: My submissions on the question of forest grazing are based on the fact that it is more difficult to control such areas than in the more open country, which is legitimate grazing country, and the danger from uncontrolled fires is very much greater there. Fires in open country can be very much more easily controlled. The third matter to which I wish to refer is the question of forest industries. I submit there again that the forest industries should be conducted in a way that will reasonably safeguard all interests within and without the forest areas, even if this policy costs more. To my knowledge, this has not always been done. I know, from my own observation, that the debris in the milling areas, and in the felling areas, is not dealt with as it should be. The tops are not always burnt. I know that they are burnt.
in some cases, but I am not prepared to say in what proportion they are burnt throughout the whole areas concerned, because I do not know what is done in certain wide areas. I do know, however, of the practice in certain areas with which I am familiar, and this practice is well known. I give it as my opinion that that practice is consistent with the cheapest prosecution of the industry, but is not the best practice, and I submit that, even if it costs the milling industry more, better methods should be adopted. In many cases, the burning of the heads has amounted to little more than the burning of the leaves. Even the miller who is well intentioned often sends a man out to put a match to the tops, and there is often a broadcast burning as a result. That broadcast burning has not always been confined to the areas where the tops are. I have knowledge of plenty of cases where the fires have got away. In viewing that position, it is proper to say that accidents will happen in any industry, but accidents have been more common than they ought to have been. Broadcast burning of tops results in the destruction of forests, and I consider that that is unnecessary. The tops in the milling areas should be lopped and burnt in stacks, in an absolutely minimum compass. I know that in thick mountain ash growth that would cost a great deal, but, on the other hand, thick mountain ash country is extraordinarily productive, making high returns, and the cost of proper precautions of this nature is warranted in the circumstances. I consider that, although this procedure may be somewhat costly, it should be made compulsory, and that the tops should be burnt regularly, so that, when a danger period arrives, the tops made before that time at any rate will have been disposed of as far as possible. The danger period starts, say, from the 1st of December, but milling does not stop on that day. The production of inflammable material goes on. The use of fire, in association with inflammable debris, continues, and that does constitute a definite danger to the forests. Probably

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in some years, the danger is not so great as to warrant this stoppage, but in a year like this I have no doubt that the right procedure would be to cease the industry altogether at a certain date, when it becomes obvious that we have reached a critical period, and I think that everyone working in the bush knew this year, as early as October or November, that we were in for a definitely bad year. I am sure that I had that conviction, and I have heard many others say the same thing. These critical years do not occur very often. The fact remains that the industry actually has to stop after the fires have obtained such a hold that nothing can be done. You have heard evidence, Sir, to the effect that the mill hands were taken away from the mills to fight the forest fires. I say, take them away for the purpose of putting out fires in the early stages; have them on hand with a proper procedure established, and leave the control in the hands of the Forests Commission - which has control of the forest areas - to close the mills when these critical years arrive. The Commission might close the mills sometimes in years that do not turn out to be critical ones from the viewpoint of fire, but I feel that the safeguard is even worth that eventuality. Let the Forests Commission take over the training of the forest men - the men who know the forest - and make them forest rangers, on the pay-roll of the State, and have them available for fighting fires where necessary. Let them be the nucleus of an organisation on which a fire fighting force will be built for the critical areas. Something else must be done. Other men must be permanently employed for fire fighting purposes, but let the fire fighting authorities have the advantage of from 3,000 to 4,000 men that we have trained to forest conditions. I know this will cost money, but it will not cost more money to the country than the loss involved in the fires that they will save.

So I say that this industry firstly should carry the cost of doing
its own work properly - 2/- or 3/- per 100 super feet on a price of 16/- may be involved in some cases, and, in other cases, the cost may be less, but the community in the end will have to meet that cost, and the community, in the final analysis, gains. The industry should carry that cost, just as the settlers should carry the cost of doing their work properly, and just as any other industry should carry appropriate costs of seeing that everyone interested has his rights conserved. A proposal has been put before the Commission - it may be a theoretical proposal, but, in my opinion, no more constructive proposal has been advanced - and that is the final removal of the mills from the forests altogether. In my opinion, the saving by having large mills in suitable places, instead of a number of small and often inefficient mills throughout the forests, would be very great indeed. That should result in a saving which should more than pay for the extra cost of transporting the waste material from the mills, which otherwise would be disposed of in the bush, at some risk to the bush. That may not be a matter for the consideration of this Commission, but it has been brought up, and I felt that I would like to state that, in my opinion, the ultimate development of a few big mills in appropriate areas near rail heads, and the collection of logs from the forests, for removal that way, would be well justified on an economic basis, apart from the basis of safety and improved conditions for the workers. That is a development which would occur gradually, in order not to upset or unduly disturb the industry. It is a very good suggestion, and this policy, I believe, has been pursued overseas. If, in the development of our eucalypt woods, pulping takes place, the association of the big mills with the pulping industry may be a possible development. That, of course, is merely speculation, and has not any real bearing on the matter before us at the moment. I think I have dealt with
the question of leaving the heads in the bush unburnt for
the sake of the seedlings. I submit that that is not
advantageous, because, on the average, that results in
complete destruction. Another branch of the forest
industries relates to silviculture and forest thinnings.
That is aimed at the production of a good remarkable crop.
I submit that the policy followed in that connection is a
dangerous procedure. Associated with that procedure in
general, so far as I have been informed and seen, is to cut-
ing and burning around the thinning areas, and that is a very
proper thing to do. If that can be done over the whole area,
I have no more to say. It is a matter for the forester to
decide whether the forests would, in these conditions, be
improved by thinning. If thinnings are left on the
floor of the forest, that is, in effect, actually building up
inflammable debris, which is dangerous, and on the whole I think
it is not a justifiable procedure, for the advantages may be
wiped out by destruction by fire. On page 172 of the work
"Forest Protection" by Hawley, the following passage appears:

"A preventive measure sometimes employed in
localities of great fire risk and hazard is to shut down
the logging operation during the most dangerous portion
of the day or season. In the Douglas fir region of
Western Oregon and Washington strong support has been
given this policy by the action of the insurance companies
insuring felled timber and logging equipment, in
establishing a "humidity warrant" which requires the
suspension of logging operations when the relative
humidity is below 30 per cent.

"A further advance toward the prevention of
lumbering fires has been taken by the State of Oregon.
This state now enforces a logging operator’s permit law
which makes it necessary to have a permit for carrying
on any woods operation west of the Cascades during the
fire season. Under this law the state forester can
"suspend permits to operate during periods of high fire hazard. Operators must meet certain requirements designed to prevent the start of forest fires."

This proposal is not radical in the sense that it has never been tried before. It is a proposal that is actually in force in areas of extreme fire hazard in the United States. I submit that the fire hazards in our own forests are greater than in the American forests. I have not seen these forests, but that is my impression, from what I have read.

On pages 195, 196 and 197 of the same work, there is a discussion on the various methods of disposing of the tops—they call them mumps there—and three methods are mentioned. The first is broadcast burning, to which they are completely opposed; the two methods involve stacking and burning. The appropriate passages are rather long, but summarised they are to the effect that if the conditions are such as to warrant such a course, and if inflammability is high, and if damage to the forests is likely, the procedure of stacking and burning is most desirable. I submit that in our forests it is more than desirable—it is necessary, in order that the forests should be kept in a safe condition. Admittedly forests should produce a crop, and should be capable of perpetually producing timber. It is in the interests of the industries in the forests that the work should be carried out in such a way as not to endanger the forests generally. It is in the interests of everyone in the community to do this, and I submit that the extra cost is justifiable on these grounds.

The fourth point is a central feature, and that is the provision of proper fire fighting organisations. Fire fighting organisation should not be something dependent only on the good will of people. The organisation should be operating all the time, and it should function by being fully prepared to fight fires. It should function in fighting fires, and should function in doing away with damage that results from fires.
I do not think we will get rid of fires in the forests. I have not felt competent to put before you an exhaustive list of source of fires. I have dealt with those sources of which I know something. I have no doubt that natural causes sometimes start fires. I am confident that we will never stop people being careless to the extent of never causing fires. We must prepare for forest fires, and we must prepare to put them out. The idea is to reduce the liability to fire to the smallest degree, and to reduce the actual or burnt over area to the smallest proportions in the forests, and to set up conditions within the forests that will enable timber to generate and regenerate, as to control the inflammability of forests, and in the end have less trouble in keeping the fires out of the forests. Before speaking of the difficult question as to how the organisation should be built up, I should like to say what it should be. I do not suggest that no attempts have been made to do this. Of course they have. One essential thing is to provide proper outlook towers, and many have already been provided. It may be taken that some of these things have been done, but I visualise a strong central organisation, the sole duty of which is to prepare for fire fighting, and put fires out, that is, an organisation with enough men and supervision to enable this work to be done around settlements in particular. We should make settlements safe from the forest fires. The preparation of fire breaks, the preparation of whatever amount of burning is feasible and desirable, and the doing of that burning, the construction of outlook towers, telephone and other lines of communication, the organisation of such a body of men that, when fires do break out, they will be detected at once, even when they are only a wisp of smoke in the sky, that someone somewhere will have the duty to determine where that fire is and of telling the central organisation all about

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it, and giving that organisation an opportunity to direct as many bodies of men as are necessary to go and deal with it, an organisation that will keep abreast of the provision of the best possible equipment, and get plenty of it, are all factors requiring attention in this connection.

THE COMMISSIONER: How would you constitute such an organisation?—I will come to that later on, if you do not mind, Sir. I am clearing the ground of the things I know of first.

What will you do about the things you do not know of?—I will make suggestions. I can only put forward certain suggestions based on reason and theory, if you like, and I can only tell you where I am unable to go any further.

I do not wish to interrupt your trend of thought. I merely thought you were not going to tell us about that, and I am anxious to get information on that matter?—If you feel that you would like me to refer to that aspect now, I will do so—I will not baulk it.

No; I had a feeling that you were winding up that part of your evidence, and I did not want to let you pass on without dealing with that aspect?—No, I am only stating at the moment what I visualise the organisation should be. If it cost the country £100,000 I do not think that would be too much. That money should come from the revenue of the State, as a contribution towards saving our forests. I believe that, without a permanent and solid organisation, we will get no distance in this matter. In similar organisations overseas, cost has not been spared, and efficient fire fighting organisations have been established with regularly defined duties, covering such questions as the supply of water and the general duties of fire fighting and prevention, and they are obviously established on a basis that should lead to efficiency. They are given a definite job to do, and I should like to see a fire fighting organisation here with a definite job to do.
And nothing else?—Nothing.

You would not have that as a sideline of any other Department?—That is leading to a question I am coming to. If it is the sideline of another Department, it must have its own complete organisation, if necessary under the supreme control of another organisation. It should not be necessary for the workmen to be doing two or three jobs. A man employed on fire control work should be kept at fire control work. That may be a sweeping statement, and in a way some men may have to do dual purpose work during some parts of the year, but fundamentally they should be units in a fire fighting control organisation.

Would you use them for fire prevention work?—Yes, for pre-suppression work, fire prevention before and during the times that work is needed.

Pre-suppression work?—That is the term used in this work I have quoted.

You cannot have suppression in anything until it comes into existence?—That term is applied to work cutting fire breaks and burning off in places where that work may be of assistance in the prevention of fire, erecting towers for lookouts, providing fire lines, telephone systems, etcetera. In America, aeroplane landing grounds are provided, and even dug-outs are provided for the fire fighting men.

You would have this organisation constituted as a State body?—No, I have not gone as far as that.

Well, an organisation for the State, I presume?—The aim I have is that every piece of timbered country would be under the control of a fire fighting organisation, in one way or in another way. Even in settled areas timbered country should be under control. In the Crown land and forest land, and in special areas, such as those controlled by the Board of Works— and, indeed, in all necessary areas—there should be
a fire fighting body. In the smaller areas, such as those controlled by the Board of Works, fire fighting bodies might not necessarily be solely employed at fire fighting work, because the area may not justify the maintenance of a number of men for this purpose only, but, generally speaking, fire fighting should be made a definite job of a special organisation. I think that is fundamental.

(Continued on page 1829).
MR. KELSO continued:

That of course is fundamentally tied up with the question of money. It is not my job to say what has been done, why it has been done, and what has not been done, but I feel profoundly certain that unless substantial funds are set aside for this purpose it will not be done. I know from my own knowledge fire fighting within the timbered areas of the State has not effectively been done, and I do not except any areas in that statement. To my knowledge fires have drifted about in timbered areas, sometimes the Forests Commission areas and sometimes areas not under the control of the Forests Commission, and the attitude in the past has been very often that as long as the fire was not endangering something no action should be taken. I do say in that connection that is not always so. I have known Forests Commission officers to do very good work on fires, and they have on numbers of occasions, to my knowledge, attacked fires in and around areas not under their jurisdiction; but I do know that in some cases they have not. I would say that is the position in a rough sort of way. There has not been any vigorous attacking of fires near forested areas. There are probably reasons for that. It is not my place to apportion blame or praise, or anything else; but I state that is a fact in my opinion. There are a good many advantages, but one that is worth mentioning from such a vigorous policy of fire fighting; a very big cause of the prevalence of fire is that where a fire starts - I think very often before it is started, but where a fire scare starts - people who themselves believe they are endangered by the forest immediately start firing back. That is because they do not feel secure. I fought fires in the O'Shamassy Valley in 1926 and we had more trouble from that kind of fire than from the main fire itself, when it did come to us.
People at the mouth of the O'Shannassy Valley were making themselves safe, and I think on four separate occasions fires came up the valley which caused us to leave the business of fighting the other fires to go and put them out. I feel if the people living around the forests, and some of them who live in the forest, had the assurance that the fires would be fought and the realisation that they were mainly put out there would be less of this firing back. That perhaps is only a hope, but that is a frequent source of fire. I think that effect would follow from a thoroughly well organised fire fighting system.

I had intended to deal with the question of how this could be done after dealing with the Board of Works areas, but I think I will deal with it now. A proposal has been made that the question of fire fighting should be brought by some means within the scope of an erosion committee. I am wholly favourable to an Erosion Committee as an Erosion Committee; I believe there is a need for it, but such a Committee would be very largely concerned with the use of land throughout the country, and not so directly informed and concerned with this particular matter of bush fires. I think the Erosion Committee would properly be an advisory body; but I feel there is a need of something very much closer to the problem than such a Committee could be. It is essential that the body which is to be a bush fire fighting body should be right on the job; should be organised for that purpose. For that reason I feel that the Erosion Committee idea is too general. It would have a function in an advisory capacity; but something more than that is needed. It is obviously attractive in any organisation to have centralisation. It is most desirable that the whole of the fire fighting should be, if
possible, under one organisation that could control and co-ordinate in a way that could not be affected by voluntary co-operation. When you think only of the question of fire fighting it seems perfectly simple.

The Forests Commission, the Board of Works or anybody else would not be opposed at all to the fighting of fire by assistance from a central body and co-operation, and even more than co-operation on the question of fighting fire. It is only when you come to what I have called presuppression measures you realise the matter is not so simple.

The Forests Commission has the function and duty of operating industry in the forest, and that industry does involve fire. If you had a supreme authority, independent of the Forests Commission, there is an obvious difficulty in providing for the rights of procedure of the Forests Commission, where they overlap with the fire authority, where they clash with the fire authority. The same thing applies in the Board of Works area, only to a greater extent; the question is actually more concentrated and a greater danger of risk. The utility, shall I say, is more sensitive to danger, that is to say it does not seem reasonable to me - perhaps you will say I am biased - that an authority which is a fire fighting authority and which has no real knowledge of the needs in a matter of maintaining, for instance, the purity of water supply, should be given the power and jeopardise the purity of the supply by entering and carrying out works. That is what I foresee being necessary in this presuppression work, the burning of areas and the operation within the forests to carry out any works thought to be necessary. It does come down to this, that the ideal body is one with full co-ordination within itself. It can only be achieved by destroying the internal body.

THE COMMISSIONER: Would you repeat that?---If you give the complete
ideal co-ordination of the bush fire authorities you can only give it full power over all the forestry areas, by, to some extent, damaging the co-ordination of the authority of the Board of Works or the Forests Commission.

You have to choose between the damage you will do by destroying that co-ordination and the advantage you will get.

THE COMMISSIONER: You could limit the power you would give to that authority in such an important item as the supply of water to our big cities. It might be that that authority would not interfere with you in your policy. The maintaining of the supply is far more important than the risk?—Naturally we would think that.

I do not know whether I have understood you properly?—Yes. The whole idea was to supply any permanent authority as organised with the power, if necessary, to do whatever it saw fit within the forested areas. It might not have to enter the Board of Works area, that is a special case; but if there was an authority which was not carrying out its duty, the organisation of an over-riding authority might involve the construction of considerable works within that area.

I feel that the handing down of authority from the people to the responsible body is direct in this matter. The people have established Parliament with responsibility; Parliament has handed on its responsibility in this important matter of water supply direct to the Board of Works as far as the City is concerned. The Board of Works is given the duty and right to operate within certain limits, and its responsibility to Parliament if it fails is clearly defined. The interposition of any other authority in that direct line of responsibility will create difficulty, if that authority is given the right to over-ride the Board of Works or any similar
authority, even the Forests Commission. To what extent can it relieve them of their responsibility? That is why I say you may establish a central authority on ideal grounds as far as the fighting of fire is concerned; but you can only do it by destroying to some extent the same type of centralised authority in the other bodies which are affected. There must be a choice. However, where it is possible to achieve the end sufficiently well by maintaining those authorities supreme in their own domains it should be done. I believe really that is a possible solution. You may say it does not look like it, but again I say I think it can be done, as, for instance, if the settled areas were under the control of some such organization as the Bush Fire Brigades, but the Bush Fire Brigades centrally organised with permanent staff, a permanent fire officer who could be the administrative officer for the settled areas, and if in the forested areas - other than special areas such as the Board of Works areas - there was organised a fire fighting authority which was under the same administrative control as the exploitation of the commercial side of the forests - if that authority were supreme in itself except when it was formally co-ordinated with the forest policy on the other side. I do not feel competent to deal with the question between the Lands Department and the Forests Commission - I feel there should be only one authority there with regard to fire fighting. Maybe it is not possible, maybe there must be two. That is an extension of what I am putting to you; it seems an undesirable extension. But in such other special areas, as that operated by the Board of Works, there is another fire authority. I feel the several authorities should actually co-operate in this matter of fire prevention. There is not much which is controversial in it. I feel that
would be the right way to do it, that on behalf of the
Bush Fire Brigades there should be a central organisation
and the administrative officer or officers of that organis-
ation co-operate with the Bush Fire Administration officers
in the forests, and co-operate where necessary - where
their interests approach - with other authorities such as
the Board of Works.

THE COMMISSIONER: You could probably co-operate on fire fighting but
do you think you could co-operate on prevention?—-I think
so.

The two schools of thought about the burning question are so diverse?—-
I do not feel the position is as bad as that; I feel that
nobody will suggest the general burning of our forests is
even possible. It then goes on to a question of what is
possible and what is probable, and how much that is a
question of policy. I do not know the Forests Commission
policy; we have not heard it yet. I do not believe
that in view of the fact they have obviously used it in
some places that they are going to say they will not have
any burn. It does then come down to a question of degree.
I feel there is more than a prospect, I think there really is
a chance of success providing that in the forest - there is
no doubt about it that that is the important area - that this
strong organisation of which I speak is built up, and provided
that Parliament provides the funds. Undoubtedly it involves
the modification of the Forests Act. Reading the Act entirely
as a layman, it seems to me that the Act leads to exploitation.
The Act presupposes the commercial use of the forests, and not
to any great extent the protection of them. It seems to
me that is the root of the position in the first place
in an Act of that sort. I say most definitely that one
of the primary duties of the Forests Commission is the protection of the forest from fire and it should be provided for in the Act. Certain funds will have to be made available for that purpose, and it would be a proper thing to provide they shall not be used for any other purpose.

Do you agree with Mr. Clarke that all people who can, or who desire to earn a living from the forests should be permitted to enter and carry on their operations?—No.

Leaving out your catchments and your reservoirs?—I agree on a broad general principle that the forests should be operated in the best interests of the State, and if you take that view of the forests, particularly with regard to catchments, it is probable that of the parts of the forest that are doing their work for the community, these catchment forests, even perhaps only 100,000 acres, are doing as much for the community as all the rest of the forests together. I suggest they should be left alone to do that duty; it is not reasonable and sensible to endeavour to squeeze from them a little more profit.

I think that perhaps you misunderstood me. I expected your catchment areas and reservoirs?—The principle still holds with regard to any area.

I am not fore-shadowing anything; I am making an example?—I appreciate that. I would say the fundamental principle still stays. The forests must be used to the whole for everything and for future years in the best interests of the community. It is difficult to decide in a particular case what is the best use.

Your objection is to the free and unrestricted use of the forests by people for the purpose of earning a living; and the fact you cannot control or police them properly?—You might say grazing in the forests was a legitimate occupation, but if it is found that the use of the forest by graziers
jeopardise interests that are much wider, then I say that
industry should be stopped in the interests of the public.
I cannot go much further than that. In general it is
not individual members of the public that have the right
to the use of the forest, it is the public themselves, and
if individuals in using the forest destroy, in effect, more
than they give to the community they should not be allowed
to do it. That is a wide general principle. It is quite
easy to state the principle but in a particular case it is
not so easy.

If it were found that the ordinary hiker did not behave properly you
would exclude him; you would exclude all offending classes?—
I think if it were found that the general practice of hiking
through the forests was in fact destructive to the forest
you would say "If we cannot control them so that they are
not destroying we must stop them because they are destroying
above the value of having hikers in the forest." That is
an extreme case.

It would be very hard to stop several classes; that class especially.
Men are so anxious to go into the forest?—I think that
the hiker is not in that way a danger to the forest.

I do not think he is either, as a rule?—On the supposition you have
made, if it were found the hiker was a danger, the principle
the
would hold. I think I have really reached/end of what
I have to say about this authority. The proposal I am
putting to you virtually is that there might be more than
one probably three, or possibly more. I do say that unless
a special authority that has control of a special area such
as that of the Board of Works - if other watershed authorities
arise in different towns they should have no right to separate
control unless they establish a control that is equally
effective - that control should remain in the hands of the
interested party, which is the forest surrounding them.

Unless they are prepared and do in fact establish an equally
effective control, that is their duty, I would not remove it from the general supervision of the central authority, otherwise it would become out of control of the controlling authority and become dangerous.

Have you given any thought to the more detailed part of your suggestion; the possible constitution and its method of operation? I am quite clear on its method of operation in relation to fire.

I mean its method of internal organisation; how is it to be made active and potent? I cannot foresee any real difficulty. In general terms any organisation can be made effective that has a proper authority issued it. Apparently we now have one or two forestry officers to 200,000 acres or something like that. There must be more of those. There might be two or three extra men introduced into such an area and some of them, perhaps all of the extra men, would be men whose duty it would be to take charge of parts of that area for fire purposes only.

We are getting back in effect, not in form or plan, to the local committee and the local fire warden? I do not think so. Except that it would be centrally controlled? The local committee only functions in the settled areas if it functions at all. I do not feel a local committee would be very effective. I feel a better organisation for the settled area would be the Bush Fire Brigades centrally organised with someone who could confer with the Forests Fire Brigade. I am not very hopeful that the local committee would do more in the end than safeguard some certain properties.

Of course, one witness said something that I had already thought of, that in a small community it is very hard to get a local committee in agreement on anything? Yes, and the small community from the point of view of a Bush Fire Brigade
is definitely a difficulty, because there would not be enough men to have a Bush Fire Brigade. However, I feel those are matters of detail; I have only tried to touch on the principle. I do not think they are sufficiently important to worry about.

I do not think so, but I see what your plan is?—There is the question whether the central authority in the forest itself should be under the control of the Forests Commission. I do feel this question of fire fighting in the forests is fundamentally tied up with forestry. Leaving aside any question of existing organisation and coming down to principles only, the two things are one.

If it were suggested that the Forests Commission were to retain control of its own forests on the matter of fire prevention and fighting, and that a certain rim of the forest near any settled place should once under the jurisdiction of the local people who wanted to arrange their protection, or your body who want to protect the local people, what would you think. Do you think that is rather tinkering with it?—

I do not think that is sound in principle. What I feel is the principle in these matters is that if a body is not effectively doing its job the first action should be to try and establish conditions and make it. I feel that suggestion implies that the Forests Commission is not doing its job.

In other words you say that if you have a State department which is obviously not doing its duty—here I speak quite impersonally—then you should not take the power from it, but discipline it to make it use that power?—Otherwise you might find you have created an authority that is no better and you still have to do the disciplining.

With multiplicity of State Departments you are a lot worse off?—

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The first action, if it is decided the Forests Commission, talking specifically—has failed to do its duty—is to provide a measure by which it can see and must do its job. I am speaking hypothetically.

Perhaps when you get men who are so cast in thought on a certain line; do you think they can be persuaded to alter that line of thought?---I can only answer that generally. It would be a mistake to mould the whole organisation for a hundred years ahead due to the failure of some individual at present. I have that factor in mind?---Some individual or some group of individuals may fail to do their duty; we do not ordinarily dodge that issue, we tackle the problem and see they do it. We provide means of making them do it. I believe the Forests Act has led to a position where forest protection has been, not perhaps overlooked, but where it has not been given enough emphasis. The first thing to do is to permit a modification of the Act in such a way as to make it obviously and definitely the job of the Forests Commission. I believe it is their job. In all other countries the protection of the forests and their exploitation go together.

To have it otherwise in principle would appear to be rather absurd. Every man is supposed to order his own force?---It is very difficult and wrong in fundamental principle. I cannot get past and I do not think it is the proper solution of the particular problem. I feel the border areas of the settlement, those on our forests, should be properly controlled by the Forests Commission. It does not matter if the settlement is a mile in the forest there is still the boundary problem. You can go as far back as you like, and still there is a boundary problem.

What do you refer to as a boundary problem?---The margin in which there
is a dispute between the Forests Commission and the settlers. There is a boundary now that is fixed geographically or by vegetation covering which is the boundary of the forest, and the Forests Commission has to control that for that purpose; they should control it properly for fire purposes. They should co-operate with the settlers and give the settlers the security that in and around the settlements the forests are safe. I consider that their duty and they should do it. With the division of authority we cannot frame the Act to really mean and impose on anybody the duty that is intended to be imposed on them. That is the way it should be. In the first place I feel that the Act does not do that; again, I am speaking as a layman and perhaps I should not be criticising an Act; but that is what I feel from the reading. I feel that it could be made very definite if the enactment were altered, that the duty to protect the forests and the funds to do it with could be provided in a way that could leave no mistake. That brings me to the point where I say that probably the best solution of the business is independent control - if you like to use that word - of certain defined areas, every forested area to be included one way or another, and co-ordination and co-operation of those bodies to produce a consistent plan.

The vast majority of country people who are interested in this subject feel, rightly or wrongly, that a great many of their troubles are due primarily to the policy of the Forests Commission, and a lot of them appear to generally live in dread of fire?---I believe that is really so.

And a number as well say the Forests Commission threatens to burn and they do nothing, that they put in applications to burn and returned they are/to them?---The suggestion I make will remedy that.
Would you not give your suggested organisation some authority over
some edge of the forest where you have people living close
by?—You mean the fire lighting authority of the settle-
ment as opposed to that of the Forests?
Yes, give the Forests Commission an opportunity to do the right thing
and if they fail to do so the settlers could invoke the
authority of this other body?—I can only believe that
if the Forests Act were framed to impose that duty on the
Forest Commission, and if the Act were sufficiently en-
lightened to provide the funds, I do not think there would
be cause for any more complaints. The necessity to
do this might be difficult to introduce into an Act for a
special case around a settlement. That really is the
problem you are talking of.

Speaking rather personally, but without wishing to be offensive,
you possibly have a certain class of thought which leads
you to shun the idea of interference with you area and
you may be applying it in your argument now?—I can only
answer that in the way any witness would do. I am
putting my statement honestly in what I believe in the
right way.

I have no doubt about that?—If it is coloured by the particular
interest I represent— that may be so—you must assess that.

I have a fresh mind, not particularly stored with knowledge of this
subject?—It is capable of assessment of anything put by
me. I have tried to view this thing in an unbiased way
in the interests of the Forests.

I think you have maintained that?—Quite frankly, in relation to
water supply, I feel it would be dangerous to give any body
the right to do things in the water shed without the
approval and supervision of the responsible authority, and
that may colour my view of the forests. I can only say in

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general what I think. If the Forests Commission were given this responsibility beyond any shadow of doubt by the Act and the duty of safeguarding the forests and the settlements surrounding the forests were definitely one of the things given to the Forests Commission by enactment, and if the necessary money was provided for doing that, I think in the end the hostility of the settlers would disappear. I think that would be the outcome of the proper co-ordination. Mutual protection would take place of the degree of hostility that is being expressed.

I fear in your suggestion of this co-operation between public Departments and individuals - again I speak impersonally - is that so many public departments live in utter disregard of the individual, his rights, his hopes, or his fears; he does not matter, he merely pays the tax which keeps the officers of the Department in employment. Their unwillingness and arrogance is very noticeable. I again cover myself enough on this question?---I appreciate that point and it is so. Of course, you get down to the difficulty of the breach of the principle by the failure of the individual. What I feel about it is that the principle should be observed if you can provide against the individual; but I cannot go much further.

Your scheme might be a perfect one if you could only be assured it would be properly manned?---Do you feel the over-ruling authority is certain to be no better?

No, I do not, except its job would be solely that of fire prevention and fighting. It would have no other interests to divert it from that end?---That would still raise the difficulty with the settlers. It would get over the possible difficulty with the Forests Commission - between the fire fighting authority and the Forests Commission; but the fire fighting
authority might take up exactly the same arrogant attitude towards the settlers as any other body.

That is to say you can put a man in the forest but Goodness knows how he will turn out?---It does depend on the individual.

If you have any further thoughts on this matter I would be glad to discuss them with you privately or when occasion suits you. If it might be to the detriment of your friends the Forests Commission we will invite them to be present to show we are not putting all the cards up our sleeves?---I do not think it is to the detriment of anyone. I have tried to put it without fear or favour.

In theory what you suggest is very attractive but I am afraid of how it would work?---I have given it a lot of thought and it appears to me to have a reasonable chance of working.

I think it is the proper thing in a properly ordered community?---I think if there is any suspicion there may be failure on the part of the organisation the only recourse is to provide a method of dealing with that failure, not to side-step it. That can only be considered a general principle, which I should prescribe at all events.

I do feel you would need to be cautious in divorcing the commercial operations in the forest from the very closely allied control safety operations of fire.

What is an example of that; I do not quite see what you mean?---You would need to be cautious in doing it.

You say divorce the commercial activities from the safety operations?---If you make an over-riding authority whose sole object is fire control you give them the right to do what they see fit for the purpose of fire prevention in the forest; you then have two authorities in the forest.

You have an authority which may be in conflict with a great many other interests?---The co-ordination within the forest of those two sometimes divergent matters is best done within one authority. If that authority is responsible for both it is likely to arrive at an unbiased conclusion, which is

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the best conclusion. If there are two divergent interests they are likely to clash.

The people in control are the right people. It is more likely to lead to a better balanced policy which would study all interests—

It is done overseas. From these books it is clear that the forest control authority is also the fire protection authority.

I am expressing a lot of opinions this morning. I have learned in this Commission I cannot be too careful. I am not making any findings at all—they may sound like it—I am assuming things for the purpose of discussion and trying to inform myself.

MR. GOWANS: Perhaps if Your Honor prefaced your remarks with the words "without prejudice".

THE COMMISSIONER: All right, it will be "without prejudice" henceforth I will not repeat it.

THE WITNESS: I started out putting the position of the natural forests but I have come round to the forests as they are at present. I do not believe we can save them by general burning at all. I believe there is a hope of saving them if we can very greatly reduce the incidence of fire.

I believe that in time the increase of the forest cover will help in abating the scrub. That is a long range result, but the main thing is the suppressing of the fires, to prevent the development of these very destructive fires, and I believe that would happen all right. It may be mere speculation as to whether the scrub would in fact decrease.

I am now going to talk about the Board of Works watersheds. In the Wallaby Creek watershed we have a condition where a very large area has passed to bracken, the ultimate fire resisting scrub.

You cannot kill bracken by fire, and that is about the only thing you cannot kill. In the first place it looked to be a hopeless proposition to deal with.

The Board first of all started to cut out small areas inside the
bracken, wire netted them and planted trees. That was defeated by the deer. I do not know why but deer seem to have a particular liking for things handled by human beings, anyway they jumped over the fence and ate the trees. Another attempt was made by broadcasting seed of mountain ash - it is a mountain ash area. The bracken was cut and the seed planted. However, that was unsuccessful; we got no regeneration worth talking about. We have actually replanted by hand some fairly extensive areas, and we have made plantations. Enough trees were planted so that the deer could not eat them all, and in the end we established plantations in bracken areas, which are now themselves controlling the bracken. We have to cut the bracken still, but very much less. However, the noteworthy thing that I think is of interest is that around the fringe of these bracken areas we are gradually re-establishing the natural forest. Although this cannot take place within the bracken area where the bracken is thick on the fringe of the forest where the bracken is more controlled there is a gradual encroachment. Perhaps 10 or 20 per cent. of the area has encroached, so that the re-establishment of the forest is possible; but it is only possible by keeping fire out of it. If we burn that bracken all the work of 15 to 20 years would be gone; the bracken would be up more strongly and the seedlings would be gone. That is a particular incident of the possibility that you can exclude fire and improve the forest, and I believe that would make happen.

(Page 1847 follows).
It seems to me it is the only way. We have not a hope of any real improvement in getting the forest back to a better condition by any other system, so that the establishment of a fire fighting organisation is also sound in that respect. Now on the general question of the Board's watersheds it is interesting in some ways. The O'Shamassy watershed has been entered by fire; but it has never been settled, it is quite different from the other two in that respect. There has never been any industry of any sort, or timber splitting or milling there and I think that watershed is fairly near, as near as most forests we have today, to being in its virgin condition. I do not mean it has no scrub in it. It is a mountain ash forest for the greater part and a good deal is of the wetter type of mountain ash forest, that is, forest with undergrowth that is mostly green and wet. That fire on Tuesday the 10th reached the boundary of that watershed over the whole of its western side. It swept into the watershed on the south and the whole front was such that the men we had available could not hope to cope with it. Those fires died down on the Wednesday and Thursday, but were revived again on the Friday. Fire attacked the watershed on the whole length of its eastern boundary some time within those days. Actually the fire was known to be in the Armstrong area before the Tuesday; but our men were actually fighting it on the Tuesday night before the big fire came out of the Acheron, so that in spite of the fact that that watershed was subjected to the same conditions as all others valleys in the country, I should say 90 per cent. was totally untouched.

I did not believe that when we were told so by the patrol men,

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so I took the opportunity of going over in the airplane and having a look at it from the top. I am very much understating it to say I am delighted. There are patches throughout the forest where obviously burning debris had landed and started fires; but they are small and those fires went out. As soon as you cross that watershed you are immediately into green country. That fire burnt out of the Armstrong. I am putting this forward as a conclusion, that virgin forest is actually very resistant and strong support is for what I have said, that probably these forests in their virgin condition were fairly resistant. I have had some photographs taken and although they are not very remarkable, they are quite helpful in actually establishing that fact. (Producing photographs).

In this photograph produced the ridge that you see is a ridge between the Armstrong and the O'Shannassy valleys. The O'Shannassy is on the dark side and the Armstrong Valley is on the light side. The position about the Armstrong is very notable in that according to all our beliefs a forest that is on the north and the west should have been much more burnt than a forest on the south and the east; but the Armstrong has an east and south slope, and it is completely gutted right throughout to the road. The north and the west slopes of the O'Shannassy are touched in some places but generally speaking, not very much. This other photograph produced is of the same nature and in it the ridge is quite clearly marked at the edge of the timber. That photograph was taken at a lower altitude, looking straight west against the edge of the O'Shannassy watershed. I will put these photographs in.

EXHIBIT FF/1 & FF/2. ..........Photographs.
the same condition applies on the edge of the Acheron. Those two valleys, the O'Shamassy and the Armstrong are very similar, they both face generally southward and both are fairly well protected from the north, except that in the O'Shamassy there is a definite ridge in the middle that faces north. I would say there be no other conclusion than that the freedom of that forest from the danger that would have been induced by frequent firing and, of course, its freedom from products of industry, and the damage industry inevitable does, have contributed very much to this immunity, even with these tremendous fires we have had. Owing to the Maroondah watershed, I have to correct a statement made on the plan put in during my earlier evidence that the whole was burnt. I believed it was at the time. There again, we have very much the same conditions. The Maroondah watershed is not in the same category as the O'Shamassy, because it was settled until the nineties and we do know there was a good deal of bracken generated in it at that time - more than I really thought. Still a good deal of that forest was pretty nearly virgin forest, but I think in that case the immunity it does turn out to have had was as much as anything that the forest itself although previously damaged had been kept fairly free of fire for many years. At all events the fact is the fire swept into that on the Tuesday. I cannot tell you how far it got across the watershed before it went out on the Tuesday, but that fire was revived on the Friday, and even with the amount of travel it made then, there is still on the south of the watershed more than a quarter of the whole area unburnt. If you compare that condition with the intermediate valley, the Acheron, the comparison is significant. The fire
went right through the Acheron. I will say something about a patch of it not burnt, but generally speaking the fire swept through the Acheron, at least down to the Yarra, on the Tuesday and I believe on the Friday it went right through the Yarra Valley and into the Latrobe, so the behaviour of this forest which has been protected from fire and which by that means has established some degree of resistance over these 40 or 50 years in which it has been protected, does give some justification for hoping that the exclusion of fire will improve our forests. A statement has been made that that fire burnt down to the Warburton area. It is perfectly obvious it did not, there is a strip about one mile wide totally unburnt in the vicinity of Donna Buang. There are spots of that burnt; but again the fire has gone out where it has gone into it. The Maroondah watershed on its northern boundary, was, of course, badly burnt, and behind Mt. St. Leonard, that is, of course, in a southerly direction, and in this case there is quite a big piece of forest that was not burnt on the Tuesday or the Friday; there, again, the fire went out. None of these fires were effectively put out by our men because on the day there was so much fire that we had not enough men to even begin on the job, the fires that went out went out naturally.

LUNCHEON ADJOURNMENT.

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UPON RESUMING AT 2.15 P.M.

THE WITNESS (CONTINUED): This morning I overlooked a small quotation
I intended to make from the American "Readers' Digest", which
is not necessarily very authoritative, although I believe
it is quite correct. On page 28 of the issue for October,
1938, in an article entitled "Hell and High Timber", It is
a literary effusion and is quite a fine piece of work. It
is only the facts that I desire to bring to your attention.
The article states:

"Our nation forest area covers well over
200-million acres, with one forest ranger to every
32,000 acres. Yet the total fire loss in all this
vast area last year was only 105,155 acres."
The article compares that figure with the much larger loss
in timber areas outside the forest service area. I bring
that forward to indicate what is virtually the purpose of the
article, that forest control as applied in the national forests
in America was outstandingly effective in the period to which
the figures apply and is an outstandingly proposition as far
as those forests are concerned. If we can achieve anything
like that, we need have no fear of retaining our forests and
all they mean to us. I reached the stage this morning when
speaking of the metropolitan watersheds where I said that in
general those watersheds were not wholly in a natural
condition. In places and in respect of some fairly extensive
areas, there has been damage unfortunately. The freedom for
many years, and for all time in the O'Shamanssey, from
settlement and industries, and comparative freedom from fire,
has enabled them to be brought to a fairly high standard of
immunity from fire damage. I am submitting to you that,
although some comment has been made that they are in fact a
menace, the contrary is the truth. Those watersheds are not
particularly inflammable. The further point I wish to make in
that connection is that whether as forests they were or were
not inflammable, the effective fire control maintained
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within them, which has resulted in almost all fires being effectively dealt with, has made those areas not a fire menace but actually areas of safety into which fires from outside did not penetrate, and areas in which it could be relied on that fires would be extinguished, except such conflagrations as those which occurred this year and to a considerably less extent in 1926. That brings me to the fundamental consideration in relation to watershed forests. I have more or less built up the groundwork to that in relation to the ordinary forests. I have said that the forest is necessary to enable the soil to absorb water and hold it. The conditions of a forest are really the only satisfactory conditions in these mountain areas for ensuring that the water will percolate into the soil and be stored by it. I want to give point to that by comparing the conditions in the watershed areas of Melbourne and Sydney. Sydney has a slightly larger population, amounting to possibly 1,250,000, than Melbourne. Our population is perhaps 100,000 less, but there is not much difference in the population served by the water authority. The catchment areas of Sydney are greater — they may be 70 per cent. greater — than those of Melbourne, but the outstanding fact is that Sydney has six times the storage capacity to meet virtually the same conditions. There are several factors contributing to that, and one of the big factors is that the Melbourne storage is not solely confined to reservoirs. The catchment areas in Sydney are rockeries from which the water falls off immediately it falls on. A few days after rain has fallen, the streams drop back to a small flow. There is no storage worth speaking of in the ground. In the Melbourne catchment it is the opposite. The greater part of the Melbourne storage is in the ground of its catchments, and not behind its dams. Its soil is deep and well protected by forests, and the water is able to pass into the ground and flow out so that
the flow of the streams is kept perennially high. It is very difficult to assess the real value of that, but it is of enormous value. Anything that is destructive to it is destructive of a tremendous asset. If it were destroyed or impaired, the immediate necessity would arise for more storages, and very soon Melbourne would be in a difficulty not met in Sydney. Sydney, owing to the rocky catchment, has plenty of storage space. It can get big storages; it needs them and they are available. Owing to the nature of our country round Melbourne, we have not so many storage sites. Our storages are small, compared with those of Sydney, and even if we wanted storages like Sydney, we could not get them. That means that if more water is required, more catchments are required, and if we impair the efficiency of our catchments, we must find new catchments. The new catchments are not within our control and there are not many of them left. I do not need to go into that aspect of the question, but I can assure you that the time will come when Melbourne will need every catchment that is suitable and available, and every catchment will need to be in a condition of the highest possible efficiency. Therefore, I say that any decrease in efficiency through failure to foster and safeguard the forests will be highly detrimental, and will involve very considerable loss. I have tried to show that slow burning does involve that loss, even if the fire burns only the litter on the floor. What it does in fact, and we can see it in plenty of places, is to produce bracken. In the catchment areas and out of them and throughout the forests of the country, particularly in the mountain ash regions, we have by regular burning degenerated the forests and regenerated the bracken until we have nothing but bracken in many places. I have already given evidence as to how ineffective a bracken area is in water conservation. The Wallaby Creek area in a critical season will produce only one-tenth of the streamflow produced in other areas where there is less bracken.
That is not wholly due to the bracken but it is partly due to it. I have said that light burning will in any case destroy mountain ash forest, and that comprises the greater part of the catchments and almost all of the really productive parts. Whatever the position may be in the forests in general, the position in the watersheds is much more acutely the same, in that the use of fire, however light, is fraught with danger and is certain to do considerable damage. I am speaking of fire of the sort we have been talking about. I come back now finally to the final statement of the position that I originally put with regard to watersheds.

The watersheds have been controlled in relation to all fire except one type of fire. If they could be safeguarded from that type of fire, they are actually reasonably safe from damage by fire altogether. I have put before you the suggestion that the way to safeguard them is by proper fire control and certain other matters. If those things were done in the general forest, the watersheds could then look forward to their maximum productivity undisturbed by these conditions; but if you feel that that kind of fire control is insufficient, if you feel that some burning is necessary somewhere to provide safety, my suggestion is still that there is no avail in burning the watershed. If you can stop fires of the type of 1939 by burning where that kind of fire originates, that is the place to do the burning. If that kind of fire can be stopped where it originates, no other kind of fire will affect the watersheds. Therefore, you have no need to take the very much greater risk of fire in regard to the watersheds. I feel that that case does not arise because adequate protection for all interests is available if proper fire control is effected in the areas I have spoken of. I have practically reached the limit of what I have to say in general regarding forests and watersheds.

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There is one thing that I only touched on this morning, and I feel that I should say something more about it because I feel it is of some importance. I referred to the question of the Proclamation. I feel that in principle the Proclamation is right. It may be, and probably is, a fact that there should be more variation allowed in different districts. Districts should perhaps have their own dates of Proclamation, but I feel sure that the idea behind the Proclamation, which fixes a certain date after which no fires shall be used, and makes it very difficult under any condition to have a fire after that date, is right in intention. Those who desire to do a large amount of burning after the Proclamation are in general those who want to do their burning without cost. The Proclamation should be, and I believe generally has been, fixed at a date when fire would be dangerous if used at all. My opinion is that fire should be prohibited after that date. As I said this morning, it is possible to burn properly before that time without great cost. The danger of burning after a fire will run should not be incurred to save the difference between throwing a match into the scrub and taking what precautions are necessary in the way of cutting to keep the burning safe. I feel quite definitely on those grounds that the Proclamation is a proper thing except in so far as the date might be made more flexible in its application. One thing left to me to refer to is the conditions at Silvan. When evidence was being given about Silvan, I felt that perhaps everything had not been said. The Silvan area is not a watershed area. That does not mean that the water that runs off it does not go into the supply; some of it does. The area is insufficient to be of great importance as a watershed. The questions for consideration are the policy that has been adopted and the policy to be adopted. One consideration is the safeguarding of the property and the workers. There are two ways of doing that. One way is not to burn,
but to patrol to keep the area safe. In that part of the area in the vicinity of the township, where experience has shown that there is more than the usual risk from the township side, it has been the policy to burn. I personally was in charge of that area from 1927 to 1930. The Board only took over the area a little before 1926, and it was burnt out in the 1926 fire. Somewhere about 1930 the area between the Board's houses and the Monbulk Road was burnt under my direction in order to keep it reasonably secure. That is now a very degenerated forest with perhaps 50 per cent. of scrub. I considered at that time that the scrub had reached a stage when it should be burnt. I left the place and had no further control, but I understand it was partially burnt again in 1934.

Whatever the facts are, the policy has been quite definitely to watch the area and when the growth is thought to be too great, to burn it. For that reason it was burned under my supervision in September, 1938. The fact that a fire did go over that area is actually significant. The burn that was put through in September was too light or too heavy. If we had not put the burn through and if we had not had a sense of security, and if the area had been under our ordinary watershed policy, there would have been patrol men on the Stonyford Road, and the fire that did the damage might not have been lit. I can only speculate how it was lit, and why. On the other hand, there is no doubt that the fire in September did not burn all the scrub and made it more prone to be burnt in the summer. Speaking generally of the Silvan area, I am a little at a loss to understand the importance attached to fixing the question of fire. We have an area of only 2,000 acres and half of it is water. You could not have a better fire-break in the big sense, because actually more than half the area is a 100 per cent. efficient fire break. That break imposes between the township of Silvan and the State forest an effective safeguard to the forest from fires started in 1856.
Silvan and an effective safeguard to Silvan from fires started in the forest. There is not much forest in the catchment area. There is only a very narrow strip. The operation of the area in general is concerned with questions of appearance and aesthetic value. There are areas that have been partially painted. When the trees were put in, they were thought to be of a good kind. A strip of a quarter of a mile wide on the western side converges on a big area of State forest, and is actually up against the water break, a reservoir which is half a mile wide and three miles long, through the centre of the territory.

(Continued on page 1860.)
There does not seem to be any justification for putting a fire break to cut off a quarter of a mile of forest from the rest of the forest, unless inside that quarter of a mile there is something of value to protect, or some dangerous source of fire. Actually, neither of those apply in this case. It is a fact that it was under my instruction that the making of the fire break on that side was cut out two years ago. It was proposed to complete the fire break around that area. The officer who proposed it thought it should be completed. I looked into it, and I said that I could see no justification for a fire break, and it was not done. I can still see no justification for it. Perhaps the matter of the difficulty can be cleared up under cross-examination. I do not appreciate any other matters of difficulty in relation to Silvan. The amount of burning has been regulated to safeguard a particular place that appeared to be in need of it. As to the cause of the fire that did the damage, and the ultimate burning of the Church, it has been suggested to me on several occasions by the Board's officers in the district, that the fires were suspicious fires, as they described them, lit for some purpose or other. I have never really accepted that; it may be so, but I have no proof of it. But that fire did occur beside the road, and it is a fact that that road is used by hundreds of cars on Sundays and holidays. Obviously, that could be the source of the fire. Neither the men there nor I are in a position to say what was the cause of it. I think that covers all I have to say.

MR. BARBER: You have given us some very interesting theories and you have told us something about what the Forests Commission ought to do. Will you tell me this; do you take any precautions - leaving Silvan out of it for the moment - in areas under the control of the Melbourne and Metropolitan
Board of Works, other than having some men there on the spot to put out fires?—Do you mean precautions before fires?

Pre-fire precautions?—We had the construction of fire breaks, and I have already given evidence in relation to some of the areas. I appreciate that. Do you use fire in relation to your fire precautionary measures?—On the fire breaks we ordinarily cut and burn. I have no doubt that in some places where the fire breaks are wide—they go up to as much as five chains in width—between the boundaries of such a break a creeping fire might be used under suitable circumstances to save cutting and burning. Generally speaking, it is a process of cutting and burning.

What about other methods of protection; do you road those areas at all?—The old system was not to road them. That has a justification in that it is desirable not to encourage traffic, such as walking parties, and so on, through the areas. I visited Western Australia in 1936, and was so struck with the usefulness of roading that the Board immediately did it in the Wallaby Creek area, to try it out mostly. I should say it has proved itself, although we have not had very much fire through that area since. I am satisfied with it, and I believe it is the proper thing to do. Probably there will be an extension of that system.

Have you any other precautionary system? Do you install telephones, or are your areas big enough to require connecting up with telephones and the provision of lookouts?—In the Wallaby Creek area, we used a hill that is an outstanding point, without a tower. In the Maroondah area, we have the advantage of the Forests Commission's tower on the southern end, and that has been very useful and helpful to us. It is connected by telephone, and our district men can ring the tower. Everyone of our caretakers and patrol men is connected by telephone. The Board of Works has its own
private lines in a good number of cases, as well as connection with the Postmaster General's Department.

Passing to another matter, and adopting your theory that the virgin forest is the best forest for all practical purposes, when you take the position of the Forests Commission forests that have been burned over, forest areas that have been burned frequently by graziers and other people, what is your suggestion as to how such areas should be treated?—My suggestion as to how it should be treated is to keep fire out of it, and not make conditions worse.

As an example, we have an area that has been burnt over frequently for many years; what steps do you suggest the Forests Commission should take with that area?—The main step I have suggested is to keep fire out of it, and to establish a proper fire fighting organization. In addition to the ordinary precautions and fire breaks, and so on, steps should be taken to enable fire fighting to be effectively done by the provision of roads, telephones, lookout towers, and so on. In addition to that, around points of particular danger you should burn the forest and write it off. If you must write it off, do so. If there are portions of the forest that are of particular value, do the same with them. There must be proper precautions taken about erosion. If you try to do that class of work on a steep slope, it will lead to disaster.

Would you sat strategic burning?—I do not object to that term. I think you put it that where you must burn and write off portion of the forest in order to form a protection, that should be done outside areas under the control of the Melbourne and Metropolitan Board of Works?—I have put that, yes, and in any other watershed area of similar value, providing that area is under protective control.

Do not you think that, in fairness to other interests and other Departments, some of that protective burning and consequent writing off of forests should be done in your own areas,
such as on boundaries, and so forth?—-I appreciate the justice of a question like that, I have tried to show that there is a particular reason in relation to watersheds that does not apply, at all events so strongly as to forests. The value of the assets involved is very much greater. It would be competent for an outside unbiased authority to say that it is obvious that all people should bear the risk, cost and damage due to this. Do not forget that my main theory has been that no such burn, or very little of it, is necessary, but if it is necessary, the place to meet the danger to which the watershed is subjected is the place where the danger arises, and that is not in the watershed. Otherwise, if you stopped the 1939 fires at Toolangi, in the Rubicon, or wherever they started, the burning of anything else does not arise. Watersheds are immune from fires, except from those parts.

I suppose you will agree that the danger to any particular unit of forest, whoever has control of it, will come from the north-west?—-I do not like generalization, but that probably is right.

It will follow from that that where we have Forests Commission areas south and east of your watersheds, the danger we can look for will come if not from, at least through the watershed areas under the control of your Board?—-If various areas to the north of our watersheds are kept clear from fire, we will not have any danger from the north.

That is a very positive statement, but is it rather a hope?—-It is a statement based on experience of about fifty years, that the only fires that have swept the watersheds have come into them and have also gone out of them. If you can stop them from coming in, well —-—

They come in and go through?—-Yes, they come in and go out, although, in the fires we are talking about, the three watersheds under the control of the Board, as a fact, did not have a fire go through them.
That might have been due to all sorts of things, I suppose. You do admit the possibility of a fire starting in a watershed area and coming out in a south-easterly direction?---I admit the possibility, but I say in fact it has not occurred.

With your areas in their natural state as you have kept them, and without effective breaks, they would form a distant fire menace?---The supposition you are putting is not in accordance with facts. You say "without effective breaks".

Do you suggest that effective breaks are always provided on the south-eastern corner of watersheds?---We do not need to talk about always. I can go over the areas with you, and I can say that in the Wallaby Creek area that is so. In the Maroondah area, the fire break is the Forests Commission's break as much as ours, or, in fact, more so. I believe, by recollection, that the break on the south side of the Maroondah watershed, as to a good length of it, was actually made part by the Board of Works and part by the Forests Commission. In the O'Shannassy area, the whole of the southern end of the O'Shannassy valley has been purchased. There is open settled country which was cleared and was a source of fire. It was a danger to the Board of Works, and the Board bought the lot. It is a fact that the whole of the southern end of the O'Shannassy valley, except for a very short length, is under the control of the Melbourne and Metropolitan Board of Works, and a big lump of it is open country. That is an actual fact, without any generalisation about the southern ends of our watersheds. Incidentally, that does not abut on to any forest area; it abuts on to settled country.

Still adverting to your watersheds, as I understand it, you do not allow any milling operations at all?---No.

Is that because of the peculiar nature of the use that your land is put to? Actually I suppose there are two reasons, one being that you do not want a fire danger over it, and the other that you do not want human beings in your areas?
Substantially that, fire danger is most definitely associated with milling. We do not want the devastated condition that ordinarily follows milling operations. We say that is a frightful condition for watershed areas. It may be necessary for forests, if the forest product is to be produced.

You do not suggest that milling operations should be kept out of the forest?—I said definitely that the forest industry is proper use to which the forest can be put, if handled properly. I also tried to make it clear that I considered that every section of the forest should have its job, and that it would be foolish and wasteful to make the watersheds productive by mills that are used by the community for water conservation, but it would be also asked to do two jobs, the importance of which is jeopardized. It seems to be foolish as well as dangerous.

May there not be another point with regard to milling, inasmuch as you may get milling so controlled that it would actually do the forests good?—I have not seen it. I am not prepared to speculate, but I am prepared to see it when it is done.

In the forests under the control of the Board of Work, after a certain time, do not you reach a position where trees that become old, hollow and dead are taken out. Would not they be a fire danger factor that could be eliminated by certain amount of milling?—You might remove a minute danger, and impose an enormous one.

It comes down to a question of balance?—In the natural condition of the forest, it is inevitable that the old material at the end of its life passes out, but the forest conditions are such as to provide for those things. Most of the old hulks that stand in our forests are in process of decay, and are dealt with by natural conditions.

You would have a good many old hulks, as you call them, in your areas?—I am not prepared to say how many or how few. Undoubtedly we have the ordinary proportion.
I suppose they are a fire menace?---I do not admit they are a fire menace. Do you take any steps to remove them?---Definitely none. We try to keep the forest in its natural state, because we believe it is its best state, and we believe in that it is reasonably immune from fire.

You have never experimentally adopted any steps to cull out the hulks in the forests in the hope that you would improve them?---No.

Coming to your suggestion about a super authority ---?---That is not my suggestion.

I do not know that you claim authorship for it, but I understood you were discussing the question of the authority that would control all fire prevention works?---I think you must have misunderstood what I said. I said that, as far as fire prevention is concerned, there would be several authorities, each operating in a definite sphere, with these spheres so fixed as to cover the whole of the timbered area of the State. That is not a super authority; that places on the Forests Commission the duty of doing its work properly. It imposes a similar duty on the Melbourne and Metropolitan Board of Works and other authorities.

In other words, that is precisely the position at present, except that there are large areas under no particular authority at the moment. As far as your Board and the Commission I represent are concerned, you would not alter the system, except in so far as you would alter the Forests Act?---I have suggested certain alterations, and they stand in the evidence I have given; I do not desire to add to that.

I thought you were discussing a possibility of an authority that would be able to control and co-ordinate the fire prevention policy of Departments such as the Board of Works and the Forests Commission?---I did discuss it, to show there were reasons why it should not be done.

If that is so, I did misunderstand you?---If Your Honour feels that
there is room for a misunderstanding, it is important that it should be cleared up. After discussing it, I did finally suggest that in my opinion the provision of a super authority was undesirable.

THE COMMISSIONER: Yes, you did.

MR. BARBER: I am quite content with that. The other specific matter to which I desire to refer is the question of the non-burning of virgin country in the O'Shannassy area. I understand you are putting that as an example of the fire resisting qualities of virgin country as such?—Country that is much more nearly virgin country than ordinary forest.

Do not you think there may be a particular condition peculiar to the O'Shannassy, other than the mere fact that it is virgin country. I am going on my instructions, which are to the effect that it is a comparatively damp forest?—I have said that all virgin forest is damp, and that is one of the reasons why the virgin condition of the forest is a protection from fire.

Is not the O'Shannassy area particularly damp, even for a virgin forest?—I have no measure of dampness of forests, and I can only say that it is my experience of the virgin forest.

What I am leading to is this, that you might agree that the West Tanjil and East Tanjil country was also virgin country?—As far as I know it, there are virgin parts, but I have a feeling that there has been a good deal of burning there.

Q. It will be suggested by my witnesses that it is virgin country, and, although it resisted the 1926 fires, it was completely swept by the 1939 fires?—I cannot oppose anything you might put, and I am not in a position to say that you are right or wrong. All I can say is, the facts I have out have been carefully considered, and I believe they have value.

(Continued on page 1868.)
Do not you think that there would be a certain element of luck in saving the O'Shannassy area?—-I cannot agree. I think there is more than luck in that. I think that the fact that, not only in the O'Shannassy area, but in a substantial part of the Maroondah watershed area, the forest was unburnt proves that. I forgot to mention that other unburnt areas in that vicinity, also virgin mountain ash country, around Cement Creek were undamaged.

I put it to you that there was a certain amount of virgin country burnt over. Parts of both were thoroughly burnt and parts were left unburnt, and I ask you why you deduce from that that virgin country is more resistant than the other?—-Because the parts unburnt are mostly virgin country, or nearly so.

You are, in fact, drawing that conclusion from something other than mere opinion with regard to the burning of the O'Shannassy area. I was objecting to your drawing justification from that particular instance only?—-I put it to you as a theory, if you like, but there are many supports to that theory. One of them is the fact that our forests have come through, but I think I have developed that point sufficiently. I supported that argument, and used it merely as incidental support by showing that the parts of the country that I did know were natural forest were immune and have come through the bad fires. The whole thing hangs together. I am not prepared to take one section and say that one thing depends on one factor particularly.

Another matter, you suggested that mill hands should be put on to fire fighting work, and during a period you would close down the mills, so that, so far as your areas were concerned, the cost of fighting fires would be paid by some other Government authority, which would protect your areas?—-I would not expect the, to work for nothing in our areas. I am totally unbiased on that matter. The Board of Works has always paid for the protection of its areas.

You do not want mill hands to go into your areas and work for nothing?—-
I would be a super-optimist.

I appreciate the attitude you have taken up?---I have done what I could do to help.

You certainly have. There is no doubt about that. In regard to thinning, I do not know whether you were referring to thinnings in ash?---The parts I knew were in a sh.

Well, you suggest it is dangerous to thin and leave the thinnings on the floor of the forest?---Yes.

That may be, but it seems to me that is a little inconsistent with other parts of your evidence, because the thinning would be done when the trees were comparatively small?---I have known thinning to be done when trees were 30 feet high and 6 to 9 inches in diameter.

That would be pretty well the maximum size at which trees would be thinned?---I am not in a position to know whether that would be the maximum. Nine inches is the diameter of trees I know to have been thinned.

Why would it follow, having regard to your theory, that natural forests would eventually destroy the debris, that these thinnings would not in the course of time be destroyed? Why would it not be better to leave the thinnings on the floor of the forest and allow natural agents such as you enumerate gradually to break them down? Would that not be better than putting a fire through and destroying the humus and possibly other trees?---I have pointed out that if you overburden natural agencies, the debris will not be destroyed quickly and the fire risk is tremendous in the meantime. I say that this is unnecessary.

I suppose it is a question of degree. It would depend on the areas and the quantity and the quality of the thinning done?---I am not prepared to have it modified in that way. In my opinion that policy sets up a danger which is unnecessary condition in the forests. It is not a matter of degree in my opinion, but a matter of principle. If the thinnings can be burnt and disposed of at the time, well and good.
If they must be left, I consider that the danger is unnecessary and too great.

You would not have that under any circumstances?—Not unless you can tell me other circumstances which you have not stated so far, otherwise I will not agree.

MR. GOWANS: Like yourself, I have been somewhat impressed by the absence of any emphasis of fire protection in the Forests Act, and I think in the case of an authority dealing with forests, one naturally expected to find that. If you look at your own Act, even, you will find no reference to fire at all? Is that so?—The reference is solely to the protection from the supply itself.

Does that not apply with equal force to the Forests Act?—I would have no objection if an addition were made to the Board of Works Act requiring forest protection, which would mean telling us to do what we are already doing in many respects, although perhaps not as effectively as some might desire.

It is not so much a question of effectiveness, if, in fact, you are doing something. Apparently they are interpreting their Act in that way?—It may be that they are interpreting their Act quite generously. I have not tried to be critical of policy matters. I have confined myself to what I considered to be good or bad practices.

Correct me if I am wrong, but I think we found out early in the sittings of this Commission that the only regulation dealing with fire at all was Regulating 56, by-law 34?—I think that is correct.

And that is only a regulation which imposes penalties on persons who light fires in parts of the watershed areas. There is no section such as there is in the Forests Act, for the Board of Works to report to Parliament on the question of fire protection?—Not that I know of.

Do you think there would be any objection to such a section?—I cannot see any objection to that. The Board of Works has interpreted its responsibilities very rigorously in that
matter. If an authority happened to be careless regarding fires, it might be in the community interest that they should be so bound.

It might be desirable even in the interests of the Board that there should be some publicity to these measures you have outlined?---

---Yes.

Have you any reports forwarded to your Board which would enable us to assess the expenditure on fire precaution methods carried out, say, within the last 12 months?---I cannot tell you that offhand. Reports are being supplied. Do you mean officially published reports?

Yes?---I would not like to say what the wording of our annual reports is on this matter, probably terse reference would be made to forest fire protection.

You have no reports such as that submitted by the Forests Commission to Parliament containing the details of the number of chains of breaks constructed, etc.?---So far as I can recollect, no. Our areas have reached a static condition, or rather perhaps I should modify that. We cannot exactly say that we constructed 100 miles of fire breaks this year, because fire breaks have been constructed for many years, although we might say so many miles of roads were constructed for fire fighting purposes within recent years, etc. Details are set out in the estimates, but probably they are not published. The amount allowed for this work is from £7,000 to £10,000 a year.

You are not in a position to tell us how many fire breaks were reopened or cleaned during the year?---Kept maintained? Offhand I could not supply that information, but I can obtain it. At the moment I could only speculate.

I should like you to supply us with the figures for the last 12 months in the same detail as that furnished by the Forests Commission in their annual report to Parliament. These details are contained in the reports of the Forests Commission for the last 10 years, under the heading of "protective

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measures”. The details are given as to the number of chains of new firebreaks constructed, new tracks, firelines & etc. constructed, existing firebreaks re-opened and cleaned, and existing tracks, firelines &c., re-opened and cleaned? I shall obtain that information.

In some cases details of areas burnt are given, but you would not worry about that so much? I appreciate what you want, and I shall obtain it.

Can you also let us know the amount of money spent on fire protective measures within the last 12 months? I can give you the regular expenditure without difficulty. I will ask someone to go through the accounts, because the money spent on firefighting is not a regular account. It depends on the amount of firefighting done.

Would it be possible to distinguish between money spent on pre-suppression and suppression measures? Yes.

I think you told Mr. Barber that the policy of roaded has been put into operation rather more fully within the last 2 or 3 years? Since 1936.

Have all your areas been sufficiently roaded? That policy has been adopted in the Wallaby Creek area which we have always looked on as our worst fire risk area. We have made that an experimental area in a sense. That has not been extended. I am favourably disposed to that.

Would the decision rest on you? My function is to recommend in these matters. I recommend to the Water Supply authority which takes such action as it thinks fit. That has been the position for some years past? Since 1936.

The general policy of the Board in regard to milling the various areas under its control is initiated by the Board itself or is it something which has been recommended by you? It goes back a long way before my time. The policy of the Board is a policy going back to 1860 or 1870.

Does the same thing apply to the policy of keeping people out of the

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area concerned?---It is the same policy.
It is part of the same policy?---Yes.

Q. . . . . And the absence of burning off in these areas?---Yes. The question of burning off, although it appears an acute problem in these discussions, is viewed by the Board in a different light. Definitely it was the Board's policy not to burn off its areas or to use fire unnecessarily. The question of the occupation of catchment areas has received a great deal of attention. The practice of burning, and the forest policy in general, have not received the same amount of publicity, but it is proper to say that it is not the Board's policy to burn. That is not associated with the regulation regarding the lighting of fires. We break the regulation every time we burn back in front of a fire, but that is considered necessary.

Do you yourself feel that any modification of the Board's policy in this matter is necessary?---Burning firebreaks? That is not a modification of the policy but a growth of it. I am referring rather to the restrictions?---You mean, whether we should alter the burning policy? I am opposed to burning in general, and particularly burning forests in watersheds.

I appreciate that. I put it to you to say whether you think it is possible to modify that policy in any way in the light of these factors?---In what way?

In regard to manual burning?---In what way? What have you in mind? I do not like to answer that generally.

Very well. I suggest to you the possibility perhaps of more burning in certain areas which you would have to select for yourself?---If we really found it advantageous and if necessary, I have no doubt the matter would be considered.

I am not quite asking you that. I asked you whether it is at all desirable in the light of recent experiences, or indeed possible, to carry that out?---The recent experiences did not move me very much so far as that is concerned. I have considered the matter very carefully, and I can see nothing that we
can do to save us from the type of fire that occurred this year, if that fire risk is not dealt with in the initial stages and is not prevented, difficulty arises. That is the whole of the problem. The question must be dealt with in the remote parts where the difficulty arises, and whether that is done by fire control or by burning it does not make very much difference to my argument. I cannot see what we can do once that type of fire comes to our areas. Even if half or indeed all of it were burnt over, a top fire under these conditions would probably go through it again.

We heard of some cases where burning had been carried out and where the fire did not go through. I am distinguishing between the ordinary burning in autumn and spring burning?—I do not appreciate the difference between autumn and spring burning. The only clear justification I can give for autumn burning is that the logs will be put out during the ensuing winter. Is there no virtue from the point of view of the new growth?—Maybe, but I cannot see a lot in that.

Your view, at all event, whether important or not, is that you do not place much faith in the statement that there is a difference in the risk as between autumn and spring burning?—No. If you were able to take a census of all areas burnt in the autumn and in the spring, you would probably find little real difference in the behaviour of fires.

I suppose in all these statements you are relying on an accumulation of experience?—You have asked me to speculate to a certain extent.

I ask you now not to speculate; can you recollect in your own experience where you can say that a fire does not make any difference in these cases?—I am not prepared to say that offhand. There is one matter you did not touch upon in your evidence, and that is the suggestion put forward by Mr. Clark as to breaking
up, the areas?---I think that is an extension of the firebreak principles. I am very doubtful whether that kind of breaking up will help us to cope with fires such as the recent ones. It appears to me that in well-settled areas even, where the land has been cleared to some extent, fires will spread under certain conditions. Whether they spread through the air or over the grass or are spread through flying debris, the result may be the same, for it is extraordinary to know how the light timbered areas carry fire. In the case of ordinary fires, however, I would say most definitely yes.

Have you any idea as to the practicability of the suggestion?---I would have to make the same reservations that Mr. Clark made. The practicability depends on the actual proposals. You can say that certain things will be good in theory, but you must go on to the ground to see whether they can be applied in practice. I do not cavil at what Mr. Clark put up.

In regard to periodical burning, you have supported your own views by reference to an American publication. Do you consider that allowances should be made for differences in the nature of the timbers?---Yes. I tried to point out that matters of fundamental relationship should not be, and I do not think they are, affected by particular conditions, but of course in relation to some things I did point out that American conditions were not necessarily parallel, and I only gave the references as a kind of guide as to what had been done in other places.

Do you think it would be a fair guide if in fact conditions were entirely different in both places?---I feel fairly certain that the inflammability of our forests is greater, and if protection is necessary in the United States, it is more necessary here.

Was not the suggestion put to you rather in the nature of the damage to the timber?---When I read the quotation on light burning in relation to the United States practice, I said that this

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gave information about this problem being faced elsewhere.

Will you allow me to examine the book for a moment? I see one line here, which apparently seems to be the passage quoted by you this morning, in which it is stated that where continued production of forest crops is wanted, annual burning cannot be allowed?---Yes, I said that that was more or less applicable.

I see you have a note here "Not necessarily eucalyptus". Is that your note?---Yes, so that I would not fail to mention that at the time.

I must have missed that. At all events, that is your opinion about it?---Yes, it is not fair to read only that note. I intended to draw attention to the necessity for enlarging on that point. A good deal should be taken as being applicable. I did say that at the time, but merely as an indication of how the problem had been met in the United States.

(CONTINUED ON PAGE 1877.)
MR. GOWAN: In order to make it entirely fair I should read the next three paragraphs which I think you did not read but referred to. They read as follows: "Light burning has been practised chiefly in the forests of California and in the southern Mississippi pineries. In the mixed coniferous forests of California this method of burning is entirely out of place. The sentiment favourable to light burning which existed in the past has now been overcome and the method has fallen into disrepute.

In the South annual or periodic burning over of forest areas is still favoured by the settlement of the people. There are a variety of reasons for this which is not necessary to consider at this point. So long as the present sentiment remains unchanged, it may prove impracticable in the face of adverse climatic conditions to get along without burning over the forest at periodic intervals. These intervals should not be annual but should come two to four years apart. The burning should be carried out during the winter season on specially selected nights when the danger of a serious fire is reduced to a minimum. Such fires should be confined to stands of longleaf pine, which is a fire-resistant tree, but can be destroyed by fires occurring in territory where there have been no fires previously for several years and a 'deep rough' or accumulation of pine needles, grass, and other vegetation and dead branches has formed. Even although the longleaf pine is located on deep sands which represents the soil type least injured by continuous burning still the productive quality of the site is likely to be lowered by these periodic fires.

Periodic burning to reduce the chances of disastrous fires has been practised successfully for many years.
with the Chir Pine (Pinus longifolia) in India (Gorrie 1935) under conditions somewhat similar to those prevailing today in the longleaf pine type?—I did actually read that last paragraph.

I think you referred to the effect?—I read the last paragraph. At that time a question was asked about conditions in India and that may have some relation to it.

I remember it very well at the time?—I do not want to make any deception about, and those last paragraphs do say it is a matter of sentiment.

Do not misunderstand me; I am not suggesting you were deceiving us in any way. Can you give us any information on the question as to whether those Chir pines just referred to are more or less heat resistant - more resistant than our local trees?—I do not know the particular species. All I can go on is the word "pine", and that is not very helpful.

In general, may we take it pines are less fire resistant than eucalypts from the point of view of the effect of the timber?—I cannot answer the question that way; I think they are less inflammable.

What I want to ask you is whether they are less heat resistant?—From the point of view of damage to the timber I would not like to answer that. I think that as a whole a eucalypt forest and dead material is more inflammable.

I suppose, like Mr. Clarke, you would agree that if it became a question of using the burning in Victoria it will be a matter of great importance to consider the various factors of locality?—Yes.

And timber and so on?—Of course, if you were thinking of broadcast burning to any degree it is economically impracticable in the end. If you do desire to burn you have to come down to burning some areas; you cannot burn all of the forest.
I suppose you agree with this, too; the question of annual burning of any particular area hardly arises?--No, I should not think so; every three years, perhaps.

So that passage has to be read with that in mind?--Yes; that may be a respect in which conditions are not parallel; it is possible I had that in mind when I read it.

MR. BARBER: Arising out of the reference to Mr. Clarke's theory of breaking up large forest areas, assuming his suggestion is favourable, have you any views as to the size $A$ of those unit patches?--I think it would depend on a lot of factors.

In the West they fix their wide fire-break blocks at about a square mile. There is a mile by a mile, and it has been found--That is the area of the break?--No, that is the area between breaks. They have them on roughly a group system of long straight fire breaks at intervals of about a mile. It has been found suitable there. I have no doubt it would not be suitable in our very much rougher and steeper country, and I would not speculate. If I had the job of deciding it I would try it; I would examine the thing and go into it as carefully as it could be gone into theoretically and then take steps that would establish that.

As I understood it his idea was rather something different from that?--I think it was much bigger.

Bigger breaks?--Yes, not different in principle. It is different in the actual usage and development.

The essence of what he was getting at, as I understood him, was to break up the large forest areas completely in a way that could not be achieved by mere fire breaks of the ordinary type--a chain break. Do you think that is necessary or desirable and if so what do you think should be the area?--I will go to this extent and say I do not think it is desirable to break $mx$ it up into very small plots.
In other words, your area which I quoted yesterday as roughly 45,000 acres—would you regard those as being a reasonable size?—

I think they are quite practical areas but we have broken the Wallaby Creek area into three by-roads. They are not recognised fire breaks.

I am not talking of roads; I did not mean breaks in the ordinary sense of roads, I meant by the use of building blocks. The areas you control are reasonably sized?—Yes, I think so. I would not want them to be small or for fire control purposes, if they were smaller we would provide the necessary means, of course.

MR. GOWANS: Do you think when applying this policy of breaking up large areas, if it were applied, that some consideration might have been given to the fact that you have to have due regard, in the case of water reserves, to the fact they are water reserves and consequently it might be difficult to break those up, whereas the same difficulty may not exist to the same extent in the case of other forests?—The answer to that is obviously yes. You would have to have due regard to more than water reserves. One of the very important and difficult things you would have to have due regard to is the configuration of the country. While I listened to Mr. Clarke's evidence, what I had in my mind's eye was very sheer country falling away from the Baw Baw Tablelands. As I gathered from him his idea was to put a band of settlement from Gippsland up through all that country. The settlers would have to hang on.

I doubt whether Mr. Clarke would accept that?—That is a limitation which is definitely fixed by nature. Unless you find suitable valleys for that sort of procedure to run right up the tableland.

That was not precisely what I had in mind; what I rather put to you
was that taking the case of water reserves you would have to treat those as a separate thing altogether, if you were going to apply this principle, because of the fact that they are water reserves?——Yes.

And you may not be able to apply it at all in the case of watershed areas?——You would presumably endeavour to get water reserves inside the blocks, completely inside one water block. You are making me speculate on a theory very capably involved by someone else.

I am merely trying to get your views?——I will give them as far as I am able.

Does your answer mean that a water reserve must be a single unit; it cannot be broken up by settlement?——There are two types of water reserves, one is the water reserve which provides water for irrigation and there are some reserves that do not provide water for anything but irrigation. Some provide only for water power. The question of pollution does not enter into that at all. In the very big areas that are necessary for irrigation catchment it is the practice all over the world to have settlement, therefore, that kind of water reserve naturally could be broken up. If towns were supplied from such a catchment along the irrigation area those towns must purify their supply, and they do in fact purify the supply in most cases. However, where you are dealing with the supply to the City you are dealing with a different kind of water—a water must be kept clear. If the City purifies its supply, again the same principle does apply; but if the City is one like Melbourne which depends on no occupation in its catchments then you cannot break it up by settlement.

THE COMMISSIONER: I think it is fitting for me to thank you for the assistance you have given this Commission. You have
had a most gruelling time, as I know, travelling long
distances and acting as advocate, and I do feel you have
assisted us very much?---Thank you. I can only say I
am glad to be of assistance.

THE WITNESS WITHDREW.

MR. ANDREWARTHA: In regard to a question Mr. Gowans put to Mr. Kelso
as to why the Board did not have provisions in its Act with
regard to the prevention of fires and fire penalties an
amending Bill went through the State House of Parliament
sponsored by Mr. Bailry, which covered this matter and many
other things. Unfortunately Parliament was dissolved and
the Bill has never been resuscitated. That is why it is not
in the Board's Act, but we have been trying to get it for
some time.

MR. KELSO: Dr. Paton of the University is a fairly busy man; I have
spoken to him and he is able to be here at 10.30 in the morning.
That, of course, would suit the order of presentation of the
witnesses.

THE COMMISSIONER: You are calling him?---

MR. KELSO: I would not say that. He is coming here as an independent
witness. I asked him whether he was in a position to help
the Commission in relation to the botanical aspect. He is
the senior lecturer in botany at the University. His evidence
will not be very long. I spoke to him and he said he would
be available at 10.30 tomorrow if it suited you, or any
time which suited you better.

THE COMMISSIONER: The Commission will adjourn until 10.30 a.m.
tomorrow, March 24th.

ADJOURNED.

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