MR. GREGORY GOANS: Assisting the Commission.


MR. A. E. KELSO: On behalf of the Melbourne & Metropolitan Board of Works.


Leslie Herbert Gordon Samuell: Sworn and Examined.

MR. GOANS: What is your full name? Leslie Herbert Gordon Samuell.

I live at Beechworth. I am the Shire Engineer for the Shires of Beechworth and Wodonga.

In addition, you are a Vice-President of the Bush Fire Brigades Association, and President of the North Eastern Division of that Association? That is right. The North Eastern Division includes one hundred brigades.
I understand you desire to place before the Commission some evidence as to local problems that have been concerning the people, and the bush fires brigades in your Division, and also some views with regard to the Association or organisation of all bush fire brigades in general?—That is so.

Will you give that evidence in your own words?

THE COMMISSIONER: Mr. Gowans, would it not be of some value for us to know the respective standings and organisations of the country fire brigades and the bush fire brigades. I understand they are quite distinct.

MR. GOWANS: That is so.

THE COMMISSIONER: I do not suggest that necessarily this witness should give that evidence, but we could get it.


THE COMMISSIONER: That would be sufficient for my purpose.

MR. GOWANS: I shall direct Your Honor's attention to that later.

THE COMMISSIONER: That can be done in private.

THE WITNESS: Even in the Argus, a fortnight ago, on the front page of the Weekend Magazine, there appeared a photograph of fire fighters at a demonstration at Maryborough. That photograph bore a statement that the men who were giving that demonstration at Maryborough had been fire fighting throughout the country during the months of November, December and January, protecting lives and the forests. That is all wrong. It is a different organisation that was at Maryborough. There are hundreds of towns in Victoria that receive no assistance whatever from the Country Fire Brigades Board. They operate only where there is a town water supply, such as at Warrandyte, Ferntree Gully, and several towns in that area. At Moyhu, Whitfield, Avenel and other towns in the north east there was no assistance of any kind received from the Country Fire Brigades Board.
Board the whole protection being given by the Bush Fire Brigades organisation.

Will you proceed with your evidence?—I do not desire to cover the ground that has already been amply covered by Mr. Swindon, the President of our organisation, but, as an engineer and as one who is very interested in the north eastern part of the State, I say that we have experienced two of the driest years on record. Despite that fact, we consider that the losses from bush fires in the settled areas and the areas covered by our organisation were comparatively light. I think that point alone proves the value of our organisation, not only for its preventive and educational work, but also for its co-operation with other Departments. By the way, the other Departments are all represented on and are invited to attend our conference. With their co-operation and with the effective control of our men and equipment, with prompt attention and attendance at fires, hundreds of small fires in forest areas throughout the State have this year been effectively put out. In some cases they have been extinguished within a few minutes, in that way preventing the possibility of those fires spreading and reaching great dimensions. The fires that did occur in grazing areas were either adjacent to or were actually joining on to Crown lands. The extent of those fires was due to the fact that, in those localities, there were no means of fighting the fires readily available. We stressed the point all over Victoria where we have our four hundred brigades; and we put out hundreds of fires that would have reached serious dimensions but for the prompt attention of our members, who had the advantage of being equipped with valuable equipment, valued in all at about £25,000, contributed by the landholders. The value of the work performed by our organisations was enormous. We had men at Warrandyte ten days after the fire, and they were still
operating with their knapsack pumps. It would be difficult to estimate the value of those thousands of men who were engaged throughout the State, but I place the value of our men to the State at approximately £30,000.

THE COMMISSIONER: How do you value the men?—At the rate of 1/- an hour, or 10/- a day. We say that our organisation has proved its value. It has grown from the one hundred and thirty brigades that were originally formed at the time that the Hon. W. J. Becket convened the conference in the Melbourne Town Hall for the purpose, to four hundred brigades. I shall deal with two very important aspects as they present themselves to me. The first and second points that I have considered have been amply dealt with, but the third and fourth points are vital aspects. I think that there should be a national fire protection organisation in this State. With that end in view, I suggest the formation of a Board along the lines suggested by the president of our organisation, Mr. Swindon. That Board would comprise three representatives of the Bush Fire Brigade, who would provide the men, three representatives from the municipalities, who would help in the financing of the organisation, and three representatives of the Government. The Government would provide finance, and, in my opinion, its appointees should be representative of the forests, water supply and lands interests. That would be an ideal Board to control the fire fighting organisation in this State. The Board or association would also take over the work of the existing Fire Brigades Committee. That is a committee that was appointed by the Government, and the members representative of the brigades are elected each year. Personally, I represent the north eastern and eastern parts of the States, which areas take in the greater part of the fire-menaced section of the State. That committee meets five or six times a year, and seven or eight men, whose services are more valuable than to sit around a table and register a few brigades, are called on to do this work.

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To a great extent is a waste of public funds. It has to be done, but there is no necessity for seven or eight men to meet to register captains, lieutenants and brigades after receipt of a report from the local police or municipal authorities in the various districts.

MR. GOWANS: Is that the sole function of the Committee?—That is so. That work would be taken over by the Board that I suggest. I should then appoint a Chief Officer, a Deputy Chief Officer, and other staff, if necessary. At this stage, we consider the total cost would not exceed £3,000 to £5,000. That would cover the cost of the Board, and we do not want it to be suggested that we advocate the creation of another State Board that will cost the taxpayer a lot of money.

How much from that estimated cost would be taken up in the salary of a Chief Officer?—We worked it out at approximately £200 per annum for salary and travelling expenses. The Chief Officer would have an assistant to perform office duties, and so on. His duty would be to visit the Crown lands regularly and all grazing areas, say, during the spring, and advise on what measures are necessary. He would also suggest the date for the Proclamation in various areas, in zoned areas, in accordance with what he considered to be best, taking into consideration seasonal conditions. He would be an experienced officer, who would know his job. I venture to suggest that almost any experienced person could have predicted in November last that we were going to experience a very dry year. At the annual conference of our Association at Mansfield, we predicted it, and urged all members of our organisation to get their equipment in order. We felt that it was coming, and we were right. In nine cases out of ten, such conditions could be predicted.

Assuming that is so, what steps would your organisation have taken, if it had the power to do it, to try and remedy the position?—I shall deal with that aspect later, and perhaps it would be
better if I dealt with it as I came to it. The Chief Officer would regularly inspect protection works, such as dug-outs, clearings and water supply. When I refer to water supply, I do so with the knowledge that Sir Herbert Gepp said that water is not effective. We cross swords with Sir Herbert Gepp on that point, and say that water is most effective. I suppose Your Honor has seen the working of the knapsack pump, and probably you are aware of the value of that equipment.

THE COMMISSIONER: I do not think Sir Herbert Gepp said that **water** is not effective. What he said was that some other liquid was more effective. He drew a comparison between the value of another liquid and water, and what he said was not to the detriment of water?---Water supply is essential, and knapsack pumps are useless in those areas without an effective water supply being available. I have visited the devastated areas around Macedon and there saw the very fine tanks that were provided by Mr. Cameron. Those tanks are invaluable for fire fighting purposes. Those who have seen them appreciate the value of the tanks, not only for the watering of shrubs around the cross on Mount Macedon, but also for the value of a water supply in the case of fire. The tanks need only have a capacity of 2,000 gallons, and, with the provision of 100 knapsack pumps, it would be possible to do a wonderful job with that water supply available. The Chief Officer would be required to report on and take steps to black out all uncontrolled fires. That would be one of his main jobs. At the annual conference at Mansfield last year, one delegate said that there was a case in which a fire had been burning for some weeks, and he wanted to know whose job it was to put it out. The landowners in the vicinity saw that the fire did not come down to their clearings, but nobody else worried about that fire. I approached the Forests Commission about it and I was told that in future, if such outbreaks were reported to the Commission, it would
take steps to bring that fire under control and put it out. We say it should be blacked out. We had fires in the north east part of the State that were burning for weeks and months. Kiewa was menaced for weeks at a time. If those fires had been controlled and put out at the latest by November, a good deal of trouble would have been avoided.

MR. GOWANS: Where would those fires be burning, on Crown lands or in State forests?—Mainly on Crown lands. In this connection, I have this on the authority of an officer attached to the Sustenance Branch, that last year there were 1,000 men in one part of the city alone who had been on sustenance relief, not work for sustenance, and they had not worked for twelve months. If that thousand men from one part of the city alone could be placed under the control of an expert forestry officer to construct fire breaks or doing other work of that description under proper control, they would be performing a useful service. They could be employed under control on cutting breaks, burning breaks, burning the forest floor or controlling forest floor fires. In the mountain ash country, wide breaks are preferable. I know that from experience as an engineer in the Upper Harra district, where I constructed quite a number of tramway tracks, including the steam tramway from Big Pat's Creek. Those men could be employed for a period of six or eight weeks, possibly about the middle of March to the middle of May, or to the end of May, according to seasonal conditions. Possibly this year, the burning of breaks would not be effective in autumn because of what I might term the unseasonal rains. We have had 14 inches of rain recently, which is unusual. The men could be employed in squads of fifty, in either the spring or the autumn, in burning breaks and as doing other effective protective works. They would also be trained in fire fighting work and would be available to black out any small fires that occurred in the forests or Crown lands. In addition,
they would be available for immediate transport to the scene of any sudden outbreak of fire.

THE COMMISSIONER: You would have them formed into a permanent force?—

I think something of that kind could be done, but not necessarily a permanent force. They would be what you might call a standing army of forest fire fighters, who could be called on in emergency. It has been suggested that the militia could do it.

You are suggesting that relief workers should be used; would you make it a sort of conscription?—No.

After their period of training, you would call on them for this work, and would they be obliged by law to come when called on?—

No, they would be available during a period of eight or ten weeks, and it would be part of their duty to fight fires as part of their employment.

Would that class of man result in the possibility of casualties being high in certain circumstances?—No, not if effective breaks were cut, and the whole area was carefully mapped out, with effective equipment and dug-outs provided.

Is that a very onerous sort of work?—No, it is not. As a matter of fact, it is much easier to carry out preventive work than to fight fires. When fighting fires, a man does six times as much work as he would normally do. Many men break down as a result of fire fighting, because they keep on fighting until they are absolutely exhausted. It is one of the worst things I know of.

With that scheme that you suggest, getting relief workers for the purpose, you would have to rely on the batch of relief workers on hand when the trouble started?—That is so.

If it was the first day of training, that class of man would not be of much use, and would be a greater embarrassment than help, would he not?—In the autumn, they would go out for six or eight weeks and would be trained in fire fighting.
work. They would be burning breaks, and I should say that that burning would be perfectly safe in the autumn. In the spring, they would come along when conditions were getting menacing, and would not wait until the whole of the country was dried up. They would be getting further training and would be available for use in that direction.

That rests on the assumption that the relief workers would be willing to learn these things?—I think they would. We have had hundreds of casual fire fighters working for us, and they have turned out to be some of our best men. When it comes to actual fire fighting, casual men are used, and that is why our insurance covers all men, whether he be a member of the brigade or a man carrying his blankets.

MR. GORMANS: There would be this difficulty encountered if you scheme were adopted: it would not follow that the same men who had been available in the previous autumn?—The next year, you could take another thousand men and train them. I understand that during the recent fires wharf labourers volunteered their services. What is the use of taking men out into the country when they do not know the country?

Do you suggest that there is a permanent unemployed populace which would be the same from year to year?—Not necessarily.

Ultimately you would get all these men with a certain amount of forestry experience, and, as citizens, they would realise the value of the forests to the State, which would be all to the good. That would provide not only suitable employment for the relief workers, but it would also provide the State with a semi-trained army of fire fighters. There again, they are not actually employed, but they are volunteers. If they are elected from different centres, they would have a greater appreciation of the value of our forests, and would understand the need for the protection of the forests. Those men receive approximately £2 a week. The extra cost of employing
each say, two parties for eight weeks/during the most valuable period of the year - they would not be sent out in the winter - would not exceed £30,000, and it would mean 1,000 men undertaking protective works. I can also give the assurance that they would receive the maximum assistance, not only from our brigades but also from landowners. I attended a meeting on Tuesday night last, at which it was unanimously resolved that the landowners would co-operate in this essential work. They would go out with equipment and men and help to burn breaks and patrol fires. That co-operation would supply the Government not only with men and equipment, but it would also bring about a very desirable measure of co-operation in actual fire fighting. It would enable our men to get an idea of the geographical side of the country. They would know where they were going, what they were doing, and where they would be located. It would also improve relations between the landowners and the Forests Commission. Today those relations are not as they should be.

Why?—I think mainly because of the policy of the Commission of allowing an accumulation of forest cover which, of course, is the ideal, as I grant, for water supply. As an engineer, I realise the value of that policy, but, at the same time, if that cover is going to accumulate for six or eight years, or even eight to ten year periods, and then have a wholesale burn, the damage will be ten times as great. The general opinion is that you will get that. The other day, on one of the areas that has been covered by fire, there was a rainfall of three or four inches. That washed away tens of thousands of tons of soil into the Kiewa River, and today the water in the river is as black as your hat.

You belong to the school that thinks it necessary, in order to avoid these comparatively big fires, to run the risk of a certain amount of erosion and a certain amount of injury to the
timber?---No, I would not burn in the gullies, and I would keep out of the gullies. I would confer with the committee to be appointed. That committee would advise, just as advice has been given to landowners to plough across and not down a slope. The committee would probably advise to burn where it would do no harm. With effective control, the provision of suitable breaks and plenty of equipment available, it may be possible for the Forests Commission to still adopt that ideal.

THE COMMISSIONER: Assuming it is correct to say that a gully very often acts as a funnel up which a fire advances with great force and pace, what would you do to prevent the spread of fire if you did not burn in the gullies?---It would depend on where your breaks were. There again, I suggest the breaks should not be across the slopes but on the foothills, on the tops of the hills. If you have a break on the northerly aspect, with a north wind you have no chance of stopping it from going up, but you can stop it from going down. I would concentrate on the northerly aspect, and I think some measures should be taken to protect the gullies. I would not be in favour of burning them. If the other parts were protected, you would have very little trouble with the gullies.

If the gullies were burnt with a comparatively light fire, would not that be better than having them absolutely gutted ultimately, as they have been in the recent fires? You will have erosion to an extent beyond your imagination almost, from past experience?---If possible, I should say a very light burning, perhaps once in a few years, would be all right, but if the other parts were burnt, the gullies would be protected. Those are all matters that require very careful consideration.

MR. GOWANS: Have you considered the possible effect on timber of the policy of maximising controlled burning?---In the mountain ash country, I have suggested it might be or should be advisable to provide effective breaks. I would not suggest that against the
advice of the Forests Commission, but, in areas where it can be proved that burning is injurious to the timber, it would be necessary to burn wide breaks, even if it amounted to the loss of a mile strip of forest. It is better to sacrifice one mile than to lose fifty miles of valuable country. If it were necessary, a permanent break from one mile to two miles wide could be provided, and it should be burnt every two or three years.

Obviously it would be desirable to have some sort of liaison between the authority controlling the burning and the Forests Commission, which is controlling the timber. How do you think that could be worked out?—I would say controlled burning should be left to the Forests Commission in co-operation with the Chief Officer to whom I have previously referred. Co-operation with the Chief Officer would ensure the co-operation of landowners and others.

As I see the difficulty, it is this: in the past, the policy of the Forests Commission, putting it broadly and largely, has been to avoid burning. Assuming that is so, how do you think you could bring about a change of that policy by legislation setting up the organisation such as you suggest, unless that organisation has some kind of binding force to enable it to burn in various areas in spite of the Forests Commission?

(Continued on Page 1615).
THE COMMISSIONER: In other words, how can you change men's minds and outlook by legislation?---It is a case of educating the Forests Commission to that viewpoint.

Who is going to educate the Commission, the men who wish to conserve every stick of timber?---No, I should say the fire protection service. It would be their job to co-operate on the questions of fire protection, erosion and other matters.

THE COMMISSIONER: You would not get much independence of action from the fire prevention section of the Forests Commission if the Forests Commission itself did not approve of the policy. You cannot fight your boss?---That is so. I do not know that I would suggest that legislation be brought in.

MR. GOWANS: Short of that, how are you going to bring about a change of face?

THE COMMISSIONER: I wish to make it clear, Mr. Barber, that I am using this for purposes of assumption and argument only.

MR. BARBER: I appreciate that, sir.

THE WITNESS: Take the case of the Country Fire Brigades; they have power to burn and blow down houses in streets. We are not asking for that.

What are you asking for?---We do not suggest that we are in a position to dictate to the Forests Commission.

THE COMMISSIONER: Why do you not suggest that; you are representing the fire fighting people of the State?---We suggest a Board with three representatives of the bush fire brigades, three representatives of municipalities, and three representatives from Government Departments, the Forestry Land and Water Supply Departments. If that Board were established, it should be able to control fire fighting and prevention.

Clear your mind of the operations of the Forests Commission for a moment; say, in your district you are a man with a large and valuable forest property and for reasons of your own you refuse to burn off, or will burn only under extreme pressure. Would it be your policy to say that because this is a valuable property and the owner does not want to
burn off, he should be left alone?—Do you mean when a fire is burning or as a preventive means?

As a preventive means?—In that case there should be power to burn, or someone should be given power to burn a certain width around his property.

And if he had a very inflammable property?—That would be all the more reason why it should be attended to. It has been suggested by some farmers that they should sow superphosphate around their boundaries.

That is so. Coming down to principles, what is the difference in principle, in this connection, between a public department and a private owner?—Except that the Forests Commission has its own experts.

Experts at what?—At fire fighting— or they should be.

That is the point. Are you going to give away a whole lot of concessions before you know the effects? I want you to understand that this is merely for the purpose of argument, but this is a good way of getting to the bottom of things at times?—You will realise that we are a voluntary organisation, and we wish to remain so. I think possibly it would be out of Court for us to suggest that we should dictate to the Forests Commission. Again I say, leave it to the Board which should have power to take measures in private properties such as you suggest, as well as in Crown property.

MR. GOWANS: This Board you suggest is to take the place of the bush fire brigades' committee?—I would not say exactly take the place of it.

There would still be the bush fire brigades' Board?—Yes.

Do you suggest that the bush fire brigades' organisation—or whatever you call it—should have power to burn in forest areas if necessary?—No. In that case, I would not call it a bush fire brigades' Board, but a national fire organisation.

MR. BARBER: A rose by any other name?

THE COMMISSIONER: Which means erosion by any other name!
THE WITNESS: It should be a national organisation.

MR. GOWANS: The Forests Commission has certain duties to perform in preserving the timber of the State, and to that extent it should have some control in this matter?---It would be represented on the Board.

That would be the best way, in your opinion, of covering the position?---That body would be an expert Board co-operating with the C.S.I.R. and other appropriate authorities.

Would not the policy of the Board be dictated by the number of representatives the Forests Commission had on it?---I should say no.

Suppose the Forests Commission had a majority on the Board, do you not think that the policy of the Board in such case might be the policy of the Forests Commission?---I suppose you want me to say, yes, to that, and then to admit that if the bush fire brigades had a majority, the same thing would apply there.

That being so, which organisation do you think should have a majority on the Board?---I do not think there should be any necessity to go into that at all. Our relations should be such that there would be the maximum measure of co-operation. If you like, you could give the Minister a final power of veto.

THE COMMISSIONER: Which Minister? We will not go into the personal side of the question, but what portfolio would you assign that veto to?---It so happens one Minister controls lands and forests at the present time.

Assuming that the portfolio were separated; they happen to be in the hands of one Minister at the present time?---I suggest a committee of Cabinet Ministers representative of water supply, local government and forests.

THE COMMISSIONER: You seem to have a marvellous faith in committees and boards; admittedly you must get your people together on different committees and boards to secure co-operation,
but you must look closely into the constitution of any such board or committee. Is it not often impossible to get real co-operation where more than two conflicting interests are represented on a Board of this nature. All the people you have mentioned are, as far as I can see, representative of conflicting interests on this matter of fire prevention and fire fighting. Why should they agree just because they happen to be represented on a board?—I would not say that they are conflicting interests at all.

I think there is conflict. I want to know how you will set aside that conflict of interests in order to enable the Board to work in a spirit of harmony?—Speaking for the people of the north-eastern district, I would not say that there is a spirit of conflict.

MR. GOWANS: I thought, in your opening remarks, you said that up in your district you found a spirit of conflict between the local people, the fire brigades' representatives generally, and the Forests Commission, particularly on this question of policy?—It is not so much conflict as non-co-operation. The brigades will not co-operate to the same extent because they do not approve of the present policy.

Many people in Victoria think that the policy of the Forests Commission in the past, whether rightly or wrongly, has been one which has to some extent led to this bush fire menace. Is that not the position?—It might have contributed to the extent of the fires.

THE COMMISSIONER: Do many people think that to be so?—Never mind what the facts are?—No, I would not say that.

A number of people in your district think that the Forests Commission is to be held responsible to a great extent for the intensity of the recent fires?—Speaking of our district, I would say that that does not apply except in a few instances.

THE COMMISSIONER (To Mr. Barber): Have you a different policy operating in that district, Mr. Barber?

MR. BARBER: No sir, it is the same policy, but the people
apparently appreciate what is done for them there.

MR. GOWANS (To Witness): I thought you asserted, in reply to a question, that there was an apparent absence of sympathy between the local people and the Forests Commission?—I would not say that there was an absence of sympathy. There may be conflict of interests.

THE COMMISSIONER: Are there no graziers in that area?—Yes.
Are the people not terrified of the fire risks in the reserves there?—To some extent they are.
Is there not conflict there?—Not necessarily, because the Forests Commission, when applied to, has taken certain steps to deal with these conditions. I do not think the Commission has done all that it could have done, but I would not say that there is an absence of sympathy. I would say that we are now prepared to co-operate.

MR. GOWANS: You agree that there is a difference in the points of view?—That is so.
And I think you had something to say about an absence of co-operation?—Not an absence of co-operation that amounts to conflict; there is not the maximum co-operation essential for effective fire fightings.

Between the Forests Commission and what class of people is there a difference in the points of view?—Mainly the settlers on the fringes of the Crown land areas and because of the accumulation of the forest growth on Forest Commission areas, sometimes up to the boundary fences.

Between the Commission and what class of people is there this want of co-operation, not complete absence of co-operation but absence of efficient co-operation?—Between the people and the Commission?
Yes?—Well, they feel that the accumulation of growth on the forest floor is a menace. A settler rang me the other day wanting to know whether the Forests Commission would allow him something for the repair of the his boundary fence. He said that he saved his subdivisional fence in a grass fire, but
due to an accumulation of debris most of his boundary fence was burnt.

THE COMMISSIONER: There would be a certain measure of lack of sympathy between that man and the Forests Commission?---That is so. There are thousands of these people?---Yes, that may be, individually. Was that man only rather annoyed or did he think that the Forests Commission was Public Enemy No.1?---No, if the Commission said tomorrow, "We will allow you for one mile of the area burnt", you would have the maximum co-operation tomorrow. Our people realise the value of forests. They are forest conscious.

MR. GOWANS: Getting back to the question of the constitution of the proposed fire prevention board, or national organisation for the prevention of fire, do you think that if the Lands Department had the major representation on such an organisation, it might be able to hold the balance evenly between the various conflicting points of view?---I would say, no. I would not agree.

Why? What is the difficulty about the Lands Department?---I would not give any department control, otherwise you may lose the value of the voluntary bush fire organisation, and if that organisation goes in any conflict, you will never replace it. There is no force of men who will take the place of such an organisation. The worst feature of the whole thing is that we have asked for these powers. We have asked for fines to be increased against graziers, and some contributions towards our funds and some contribution towards the accident fund, because we protect every man working on fires. We have asked for years for some assistance, and yet we have not received one penny from the Government, and these are the things our people object to.

Do not misunderstand me. I am not suggesting that the bush fire fighting organisation should be sub-ordinated to any other department or State or municipal organisation, but I should
like to get some indication as to how you are going to constitute that Board or fire control organisation so that the State Departments or other classes of the community concerned do not get a majority. How are you going to maintain a balance?—I have suggested a constitution of nine representatives.

MR. BARBER: Under that proposal, ours would be a voice crying in the wilderness.

THE COMMISSIONER: If we could cut out the wilderness, it would not be so bad.

MR. GOVANS (To witness): Let us now consider the water conservation areas. Do you consider that the body referred to should have power to burn in the water conservation areas where you have a totally different problem and one which involves serious consideration as to whether there should be burning at all?—If burning were the only effective measure of fire prevention and the whole country side were endangered by fire, I would say, yes. Even at the risk of erosion and silting of water supply?—You are suggesting burning the whole of the catchment area; I say only certain blocks should be burnt to certain boundaries.

I am putting it to you because certain representatives of water conservation bodies raised the point that it would be undesirable to have any burning at all in water catchment areas?—I should say that that view refers to indiscriminate burning or uncontrollable burning by graziers.

I suggest that they are advocating nothing of the kind?—Well, during one of the worst fires on January 13th and 14th there was a haul cast in one area for instance, when the bridge over the Murray was burnt and one of the settlers said to me that the worst feature about the fire was that he had done certain things to prevent erosion, and this good work was destroyed. Mr. Mitchell, who is now in Canada studying these matters, has done a great deal in educating farmers against the evils of erosion, and many of these
farmers have already done valuable work in trying to prevent erosion in the gullies. This farmer said to me, "For heaven's sake, see that we get some control." Despite the work done by these farmers to prevent erosion, the fact remains that the fire has swept away much of the good effects of their efforts. This is largely due to the accumulation of forest growth.

Do you not think there may be another point of view, the question of preserving the purity of the water?---The Murray today is black and undrinkable, and that is due to uncontrolled fires. Suppose you have controlled burning, do you think that might be effective?---No. Controlled burning would be all right in the autumn, when the rains would be light and that would be of some protection before the heavy spring rains.

I think I had better leave you to convince Mr. Kelso on these matters?---If it is possible to keep your catchment areas in virgin state, and retain the leafmould with its absorptive capacity, then, perhaps, we could keep the fires out, but in some cases fire is the only means of controlling the spread—by breaks and controlled fires.

You think that in some of these catchment areas, it may be necessary to burn off?---I think it would be, and only in such areas should this be allowed. The chief officer suggested earlier should be consulted regarding the construction of dugouts and he should operate in consultation with inspectors of factories forest officers and water supply officers. He should see that there is adequate provision of water for fire fighting purposes and provision for breaks extinguishers, etc.

Areas should be cleared with the assistance of the Country Roads Board, which would probably co-operate in having camping areas set aside, and these camping areas could, to some extent, be made in such a way that they would be part of safety measures. They could be used to provide for the
safety of the public in the case of fire. Finally, to get away from the point to some extent, I would suggest that this volunteer organisation of 20,000 men might be called upon in a national emergency in the event of any aerial attack with incendiary bombs which, in the summer season, would create untold loss to crops and seriously jeopardise our means of defence. I think in this respect the organisation would be of great value.

MR. GOWANS: That is pure H.G. Wells!

THE COMMISSIONER: Why "pure"? I think we might confine our discussion to bush fires, their causes and prevention?—I consider that an organisation on the lines suggested would be of advantage. In regard to municipal responsibility, personally and on behalf of the 20 shires in our north eastern area, it is considered that just as the local government authorities in Great Britain are the distributing authorities and controllers of air-raid shelters in co-operation with the defence authorities, it is considered that the municipal bodies in Victoria could and should assist in the fire protection service proposed. Although individual brigades do magnificent work, there is urgent need when fires extend to various districts, for some key organisation to ensure most effective results from the men and equipment employed. For instance, at Wangaratta I have suggested the formation of an emergency council with a supply emergency and equipment covering a radius of 50 miles. At Wangaratta, the formation of the emergency council is to be proceeded with and the mayor and presidents of two or three shires have already raised funds for the supply of emergency equipment. That is something that we can do if we have the proper co-ordination. At present each brigade does its job, and in areas where fires are extensive, several brigades may be acting as individual organisations, and in such cases co-ordination would be more effective. We hope that that will be brought
about by the formation of a council on the lines discussed at Wangaratta.

THE COMMISSIONER: Mr. Swindon informed us that you received little or no financial support from subsidies, and that you relied on donations. Am I over-stating the position, Mr. Swindon?

MR. SWINDON: No, Your Honor. I do not think you are, except that I mentioned that the Fire Underwriters’ Association contributes £100 a year.

THE WITNESS: The municipal authorities contribute about £80 per year. Under the proposed scheme they would be compelled to pay on the basis of the valuation of the municipality.

MR. GOVANS: The theory is that the municipal authority should contribute half the estimated cost for the year?---No, the first proposal suggested one-third with the Fire Underwriters’ Association contributing one-third. That is a matter of Government policy.

In expressing these views as to the desirability of forming a fire control organisation, with power to burn off if necessary in Forest Commission areas and even in water catchment areas controlled by Water Supply authorities, are you expressing your own personal views, or are you expressing the view of any substantial bodies in your district?---I would say that this is the view held by the whole of the brigades in the north east. I could have that verified. On Saturday a conference of brigades will take place. Resolutions have been carried, and I am sure that on Saturday similar resolutions will be passed.

MR. GOVANS: (To the Commissioner): Perhaps Your Honor would like to ask the witness to place some of these proposals before the brigades. It might be of some assistance to know whether the views of the witness are in fact supported by the organisations concerned.

THE COMMISSIONER (To the Witness): I think you had perhaps better test the feelings of your brigades on these matters, that
is, if you do not feel confident to speak on that at the moment. It might be as well to test the feelings of those concerned; do you feel inclined to do that?---I have before me a summary of opinions expressed at a meeting of landholders in the Happy Valley area. The meeting was convened at the suggestion of Detective Miller of Benalla. I have been asked to submit these opinions to the Commission. You will find that these views are similar to those expressed by me, although they do not refer specifically to breaks.

(Statement handed to Mr. Gowans).

MR. GOWANS: From a cursory perusal of the statement, Your Honor, I think it is largely on the same lines as that put forward by Mr. Swindon. The statement does not deal with this particular matter under discussion, so far as I can see.

THE COMMISSIONER: (To witness) Will you put in the document?---Yes.

MR. GOWANS: I would ask that this document be included in the transcript of evidence, and that it be not merely treated as an exhibit. On a previous occasion a similar request was made by me and this was not done.

THE COMMISSIONER: Whenever you have asked for this to be done, I have always directed the shorthand writer to include the document in the transcript of evidence.

MR. GOWANS: On one occasion I asked that a statement of the duties of a forest officer, which was put in by Mr. Elsey of Willow Grove, should be set out in the transcript of evidence, and I find that it is not set out there as requested.

THE COMMISSIONER: Does your request appear in the transcript?

MR. GOWANS: I think it is a matter of misunderstanding. I should like, for convenience, to have the whole statement included in the transcript, as though the witness had actually read it.

THE COMMISSIONER: Very well. The document put in is headed "Cause and Prevention of Bush Fires". I direct that it be included as part of the transcript of evidence and not merely recorded as an exhibit.
Summary of opinions expressed, under various headings, at a meeting of landholders in the Happy Valley area. This meeting was convened by Cr. J. Jones at the suggestion of Detective Miller of Benalla. The attendance was small but representative. These notes include all suggestions made and opinions expressed at the meeting. There was a similar resolution at Corryong.

Causes -

The policy of the Forests Commission, described by some landholders as criminal negligence, in allowing leaf-mould and debris to accumulate for years on forest floors is a very great contributing factor as it tremendously increases fire risk.

Late burning off of blackberry and noxious weeds by unknown landholders.

Roots of stumps set alight during clearing operations may smoulder unsuspected for months and break out on the surface during a danger period.

Lightning, broken bottles acting as burning glasses, careless disposal of cigarette butts and used matches were all instanced as mechanical causes by the personal experience of individuals present.

Careless use of phosphorus in poison baits was also instanced as having caused fires.

No person present at the meeting knew of a case where cattlemen holding leases in the district had deliberately fired the forest during danger periods. It was pointed out that such leaseholders would in most cases be the first to suffer loss.

Apart from the actual causes of fires, several factors were listed as contributing greatly towards

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fire dangers. These were —

Lack of co-operation between the Forests Commission and landholders in dangerous areas. An instance of this occurred at the eastern end of this valley in November of last year. A slow fire had been burning in the forest for some weeks. The local forestry officer was aware of its presence. As it was not dangerous just at that time, and was out of his area in any case, he could do nothing. But if a lead had been given by the Forests Commission at the right time, this fire could have been extinguished easily by the local residents. In this district, few, if any, breaks were burned in the Crown Land areas or in the pine plantation before the recent big fires.

There are few, if any, fire breaks at present in the indigenous forests in this district, and such as are on the pine plantations are too narrow to be adequate.

Remedies suggested for Prevention:—

The provision of fire breaks at least 4 to 5 chains wide on all forest frontages. These breaks to be kept clean and burned every spring. The forest to be burnt in autumn.

Stricter supervision of all forest areas. More men to be employed to make certain that all districts are policed frequently and thoroughly.

Bush Fire Brigades to be organised systematically and thoroughly and to be given wider powers to commandeer assistance, paid if necessary, of men and material in times of grave danger. That every assistance be given to these brigades by the Government to provide and distribute suitable equipment.

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That the penalties for careless use of fire and for deliberate fire-lighting be made more severe.

That restrictions on the use of fire during the danger periods apply to the Railways and other government departments.

That after November 10 of each year, steps be taken to extinguish any little fires that may be burning in any forest area, irrespective of immediate danger. Any fire at all on forest lands to be systematically stamped out during the danger period. At present this is not done.

(Continued on Page 1625.)
THE COMMISSIONER: Would you undertake to put definitely to your organisation the question whether they are in favour of the fire control body you have advocated having power to take fire prevention measures on private land, forest areas and water catchment areas under the control of water authorities?---Yes, I will undertake that. Referring to the report which has been submitted, I want to bring under notice a resolution carried by the Corowa landowners to the same effect. They took serious objection to the fire menace on Crown land areas. Regarding soft wood plantations, we understand that insufficient money was available for the Commission to burn breaks in soft wood areas. Those areas are worth millions of pounds, and hundreds of thousands of pounds have been spent on them, yet insufficient funds were provided, I understand, to burn necessary breaks. That should be remedied somehow by someone. I suggest it is covered by the proposition I put up. There are hundreds of men available, and some of them, who are working for me, are only too glad to get out into the country and to do something for the money they are receiving.

We were told by a witness the other day that there was a feeling around Bright that the soft wood forests formed a fire menace there. Is that your view?---I would not say that in themselves they form a fire menace, except that at Bright they are close to the town. The same thing applies at Macedon, where the pines were wiped out. There they are a menace to beauty spots. It has been suggested that the thinnings of the pines have been left, and that they caused greater heat and increased carbon monoxide, and thus extended the conflagration. Otherwise, I would not like to say that they are a direct menace, but, if properly controlled, I would say otherwise.

MR. BARBER: Where is this area of soft woods?---In the Ovens Valley.
The area near Bright was not burned?---Yes.

Mr. Carver is the secretary of the organisation?---He is secretary of
the committee and the organisation.

He is an employe of the Forests Commission?—Yes.

Part of his time is devoted to the work of the Forests Commission, and part of it to your work?—Yes.

In telling us of contributions by the fire underwriters and the municipal councils, you omitted any reference to the Forests Commission. In fact, the Commission spends on your organisation, apart from providing Mr. Carver's services, £225 for equipment?—Something under £250.

And it is handed to your organisation?—There is no donation to our organisation.

It is not handed to you in money, but in the form of equipment?—To brigades bordering on forest areas. I do not think I said that the contributions I referred to were the only contributions. I did not say that the Forests Commission did not contribute.

You said that the fire underwriters and the municipalities contributed?—I said the municipalities. I do not think I mentioned the fire underwriters.

Is it fair to sum up your evidence by saying that, on the great question of burning or not burning, you believe in some sort of strategic burning at important and necessary points as distinct from broadcast burning?—That is so.

I do not know that your policy and ours differ very much, except as to the particular places to burn. You told us about the Chief Fire Officer, who would control the danger areas and block out fires the moment they were observed. What sort of men will he employ for that purpose? You would not suggest that he would do it single handed?—If on Crown lands, I would suggest the Lands Department; on private property, the owner; in the forestry, the Forest Commission.

In the case of Crown lands, would necessitate the creation of a new body of men by the Lands Department?—I understand that the Forests Commission has control of the forests, and
that Commission could, at the request of the Lands Department, look after Crown lands.

What about private properties?---If a landowner had stumps burning, and they were a menace, he would be forced to black out the fire. In our district, we have had the example of forestry officers burning off before the expiration of the proclaimed period.

A forest officer can give permission for burning off in the proclaimed period.

THE COMMISSIONER: What is wrong with that. The Proclamation states that no one is allowed to light a fire in the period referred to except under stringent conditions?---I think it is wrong before the expiry of the time for the Commission to burn areas. I am referring to areas cleaned of gum and other unprofitable timber in preparation for the planting of soft woods.

One of the enabling parts of the Proclamation is that, with the permission of a forests officer, you can burn?---That is so.

Why should not the Forests Commission have the enjoyment of the law. Why should they not, in fact, grant permission to themselves?---We think it is not good policy from the point of view of the landowner. They do not inform the brigades or the landowners.

Would that be where they have refused permission to others to burn?---Not necessarily. The landowner perhaps has power to burn stubble, but he is not allowed in any circumstances to burn in forest country. He could not get a permit to burn in his own forest land.

The law says he may be permitted to burn; why should he not get permission?---I understand that, in forest areas, it is regarded as a menace.

MR. BARBER: You are putting it on the basis that he would not be given permission. You have mentioned instances of forest officers burning, but I put it to you that they were perfectly entitled to burn. Do you know that it is not the Forests Commission's policy to burn inside the proclaimed period?---
I hope so.

In effect we obey the Proclamation ourselves as a matter of policy?---

Not always.

The question I am putting is, is there anything in your information contrary to my contention that the Commission's policy is not to burn within the prohibited period? Is there anything that would lead you to suggest otherwise?---I would not say that it is the policy to burn in the prohibited period, but there have been one or two exceptions.

Your objection is a somewhat psychological one - that those who are the guardians of the law should not do what others are not permitted to do?---Possibly.

You spoke in your theory of strip or strategic burning about not burning in gullies. I take it that you would distinguish between the gullies in dry country, which make funnels for fire, and damp gullies in mountain areas. Were you referring to the latter gullies when you said you would not burn them?---I said that only where it was absolutely essential should burning take place in the gullies. The burning should only be done after consultation with the State Erosion Committee.

MR. SWINDON: You mentioned an amount given by the municipalities to the brigades. Was that not given for the accident fund only?---That is so.

An amount of £225 has been mentioned as provided by the Forests Commission for the bush fire brigades. Does that include fares and expenses of delegates, printing and equipment?---I understand there is £80 p.m. for equipment.

Do you consider that the present system of fixing one date of the Proclamation for the south and another date for the north satisfactory? Should the date be different for different areas?---I would not divide the State into too many areas. There should be a maximum of four zones.

Have you found the Forests Commission always sympathetic with the bush
fire brigades?—I hardly think that is a fair question.
You have taken part in deputations that have made requests to the
Government, and those requests have been turned down, have
they not?—We asked for a Board and were given a Fire Brigades
Registration Committee.

THE COMMISSIONER: Why did you say the question was not a fair
question?—I am speaking on behalf of the brigades, and I
have already stated that we do not get an adequate measure of
co-operation. I think the question was put rather bluntly,
and I would not like to make a sweeping statement like that.

Is the Forests Commission or the Minister of Forests in your mind?—
We have lost a number of good fire fighters in some of the
brigades, because the Government has not given us the assist-
ance we asked for. The Fire Brigades Committee was a small
part of our requests. The Government brought in a Bill
providing for three members representing the Forests Commission
and three representing the brigades. The Bill also said that
the Chairman should be a representative of the Government.
I could see trouble arising. It is hard enough to organise
the brigades. We objected, and the Government amended the
provision to read that the Chairman should be approved of by
the Minister. The Committee has existed for four years, and,
in every case, the Minister has appointed an officer of the
Government as Chairman. I have personally made protests,
but our Chairman has not even been asked to take the Chair.

Do you think that has been against the best interests of the brigades?—
I am sure of it. I could put ten men in the Box, captains
and others, to say so.

Did not the Association put forward a request to the Minister to give
£300 to the accident fund, and the brigades offered to put up
£1 for every 10/-?—Yes.

There has been no acceptance of that?—Not yet, but the Minister has
promised.

MR. KELSO: I gather that you agree that the burning of a water catchment
area involves some danger to the water efficiency?—From absorption or run-off?

Discolouration, erosion, siltation and loss of storage in the ground?—

I advocated the burning of breaks rather than wholesale destruction, which would cause discolouration and siltation.

I think something between the two is what is put to you. I think we can take common ground on the burning of breaks. Suppose you had the opportunity of burning one third or one half of a watershed area, would you agree that that would involve some damage to the water efficiency of the area?—I would agree, but I would object to one third or one half or any such proportion of a watershed being burned. I do not think that would be necessary.

You said that you would agree to some more extensive burning than the burning of fire breaks if you could not save the forests in any other way?—The breaks would be used for the purpose of burning back.

I am talking about pre-suppression—something done before an emergency.

You are saying now that the only thing is to burn breaks?—Effective breaks of one or two or up to five miles wide.

When you speak of a break five miles wide, I assume that you are thinking of the catchment areas in the north. I am going to put to you something about a different type of catchment. Consider the Board of Works catchment areas, which, unlike those existing in the north, are controlled by an authority which is a fire fighting authority and makes itself responsible for putting out fires. Is this burning the only recourse? Is it not a fact that there is an equally good recourse of keeping the fire out if the watershed is controlled by that kind of authority?—I agree, to an extent.

If you have, on the one hand, a definite danger to the water value of the area, and, on the other hand, a not realised danger of fire, and if, in fact, it is possible to prevent the danger of fire without introducing a danger to the water, do you
agree that that would be the best thing to do?—Surely.

If the Board of Works has suppressed all fires in its territories except one or two of the type that occurred in 1939, and if it were possible to devise means of protecting the catchments against that type of fire, that would be worth trying to save the very valuable water aspect? Would you agree so far?—If the protection can be afforded without burning breaks or creeping fires. That should be the last resort.

I am not discussing the small fires, of which there have been thousands, but the water catchments have been seriously damaged only twice, in 1926 and 1939. From your knowledge of the forests of the State, do you think that the first thing to try to do is to put out all fires?—I have said that.

Do you not think that is really the best solution, instead of extensive burning?—I would not say "instead of". It is the first thing.

If we have to have extensive burning, the last place to burn is the valuable watersheds?—I agree with that.

MR. GOWANS: May I take it that you entirely agree with the Board of Works policy in completely eliminating creeping fires from their areas?—I do not. I said in the first place "Black out every fire". Where the Board considers that further measures are necessary, breaks or creeping fires should be run through.

Would you wait until the fire has been actually started by lightning or other means before you burnt at all?—In a year such as this, yes.

Speaking generally?—In certain areas, it may not be considered necessary.

Would you wait until the fire had got into the area before you would sanction the burning of any part of a water catchment area?—Not necessarily.

In what circumstances would you consider it necessary to burn some part of the area?—If there was an extensive accumulation of forest growth and the seasonal conditions were such as occurred.
last year. If the Chief Officer suggested the additional precaution of creeping fires burned from a break across the centre of the catchment, I should say yes.

In those circumstances, you think there should be some kind of authority to sanction burning by controlled creeping fires?---Yes, and after consultation with the Department concerned.

Do you realise that in the water catchment areas it is necessary to have a certain amount of undergrowth to prevent the water running off the surface too rapidly?---I said before that the time arrives when the undergrowth becomes a menace. The Board says that it puts out all fires, but I was in the Yarra watershed for two or three years, and I know that fires occurred in the Upper Yarra area. They do not put all their fires out, and they could not do so.

That would not be in the Board of Works area, would it?---Yes. They did not have to pay rates on it for years.

Which Board of Works area was it?---On the Upper Yarra and part of the Black's Spur.

What date are you referring to in connection with the Upper Yarra?---1914.

Whereabouts in the Upper Yarra did a fire occur in 1914?---On the Ben Cairn side; the Black's Spur was on fire.

Which side of the Black's Spur?---Both sides were alight. Towards Fernshaw and Narbethong.

At that time, whereabouts was the fire?---It started, from memory, on the Narbethong side.

How far did it get into the Board of Works territory?---It went easterly and southerly.

How far was it in the Board's territory when you saw it?---It burned ten or twelve miles towards the Acheron.

That fire, which came from Narbethong, was fought by the Board's men, was it not?---I cannot say.

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MR. KELSO: You really do not know whether it was put out?—-It was not put out; it was too large at the time. It was put out subsequently. I went over some of the channels with Mr. Nolan. You realise fires must go into the catchments from outside. I think we agree well enough on that point. You apparently do not know where the fire was, but it was got out with the least possible delay?—-I agree with that.

Fires will go into the Board's catchments?—-Yes, and then it is the Board's responsibility to put them out.

It is a fact whatever the condition of those areas fires are always put out in them. There is evidence of that, and there will be more evidence about that. Why do you think it is necessary beforehand to take on the dangerous procedure of burning other than fire breaks. Of course, if you only mean the burning of fire breaks, say so, because I will not examine you further as the question of fire breaks is practically common ground, or is it a question of broadcast burning?—-I would not say it is a dangerous practice at all. I would qualify that stringy bark country may want to be fired in other parts, but not necessarily.

If those areas are 70 per cent. mountain ash, that is different?—-Yes, I mentioned mountain ash.

You would not burn them at all?—-Yes, I would have a stretch burnt every year, whatever width is considered necessary, and get rid of the mountain ash on that strip.

You would sacrifice that?—-Yes, for the benefit of the larger area.

What I am trying to put to you is this, you have a practical certainty on one side of doing damage in the water catchment; but if it can be shown that the danger of fire is not great, and providing certain protections are taken in the vicinity of the forest areas, is it not reasonable on account of the big value of the water catchment to preserve it in its natural state?—-Yes. I would say it would be reason-
able to have creeping fires and wide breaks. I do not favour broadcast burning.

When you keep reiterating "a creeping fire" you are thinking of the light burn on a fire break?—No, up to as much as five miles.

Why do you think five miles?—I say up to five miles, whatever is considered necessary. I fought a fire where stringy bark was carried three-quarters of a mile, and with a fire like that what is the use of a break five chains wide.

THE COMMISSIONER: Mr. Kelso, I think the witness adopted your suggestion.

You are the first one to say 5 miles.

MR. KELSO: I will withdraw it.

THE COMMISSIONER: You gave it merely as an example, and I think the witness has adopted it as a real limit.

MR. KELSO: It is not an actual distance. Really what you are saying is that you are favourable to burning in the form of fire breaks, but not general burning?—That is so.

We can get down to that much?—Providing those breaks five effective protection to the other land; not solely for the purpose of protecting the forest for the water shed, but limit the extent of that fire where it is burning.

If in fact these fires are limited in extent by this process of fire fighting the necessity for the fire break is less?—You cannot get away from the necessity for fire breaks. I would also map the whole district out, showing mountains, the height above sea level and the height of the country. The proposed Board than consult with you and say "We think there should be a strip here."

I do not suppose you suggest they would go into our area and burn without some agreement on our part?—If people would not agree as a matter of policy I should say they should have the power. You would give them powers by enactment to overrule the authority responsible to the Government for the maintenance of the
purity of the supply?—Yes, I would give them power. I would not refer to the purity of the supply.

I am referring to it?—Any burning would not affect the purity of the supply.

Not even by men being brought in?—No.

Would there not be danger to the purity of the supply by the over-ruuling authority bringing men in to work?—I should say that is a question of protection of forests. In the event of a particular season and a fire occurring with heavy rainfall and discoloration of the water, it could be dealt with by a purification process.

Would you go so far as to say the Metropolitan supply should be purified in order to permit the over-ruuling authority to burn breaks?—No, I did not say that.

THE COMMISSIONER: I do not think he suggested that.

MR. Kelso: I got that impression.

THE WITNESS: That limit of five miles would not affect the purity of Melbourne's supply to any appreciable extent. We have a small portion which we had analyzed the other day. It was given as 100 per cent pure, even better than Melbourne. I want to make it quite clear; you cannot have everything your way; the question of fire protection, I think, is paramount.

Do you think the preserving of the forests as forests is more important than preserving them to get the water supply?—To this extent, if you lose your forests you lose your water supply.

THE COMMISSIONER: If the water supply is lost, what would the people in the City do?—If you lose your forest you would lose your water supply.

MR. Kelso: I am not opposed to you, but the question is whether the over-ruuling authority can relieve the responsible authority in these matters. If you give them the power to do things
the responsible authority does not want done, where does the responsible authority stand? Are you going to make them responsible for the purity and adequacy of the supply if you give the over-ruuling authority the right to do these things? -- Take the case of the towns along the Murray today; they are responsible for the purity of supply of water, and today the water from the Murray is almost undrinkable. I venture to say if you approached every one of those Water Trusts they would favour our policy of burning as against the total destruction of the forests.

But is it not a fact these towns all purify their supplies? -- No, they do not.

Should they not? -- Just the same as you should in the event of a burning.

In the event of this emergency only, we should purify our supply? --- It is not likely the whole of the forest catchment areas would be burnt in the one fire. The purification would only be needed for a few days.

I understand you to say you are going to give the over-ruuling authority the right to enter before an emergency and to do work in the watershed? -- I maintain that would not affect the purity of your supply, and I think that could be proved beyond the shadow of a doubt.

That is your opinion despite the fact the towns which do have work in the watershed purify the water supply? -- We do not in Wodonga. Recently it was suggested we should, and I said we were not justified in spending thousands of pounds for the purification of the water once in ten years. We do have fresh supplies of water for the household.

THE WITNESS WITHDREW.

ALRUED KELLY, Sworn and examined:

MR. GOWANS: What is your full name? -- Alrued Kelly and I carry on business at 81 Cowper Street, Footscray.

You have been Captain of the Melbourne Volunteer Bush Fire Brigade.
for the last 12 years?---No, about ten years.

Will you tell the Commission how the Brigade came to be formed here?---
The Brigade was formed shortly after the Noojee Fires in 1926.
I think the then Governor, Lord Somers, took an interest in the matter. A meeting was called by the Lord Mayor and the Melbourne Volunteer Bush Fire Brigade was formed.

How did you get on for equipment?---A number of citizens came to our assistance and showed interest in the movement. They presented us with equipment sufficient for about 100 or 120 men.

How many men did you have available at that time?---For the first two or three years, certainly for the first two years, we had a register containing the names of 200 or 250 men who had signified their willingness, if they could get away at the time, to come along in the case of need.

Were they trained in any way?---Yes, for the first three years we had a burn off, sometimes in the Dandenongs and other times down Frankston way. That was held with one or two of the forestry officers and constituted training for some of the volunteers.

Did you have any experienced men helping you?---Yes, for the first two or three years we had at least 12 group leaders, men who had experienced in bush fire fighting.

What happened to the Brigade during the next 7 or 8 years, from the point of view of its activities?---When we started I think there were 36 Bush Fire Brigades in Victoria, and within about four or five years there were almost eight times that number. As the Brigades were formed in the country it was less necessary to get help from the City. Also from experience it was found that men from Melbourne took at least eight to twelve hours to get to the scene of any fire.

That was the difficulty in the
early stages; the difficulty at that time was transport. We were usually called out - possibly it was just a co-incidence - over the weekend, and it was most difficult to get in touch with a number of motorists who would come along and take two or three fire fighters to the scene of the fire. That difficulty was overcome in recent years - the last two years - by the Tramways Board and Railways Department coming to our assistance and supplying buses.

In 1933 when the Bush Fire Brigades Act came into operation was your Brigade registered with that Committee?---Yes, I understand it was.

From 1933 onwards you had practically no calls until 1935, then you had another one in 1936 and another in 1938?---Yes, 1938 and 1939.

Taking the last one, what part did you people have in fire fighting this year?---First of all the Brigade, as a Brigade has more or less ceased to exist for some years. As I said, we had a number of men, group leaders, and various officers; but owing to the fact that we were very rarely called upon they more or less faded out. Whenever, there was a call apparently I was the only one whom the Forests Commission, the police, or the Fire Brigade got in touch with, and I had to act as best I could with help from the wireless. It was given over the wireless men were to meet at our depot in Spring Street.

Has that proved a satisfactory way of getting in touch with your men?---It is satisfactory from a numbers point of view, but at times one did not know whether there were 15 per cent. who had ever seen a bush fire. That was a risk we had to take.

Did you make those broadcast appeals to the population or only those people who were members of your Brigade?---Just directly to the public, because, as I say, the Brigade ceased to exist years ago.

1640. KELLY.
I have asked you about these things in order to get your view as to the desirability and possibility of having any form of organized support from the Metropolitan area in case of bush fires. What is your view about it?—Up to four months ago I would have answered that I did not think any good purpose could be served by having a Bush Fire Brigade or relying on any help from the Metropolitan area, or from Melbourne. However, after the events of January I must reconsider my opinion, and I now think if possible, there should be some number of men who could be relied on in case of necessity; but only to fight fires within a distance of, say, 40 miles from Melbourne. That was our intention when we originally started.

Would you think that organisation should take the form of a Brigade with volunteer members known to you?—It would be possible if they were called out even once a year, to get probably 100 or 150 people who would respond to the call; but when two or three years elapse without any call they are lost. Therefore, the only way I can suggest is to rely on men of vocations such as waterside workers. I had a number out during the bush fires and found, although probably more than half of them had no experience in actual bush fire fighting, they were men in the pink of condition and did a wonderful job. I understand that every day except Sundays they are at a pick-up place waiting for a job, and perhaps there are 50 or 60 of them who are not required for jobs. I would suggest them, because they are the type of men who would be available at a moment's notice. Of course, it would then be necessary to get a certain number of men from other authorities, such as the Fire Brigade, the police Department, and the Railways Department, to control and carry out the job with a gang of anything up to 100 volunteers, or men such as I suggest.

You think that is about as far as the City can go in assisting in
bush fire fighting?—I cannot offer any other suggestion.
With regard to those men, I would just like to say that
if it was considered feasible, to have them and they were
obtained at that source, it would not be long before the
question of voluntary work would have to be considered,
because you would not expect those men to be away from
their employment for long. Perhaps they will go one day,
but they cannot afford to lose two days' pay.

In the recent fires did you work in conjunction with the Forests Commission in Melbourne in sending men out?—Yes, definitely.
I waited until I heard from Mr. Carver who was our Secretary,
because in the past the Melbourne brigade has not been wanted
on at least 50 per cent. of the occasions asked for; we had
gone 40 or 50 miles because of calls coming from a post office,
fire brigade or police department, and then found we were not
wanted. I realised the only safe method was to rely on the
Forests Commission, through Mr. Carver, to say whether men were
definitely wanted at a certain place.

Did your organisation take charge of all the volunteers, or did some go
cut under the auspices of the Forests Commission?—I think I
was practically the only one from the organisation who took
men. Volunteers went in charge of men from the Forests
Commission or some other Department.

You had no headquarters where people could have been sent to, or any
kind of organisation to enable some kind of systematic approach
of the matter?—No.

MR. BARBER: We held the business of sending volunteers into the country,
with the assistance of experienced men like yourselves?—No, I
will not say the whole responsibility. Usually I was got in
touch with by the police, or by the Fire Brigades Board and I
got in touch with the Forests Commission, that is during the
last two or three years.

I was talking of the first two weeks of January this year. You were
one of those who went out in January this year?---Yes.
And the volunteers, of whom there were a great number, all
assembled at the Forests Commission?---Yes.
During January the Forests Commission was the only body that
organised the volunteers?---Yes.
And it was a pretty big job to be taken on at short notice?---
That is right.

MR. SWINDON: During the past years when your Brigade had been
called out to co-operate, you have been to many fires
and assisted Bush Fire Brigades?---Yes.
You were present at a meeting of the Brigades of the Central
district in Melbourne last April?---Yes, about 12 months
ago.
I think a request was made by those brigades that the Melbourne
volunteers should be reconstructed?---I understood it was
to be carried on as we were. I wanted to disband the
whole thing.
A request was made that your people should be available within
40 miles of Melbourne?---That is right.
Have you found the men that you have had out with you suitable
men?---I have.
I believe the last lot of men you took to Whittlesea turned out
very capable men?---I did not go to Whittlesea; I took
waterside workers to Healesville.
Their work was spoken of very highly?---Yes.
Do you think it would be possible to reorganise the Melbourne Brigade

and get a register of all those men, something on the lines
of the original brigade?---It could be done, but one would
ask the question "Is it worth while?" It is a very big
job to get the business and private telephone numbers of
even 100 people, and have an organisation to get in touch
with them in case of need.
After the 1926 fires you had to rely on telephone communication; at
the present time you can practically rely on broadcasting?---
No, we had it then, and could rely on it.

1643. KELLY.
If we could get a register and divide the men into units do you think it would be possible to resuscitate that brigade?—As I said before, at least half the calls were futile. When we got to the fire we were told to go home.

On one occasion you were called out by the post mistress at Sassafras and the fire was out; but I understand that Brigade went on and did wonderful work at Montrose?—Take on instance of 12 months ago. An urgent call came for 200 men to go to Belgrave one Sunday afternoon. I got hold of Mr. Carver and he said "Apparently it is authentic; it is coming from the police." I got in touch with the Tramways Board and obtained two buses and took 80 men there. I think we were there within three hours and when we got there the constable's wife said "It is all over now, and you can go home." We wanted to see the constable but he was having a bath, and we were told the fire was all over.

Unfortunately that was that man's first experience?—But that is the reason I ask "Is it worth while to go to that effort of getting a number of men's names registered and obtaining their promise to come if required?" That sort of thing happens and that is the end of it; they are not going to bother any more.

THE WITNESS WITHDREW.

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HAROLD GREVE STROM: Sworn and Examined:

MR. GOWAN: What is your full name?—Harold Greve Strom. I am a Bachelor of Civil Engineering of the Melbourne University, and am at present employed by the State Rivers & Water Supply Commission as Divisional Engineer for the Division of Rivers and Reclamation. My duties include, inter alia, investigations into the effect of the utilisation of land in catchment areas of streams and into the behaviour of those streams. I have for that reason made some study of the causes and effects of soil erosion, and was a member of the Committee appointed
In 1937 to investigate soil erosion in Victoria. These erosion studies, and my other studies, have taken me into most parts of the State, principally Gippsland and the north-east.

In addition to that I have spent most of my life in country districts, and some ten years of my youth were spent in forest country in the Parish of Warburton.

I understand you have prepared a statement, which you desire to present as evidence, dealing with the question of bushfires and their control as affecting river catchments, rural water supplies, flooding, and allied subjects in which my Commission is interested, having particular regard to the soil erosion aspect?--Yes; my statement is as follows:

"THE STATE RIVERS AND WATER SUPPLY COMMISSION

Under the supervision of the Water Acts the State Rivers and Water Supply Commission controls either directly or through local bodies - chiefly Urban Trusts - practically all water supplies in Victoria with the exceptions of those administered by the Melbourne and Metropolitan Board of Works, the Geelong Waterworks, and Sewerage Trust and the First Mildura Irrigation Trust, which bodies operate separately under special legislation, and of a few Municipally controlled supplies.

The powers and duties of the Water Commission are defined by the Water Act 1928.

An outline of the history of water supply in Victoria and of the present stage of its development, is given in the pamphlet "Irrigation and Water Supply Development in Victoria", a copy of which I desire to submit as an exhibit. I would draw special attention to the statistics on page 36 and to the enclosed map.

EXHIBIT BB........Pamphlet.

The Water Commission has power to purchase lands required in connection with the construction of State Works of Water Supply. The area of unsubmerged land held by the
Commission is, however, comparatively small, being mostly limited to marginal lands adjoining reservoirs - the remnants of estates resumed for reservoir purposes - and to the lands along channels.

The Water Commission is, however, interested in the present inquiry, not so much as an owner or controller of land, as from the point of view of the management and the protection of the catchments - the water gathering grounds - from which is derived the water it conserves and distributes, and which include large sections of the recently burned areas.

It may be pointed out that the position of the Water Commission differs in several respects from that of the Metropolitan Board of Works. The most important point for present purposes is that the Board under its relevant Acts, generally controls the catchments from which is derived the water it stores and distributes. The Board can thus lay down and enforce its own policy in regard to the management and care of its catchments. The Water Commission, on the other hand, conserves and distributes much larger quantities of water than the Board, and apart from the comparatively small area of marginal reservoir lands held by it, derives its water from catchment areas controlled by various other Authorities - the Forests Commission, the Lands Department, Municipal Authorities - and from alienated land. Under the Lands Acts, the Water Commission is consulted by the Lands Department in certain cases concerning applications to alienate public land, i.e. water frontage reserves along streams, and other areas specifically classed as Water or Forest reserves. In addition, the Lands Department voluntarily consults the Water Commission with respect to the proposed alienation of public lands where it considers that the Commission's interests are involved, as for example in the Hume Reservoir Catchment. The Water Commission, however,
has otherwise little or no control over the method of utilisa-
tion of the lands in the catchment areas in which it is
interested from the points of view of water supply, flood
prevention, or general stream control.

The question of the management of catchment lands in
its relation to water supply, soil erosion and flooding is
a vast and complication one, which much of which is outside
the scope of this enquiry. As the use or abuse of fire is
an important factor in it, however, I desire leave to show
that any scheme for fire control which may be evolved for
bush areas should take into account the effect of the
measures proposed on conditions of the catchment areas as
regards water conservation, soil erosion and flood-liability.

It is important, further, that consideration should
be given, not only to the immediate effect of such measures,
but also their future effect over a long range of years, or
indeed for all time.

**IMPORTANCE OF WATER SUPPLY IN VICTORIA:**

An assured water supply is a vital factor in the
permanent settlement and development of any country. In
this respect the natural resources of Victoria are not
entirely satisfactory, the distribution of rainfall and
subsequent streamflow being irregular in both locality and
time. While in some of the mountainous portions of this
State the annual rainfall reaches 70 to 80 inches, over
many thousands of square miles it is below 15 inches, in
the far northwest not much over 10. The soils of these
drier areas often possess considerable fertility, but the
rainfall there is not sufficient to enable full use to be
made of that fertility for purposes of production; over
large areas, in the Mallee, for instance, it is not suffici-
ent to assure an adequate supply of water throughout the
year for domestic and stock use. For a large proportion
of Victoria some artificial system of water supply is thus a
necessity if the land is to be used to its full capacity. Indeed, it may be safely said that the limiting factor in the development of Victoria is water supply and not land. From time to time works have been carried out to bring water from the areas of higher rainfall to those of lower rainfall, until now a total of some 15,000,000 acres, or more than a quarter of the area of the State, is artificially supplied with water for domestic and stock purposes, while of this over 2,000,000 acres can be irrigated. The total length of channels for irrigation and domestic and stock supply is about 12,000 miles. There are, in addition, over 200 country town supplies.

Another consideration is the irregularity of the distribution of rainfall throughout the year, and from one year to another. The Victorian climate has generally a mild wet winter and a long dry summer. This is especially the case on the slopes north of the Divide and in the more arid areas, where, although summer rains occasionally occur, sometimes of great intensity, they cannot be regarded as a normal feature of the climate. In consequence, most Victorian streams show a great variation in flow through the year, running strongly or even flooding in winter, and falling off in summer to a comparative trickle or even ceasing to flow altogether. This is specially applicable to streams such as the Wimmera and Loddon, which in their lower reaches flow through the dry areas where water is most needed.

The necessity for storage is further increased by the variation in rainfall from year to year. While the mean annual rainfall for the whole of Victoria is about 24.68 inches, in 1889 the average for the state was 32.77 inches, and in 1917, 30.77 inches, while in 1914 it was only 14.66 inches, and in 1938, 16.28 inches. This variation in rainfall causes an even greater variation in streamflow. The average total annual flow in the Goulburn River at
Murchison is about 2,293,000 acre feet; in 1914 it was only 567,000 acre feet, while in 1917 it was 6,202,000 acre feet, or about 11 times the minimum. The Coliban at Malsbury Reservoir in 1916 delivered 123,360 acre feet, in 1938 only 4,460 or about one-twenty-eighth of the maximum. The total Campaspe flow for 1938 was a little over 1% of the average.

In consequence, in planning storages it is desirable to provide capacity, not only from winter to summer, but, as far as economically possible, from wet years to dry ones.

In addition to the works for distribution of water, therefore, extensive works of storage have been provided, principally during the last thirty years. The total water storage capacity of the reservoirs of Victoria (including this State's share of Hume Reservoir) is now some 1,903,450 acre feet, or 500,000 million gallons. The value of these storages to the State is incalculable in a drought such as the present one, which is very likely the most severe in the history of white settlement in Victoria. Although, for instance the flow in the River Murray in Jingellic, above Hume Reservoir, was for 1938 only 683,000 acre feet, little more than one third of the average, and actually less than in the previous low record of the 1914 drought, the water carried forward in Hume from the previous year has made possible the satisfying of practically the whole of the irrigation needs of the Murray Valley, whereas in 1914 irrigation was seriously curtailed, with disastrous results, and the Murray in its lower reaches actually stopped running. Although the Goulburn for December and January last was the lowest it has been since gaugings were commenced in 1882, it has been possible, thanks to Eildon Weir, to maintain at least a restricted supply to the important irrigation districts dependent on it, as well as supplementing the supply to the Mallees. On the other hand, many streams which in ordinary summers maintain...
at least some flow, and on which there is no storage, were in February 1939 bone dry, and in consequence large numbers of landholders suffered loss, while several towns, such as Benalla, were put to serious inconvenience.

It may be mentioned incidentally that for nearly all the rivers for which regular gaugings are obtained, the record of flow for the month of December 1938 was the lowest since gaugings were commenced, a period of over 50 years in some cases. This indicates an abnormally dry condition of the hill areas, which may help to account for the severity of the bushfires this year.

The economic importance of these country water supplies to the State may be gauged from the fact that some £25,000,000 have been invested in them. In one industry alone, that of canned, dried, and citrus fruits, the value of production for 1936-7 was £3,500,000 practically the whole of which came from irrigation districts. As this represented only about one-ninth of the total area irrigated, it will be seen, even allowing for the relatively greater value per acre of the fruit crop compared with pastures, etc., that the total production made possible by irrigation is an important part of the State's income. In addition, there must be reckoned the value of production from areas, such as the Mallee, where agriculture would be precarious or impossible without artificial domestic and stock supply. Most of the development depends on stored water. It is therefore vital to the welfare of the State that the capacity of the storages should be maintained as far as possible. To do this, the catchments of the reservoirs must be maintained in suitable condition.

An area of land, which has of itself a relatively low value for direct production may have a much greater value through the production it renders possible by its function as a water catchment.
As a case in point, the Victorian portion of the catchment of the Hume Weir has a population, according to the Municipal Directory, of barely 10,000 (or some 2½ persons to the square mile); or adding say 5,000 for the smaller New South Wales portion, 15,000 altogether at most for the whole catchment. The Directory gives the population of Mildura City alone as 7,250, while the Shire of Mildura contains over 18,000 persons, most of whom are dependent on the regulated flow of Murray Water, directly for irrigation, or indirectly for domestic and stock supply. This does not take into account Swan Hill, Cohuna, Kerang and numerous other important irrigation settlements along the Murray in Victoria, as well as in New South Wales and South Australia. Taking population as a rough index of production in rural communities, it is obvious that the production made possible by the Murray River, and safeguarded by Hume Weir, is much more important to the State than that of the Hume catchment area.

By far the most important catchment areas of Victoria are the high rainfall areas, which generally coincide with the mountainous portions of the State. Though partly alienated, these are mostly still covered with forest growth of greater or less density, and are therefore liable to be affected by bush fires.

I have here a map of Victoria on which are indicated the catchments of the main reservoirs and works in which this State is directly interested with respect to the supply of water for irrigation districts, domestic and stock districts, and country towns. It may be seen that these catchments lie mostly along the mountainous areas of North-eastern and Central Victoria, with smaller catchments in the Grampians and the Otways.

The map also shows the approximate location of the areas.
burnt in recent months, and their relation to the catchments.  

Besides these, there are numerous other river catchments without storage but of considerable importance from other points of view, such as flooding; e.g. that of the Latrobe river, and that of the Bunyip-Tarago, which affects the Kooweerup area. The drought of the last two years has caused a wide demand for further storage.  

I may point out that in the case of the catchments of streams draining into the Murray River, we in Victoria are the custodians, not only of our own interests, but of those of New South Wales, South Australia, and the Commonwealth.  

DANGERS OF EROSION IN CATCHMENTS:  
The chief enemy of any water storage is siltation; material derived from the erosion of the lands forming the catchment which drains into the reservoir is carried by streams and deposited in the still water of the storage. Even if the catchment is maintained in its natural condition, this process will ultimately lead to the filling of the reservoir with silt, and the destruction of its value as a storage. If, however, erosion in the catchment is artificially increased by injudicious human action, the process of siltation is correspondingly accelerated and the destruction of the storage hastened.  

Except for a few special cases the clearing of silt from reservoirs is practically impossible. Even using the cheapest methods of earthwork the cost would be many times that of building a new reservoir. Another difficulty is that good sites for dams or weirs are comparatively rare. In Victoria the best sites on many streams have already

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been used, so that when the present reservoirs silt up it will be necessary to build new ones on sites not so good and hence more expensive. It is highly important, therefore, that the silting up of the present storages of Victoria should be delayed as long as possible, and, to that end, that erosion in the catchments of these storages should be reduced to a minimum.

The care of other stream catchments is, however, hardly less important. Neglect of this has already led to serious consequences in different parts of Victoria. Siltation due to excessive erosion fills the deeper sections of a stream bed which under natural conditions remained as pools after the streams had stopped running, and thus provided natural water storage in drought times. This process is already well advanced on many Victorian streams, e.g. those near Eildon, and has in the present drought been a source of serious loss and inconvenience to many landholders along them. An increase in the proportion of rainfall which runs directly off after a rain, also, meant diminished streamflow later, or none at all.

Apart from the water supply aspect, this siltation of streams has other important economic consequences. Bridges are endangered through reduced waterway; roads are blocked or damaged; and valuable riverflats are rendered less fertile by heavy deposits of barren sand or clay. Conditions which make a catchment liable to erosion also usually increase the speed with which storm water runs off it, and so increase the height in floods. This increased liability to flooding is aggravated by the reduction of the capacity of streams in their lower reaches by the deposit of silt in their beds. Even recreational facilities, such as for fishing and swimming, are lessened by siltation.

These facts furnish additional reasons why in planning the utilisation of the lands in a catchment the minimisation of erosion should always be borne in mind as a most important consideration.
The best defence of land against erosion, apart from the cohesion and inertia of the soil, is an adequately thick and continuous covering of growing vegetation. Any factor which removes or reduces this covering, even temporarily, renders land more liable to erosion.

To explain this action, it is desirable to review briefly what becomes of rain falling on sloping land.

If the slope is thickly covered with vegetation, the rain drops strike this instead of the ground. Portion of the rainfall clings to the leaves and branches of the plants; the remainder passes down to the ground, with greatly diminished force, and spread over a greater interval of time. This protective and delaying action is greater, naturally, in jungle than in grassland. This water which reaches the ground surface passes into the ground to an extent governed by the absorptive power of the soil, which varies according to circumstances. Porous sandy soils, for example, naturally absorb water more rapidly than tight clays, and ground covered with forest or even pasture is generally more open and therefore absorptive than bare soil. If this action continues long enough to soak the soil and subsoil, any further absorbed water passes downwards into the rocks below. There it accumulates in the rock pores and fissures, to emerge later lower down as springs. This underground natural storage is of great importance, as it helps to maintain streamflow sometimes even long after the rain ceases.

When rain water reaches the ground at a greater rate than it can be absorbed, the surplus begins to run off, at a rate depending on the steepness of the slope, the amount of obstructions, and the quantity flowing.

On a hillside covered with forest litter or thick grass,
the flowing water meets a series of obstructions, and hence moves downhill slowly in a thin sheet or film. This has the double effect of retaining the water longer in contact with the soil, thus giving it more time to soak in, and of reducing its velocity of flow, and so lessening its power to shift the soil.

Where a hillside is bared by burning or otherwise, however, the bare soil receives the full impact of the rain-drops, which have sufficient force to loosen the finer soil particles, so that the rainwater becomes muddy. As portion of this muddy water sinks into the soil, it takes with it these fine particles and deposits them, thus choking the pores of the ground and reducing its absorptive capacity for future rains. As the whole of the rain reaches the ground without being delayed by vegetation, the absorption limit is reached earlier and runoff commences sooner and usually in greater volume. Having much less obstruction to its flow, this runoff water flows down the bare hillside faster than it would down a covered one, and thus has much more power to shift soil. It may be mentioned that doubling the velocity of flow of water gives it power to transport particles about 64 times as large. This effect is increased by the concentration of the flow in small streams, which cut more rapidly into the soil than a wide thin sheet of water would.

It is the rapid immediate surface runoff which tends to cause soil erosion and flooding. The water retained in the soil promotes plantgrowth, maintaining the cover, while that sinking to the rocks maintains streamflow. It is usually advantageous for a stream to have as even a flow as possible. Streams with flashy flows - i.e. high floodpeaks after rain, rapidly falling off and followed by long periods of low or no flow - tend to be both dangerous as regards flooding and
of little use for water supply. In general, therefore, the greater the portion of rainfall absorbed and the less the direct runoff the better. This is one great advantage of a thick vegetable cover. Another is that the roots of the plant bind the soil, thus resisting the attempt of the runoff water to cut the soil away.

The effect of rapid runoff from a bare slope after a heavy rain is, however, not confined to that rain alone. The runoff water carries with it some of the topsoil especially the more fertile elements which, being finer, are more easily moved. This leaves the slope less fertile than before, less likely to grow vegetative cover and hence more liable to erode. This effect is aggravated by the lessened amount of water retained for plant growth. Poorer plant growth means less root binding. Each succeeding rain on a bare slope thus increases the tendency to barreness and this again to further erosion, it is a vicious circle.

In the case of flat land, erosion by direct rainfall is not as a rule serious. Usually, however, most of the catchment area of a stream consists of sloping land, which is liable to attack by flowing water to a varying extent according to the degree of slope, the texture and character of the soil, and the climate, especially the amount of rainfall. Under natural conditions, these sloping lands must have been protected by vegetation to such a degree that, while steady removal of soil took place, the creation of other soil to replace it by rock weathering and plant decay kept pace with this removal. The best proof of this is the very existence of soil on the slopes.

White settlement, however, has led to many alterations in the natural cover. While in some areas this has caused little trouble, in others—including parts of the catchments draining into some of our most important reservoirs
the process of soil removal has increased till it is vastly more rapid than soil formation, so that the fertility of the area is steadily diminishing. Some forms of erosion are usually obvious at even a casual glance; for instance, landslides, stream erosion (the lateral scouring by a stream of its banks), and gully erosion (the removal of an intermittent flow of water of a strip of topsoil and subsoil, forming a steep-sided canyon). These, however, though spectacular, are probably less deadly in their total effects than sheet erosion - the more or less even removal of topsoil from a large area, reducing fertility and increasing siltation below. Illustrations of actual examples of all these forms may be seen in the Report of the Committee to Investigate Erosion in Victoria, a copy of which I desire to submit as an exhibit. Other examples could be multiplied indefinitely.

The most common factors which tend to leave ground bare, and hence more liable to erosion, are cultivation, clearing of natural cover from land without substitution of adequate cover in lieu thereof, overgrazing, rabbits, and fires. Cultivation occurs over only a small percentage of the average hill catchment, and may for present purposes be neglected. The other factors, however, are often serious in their effects both quantitatively and qualitatively. It is possible that several of them may act together, e.g. when grass begins to grow after a fire rabbits eat off the young green shoots preventing the grass from seeding and even killing it out.

**FIRE AND EROSION**

It must be stressed that any fire which leaves the ground bare leaves it in a condition more liable to erode. If during the next few months after a fire the rains occur in a series of relatively small and gentle falls, without
much runoff, vegetative cover may re-establish itself without marked erosion. If, however, a heavy fall occurs soon after a fire, when the surface is still bare, severe erosion may occur. The more frequent the fire, the greater the risk of such a downpour occurring while the ground is bare, and hence the greater the risk of permanent loss of topsoil and thus of fertility, as well as of siltation in the streams. From the erosion prevention point of view, therefore, a large fire every twenty or thirty years is almost less objectionable than a smaller fire over the same area each year.

It is fortunate that the rains that have occurred since the January fires, though of considerable total amount, fell gently and at such a rate that the ground could absorb most of the water as it fell. A check of the storage increase in Eildon and Glenmaggie reservoirs after the heavy rains at the end of February last shows that on each catchment only about 15 per cent. of the rainfall ran off. Even so, evidence is not lacking that erosion occurred. An interesting case is that of gullying in the steep hills near Wood's Point, where, as can be seen from the road cuttings, patches of country consist of a foot or two of soil and subsoil bound by roots, over a deep layer of rotten shale rock. The rush of water in the steep valleys cut through the tight upper layer, and scoured out huge quantities of the lower rubbishy layer, piling the debris on the roads and in the streams. Apart from this there was extensive soilwash. I saw the streams at Noojee recently after an inch of rain and they were running black as ink. Though less spectacular, further evidence of erosion may be seen by a careful inspection of any burnt slope, especially in the areas where the forest is naturally poorer, as on the clayey soils derived from the Silurian shales and sandstones. I have here for example, five soil samples, taken on the 9th inst.
The first three are from a slope of about 1 in 8, near Starvation Creek, on the Warburton-Woods Point Road. The first sample was taken from a heap of soil which had lodged in a stump-hole, and had obviously been laid down by flowing water. Similar soil heaps had lodged against logs, etc. The second was taken from the slope nearby, and was intended to represent as nearly as possible an average sample of the undisturbed soil of the slope. The third is a sample from one of numerous patches on the slope, and appears to be varying on subsoil. There was no growth visible on these patches, although scattered bracken a foot or so high was already growing on soil of the second type. The fourth sample represents soil lodged against the main road at Gaffney's Creek, where a steep gully crossed it. The fifth is an average sample of the hillslope a few chains above. This, like the second and third samples, had to be cut out with a knife, whereas the others were simply picked up with the fingers. The difference of the first and fourth samples from the others indicates what might be termed a sorting action on the part of the stormwater.

Serious sheet erosion and incipient gullying are noticeable on some areas of granite country in the Bunyip River catchment, where erosion/already a serious problem in view of the Koo-Wee-Rup Flood Protection District below.

The immediate effect of burning bush or forest country varies from one locality to another, depending on the types of natural vegetation, the character of the soil, the aspect of the slope, and the characteristics of the rainfall. In some localities a fire is rapidly followed by a dense growth of scrub, especially wattle and bracken. Especially in the southern districts, the more frequently the area has been burned, or the poorer the soil, the greater proportion of bracken, this is clearly visible on the areas recently
This growth of scrub may in favourable areas persist, perhaps increasingly, for several fires. I regard it as probable that most timbered areas were originally more or less open between the trees, there being little undergrowth. For example, from my own memory of the mountain ash areas beyond Warburton, which goes back nearly forty years, the undergrowth has definitely increased, and this is confirmed by enquiry from older inhabitants.

This initial thick growth of scrub is satisfactory from the erosion-prevention point of view, but reduces the grazing value of the area and increases the fire risk. If regular burning is persisted in, however, especially if accompanied by heavy rains and consequent erosion, the ground cover deteriorates and the tendency is for the soil to become more and more bare between the trees, with consequent rapid increases in erosion. For various reasons this action operates more quickly in some districts than in others, the north eastern areas, in general, show much more erosion than the more resistant country around, say Warburton. The effect of regular burning will, however, almost invariably be the same in the long run.

EXPERIENCE OF OTHER COUNTRIES:

The problem of soil erosion following fires is not by any means confined to Victoria. In the United States of America, for instance, erosion losses have reached almost astronomical figures, and as a result of public awakening to the danger a special Soil Conservation service has been formed under the Department of Agriculture, and millions of dollars have already been spent on systematic and scientific investigation and on preventive measures. That fire is considered an important factor in causing erosion is shown by the following extract from "Headwaters Control and Use".

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"Protection against fire is a practically universal requisite in forest management. Fire - even a slight fire - reduces the ground litter and plant understory and may materially accelerate erosion and surface runoff. Destruction of the cover and humus reduces the ability of the land to absorb and hold a considerable quantity of water for evaporation, percolation, or transpiration. Serious acceleration of washing, gullying, and silting ordinarily follows.

"Forest fires in an old-growth pine-hardwood forest in the southern Appalachians increased surface runoff on an average by ten times over that of unburned forests of the same type, and as much as 32 times in individual storms.

"In the Sierra pine region a 5-year record shows that surface runoff from repeatedly burned plots was from 31 to 463 times that from comparable unburned plots. The yearly erosion from the burned plots was 22 to 239 times that from the unburned, and from "Soil Conservation", published by the U.S. Department of Agriculture:

"Our farm woodlands are frequently burned, either accidentally or intentionally under various barbaric theories arising from our forefathers' struggle to establish tillage in a wilderness. Fire works in several ways to reduce the effectiveness of woodland in conserving soil and moisture. The so-called "harmless" ground fires, intended to "clean up the woods", to "kill boil weevils" or to accomplish other legendary objectives, are especially damaging to the essential mantle of litter and humus. A single severe fire or repeated light burnings consume this organic material, decimate beneficial soil fauna, and materially increase runoff and erosion. 

Station experiment results indicate that annual burning of woodland increases runoff from 1.0 to 30 times and soil loss from 12 to 300 times. Fire destroys the seed and seedlings on which woodland renewal depends. When severe, it
destroys mature trees, but in farm woodlands this is usually less of a factor than its unholy alliance with fungi. Rot-causing organisms enter the trees through basal fire scars and reduce or destroy the crop value of the affected trees.

To take an example nearer home, while on a visit to New Zealand last year to investigate on behalf of the Victorian Government methods of river control, I took every opportunity to make enquiries from the heads of Government Departments and other persons throughout the Dominion as to the erosion position there. I found that soil erosion is a vital and growing problem in New Zealand. Though various Authorities had spent millions of pounds in works for prevention of flooding and other river control, their efforts were greatly hampered or sometimes even nullified by the growth of deposits of shingle and debris in the river beds from eroding catchment areas. Overgrazing and excessive burning are two of the most important factors blamed for this erosion. As in Victoria, the two appear to be largely connected, a frequent practice being to burn off to obtain fresh feed next season.

I understand that the Forests Department in New Zealand has closed to grazing many forest areas in catchments and mountain country, while the Lands Department, in co-operation, is resuming where possible lands in catchment areas and handing them over to the Forests Department.

The frequent use of fire on private lands in the steeper areas of New Zealand has also led to widespread damage. The Department of Scientific and Industrial Research deals with this question in its Bulletin No. 62, Land Deterioration in the Heavier Rainfall Districts of New Zealand. I may quote from the summary of that bulletin:

"Over most of the hill country the fertility is failing..."
and the produce — sheep, wool, and cattle — has been lavishly subsidized by the land itself."

"The chief cause of hill country deterioration is soil erosion. Losses of fertility due to leaching and to removal of producers are small in comparison with the losses from erosion.

"The constant use of fire to control scrub and fern growth is the greatest single factor aiding soil erosion.

"Much hill land in less than fifty years has passed from forest through grass to scrub and some to bare rock."

Victorian conditions, while not exactly similar to those of the countries mentioned, are sufficiently so to make the warning of vital interest to us. In fact, in some ways the local conditions appear to be more conducive to erosion than those in the States.

CAUSES AND OCCURRENCES OF FIRES:

While the recent fires have been spectacular enough to attract general public attention, a great deal of burning, whether by accident or design, takes place in the hill areas almost every year, not only in the so-called "safe" periods, but in the danger months as well. I have made numerous journeys through the hills of Gippsland and in the Northeast of late years, and on nearly every occasion, except in the winter months, have seen the smoke of fires in the timbered areas of the hills, or have come on patches recently burnt or where a fire is still burning. This was so even this summer, one of the driest and most dangerous in Victoria's history; I counted up to a dozen fires in one trip alone, some not many miles from where severe fires occurred in January. Two reliable observers, who made trips through the remote areas near the source of the Murray last summer, one about Christmas time, have told me that numerous
fires were burning there then, the smoke being so thick that it was hard to get any view from the mountains. The locality and extent of the areas so burnt may vary from year to year; but in the aggregate they probably exceed the area swept by the recent fires, and almost certainly represent a greater erosion risk. This is the more so as the areas which are easiest to burn are often those which, to use a technical term, have the greatest "erosion potential," or the greatest liability to erode, as for instance the drier and poorer forests of the North-east.

Most of these fires appear to burn for a while over a limited area, usually of timbered Crown lands, and then to die down or to be extinguished by rain. In a summer such as this, however, they represent a serious threat to settled areas and forests, and, under conditions such as obtained on the 10th and 13th January, a deadly menace. Even some time after a fire is apparently out, one is apt to find near the edge of it a log or stump smouldering quietly, ready to be fanned to a blaze by the next strong wind.

I am informed that a fire occurred on the Prince's Highway near Bealbird between Orbost and Cann River early in February this year, and that on March 2nd, about one month later, some logs and stumps were still smouldering. Rain in the meantime totaled about five inches.

I may say here that I have never ceased to wonder at the casual attitude of many country dwellers I have met to the existence of these ordinary summer fires. If a fire blown by a strong unfavourable wind threatens the settled areas, the local inhabitants turn out and fight it, usually with energy and efficiency. If, however, it is burning quietly away in the timbered areas, the usual attitude appears to be that "it will burn itself out."

The idea of checking every fire while in that quiet stage,
and so avoiding the risk of a strong wind making it an uncontrollable menace, does not appear to have much currency in the bush areas. An interesting side-light on the attitude towards fires is that of the phrase so often used by local correspondents to newspapers, who report that a fire threatened someone's grass paddock but has been turned back by a change of wind into Crown lands—'where it is burning without doing any harm'.

The cause of these fires is not always easy to determine. In some cases they are probably due to campers. I am afraid that many Australians treat fire far too lightly. In my own experience, I have seen several hundred acres in Gippsland burnt owing to a spark flying from a billy boiling fire lit among dry grass on a hot north wind summer day. I have known a lifelong country resident light a camp fire in bush country against a dry log, which promptly caught alight, and he appeared mildly amused when I put it out with water. I have seen a fire started by an endeavour to burn a log off a road; and I have on many occasions come across a camp fire abandoned but still smouldering.

Other fires, again, on the edge of settled areas, may have been lit by settlers to clear up their paddocks or the bush adjacent. Lightning probably accounts for some, although it cannot account for many others.

Many fires, however, appear in some areas remote from any road or track where campers are liable to be, for instance, high up on spurs, ridges, or even mountain tops. It is hard to judge the exact location of such fires, but these areas are usually Crown lands. It is difficult to escape the conclusion that these have been lit by graziers, either the lessees of the areas, or else poachers, who desire to 'clean up' the bush, to use that rather ambiguous phrase, or to obtain fresh grazing next spring. It may be argued that graziers would not light fires till Autumn, as not to
destroy the existing grass. This may be so in many cases, but it may be pointed out that over large areas of the hills there is now more scrub than grass, probably owing to former fires, and that anyone desiring to destroy by burning the scrub on such an area would naturally choose the period in which he was most likely to obtain a thorough and uninterrupted burn.

I have gathered, from numerous conversations, that there are several schools of thought among graziers on this question of burning timbered country. Many are firmly convinced that it is absolutely necessary to burn the bush frequently, if not each year. Their principal argument is that it is necessary to destroy what they call the "rubbish" (which is apparently scrub or forest litter or both) to avoid big fires. Their second argument is that it is necessary to burn to get feed for next year. The adherents of this school often maintain that burning does the bush good, and tend to be indignant at the imposition of any restrictions on their burning operations. It is probable that some of them obey the regulations, I consider it also probably that others do not. It is difficult to police fire regulations in the more remote timbered areas, and in every district there appears to be one or more men with the reputation of being "fire-bugs".

Another school recognises that burning has caused scrub and gum suckers to grow in country where formerly there was good grass between the trees, and agrees that it was a pity that burning was ever started. They maintain, however, that now that the timbered areas have got into their present condition, it is necessary to keep on burning them to keep the scrub down. A third school does not believe in burning at all.
In the auriferous areas, fires may also be due to prospectors burning to clear the slope for "leaching".

NEED FOR INVESTIGATION OF USE OF CATCHMENT AREAS:

I am of the opinion that there is need for some systematic investigation into the effect of the utilisation of public and private lands in the catchment areas with reference to such questions as soil erosion and flooding. This investigation should cover such questions as the relative value to the State of each industry, the methods used by each industry, and the effect of its operations on the catchments, taking into account not only present conditions, but looking well into the future.

The results of this investigation would furnish useful guidance to the various authorities concerned in framing a co-ordinated policy for the reduction of soil erosion, of risks of fires, and floods, and of general depreciation of the catchments, both as producing areas and of their value as water catchments. It would also be useful in framing any legislation which may be found necessary to deal with the utilisation of private land in catchment areas.

Take, for instance, the vexed question of grazing in forests and Crown lands, with particular respect to catchment areas. On the one hand, it is urged by some that grazing on public lands in the mountainous areas or timbered areas should be prohibited altogether, on account of its detrimental effect on the forests and catchments. On the other hand, it is urged by others that hill grazing is a most important industry, and the cessation of it would be a disaster to the State.

Here careful discrimination is necessary. The hill grazing industry undoubtedly has a value, though the exact extent is difficult at first sight to determine. My impression is that judged by the standards of the amount of
population supported by the industry or the direct return in revenue to the State from rentals, etc., the industry is not as important as it is sometimes made out to be. It probably has, however, indirect national value. On the other hand, it is clear that certain lowland areas are suffering from the erosion of the hill lands on which graziers operate. In the public interest, the hill grazing industry should not be allowed to continue if it cannot do so without causing to other interests damage which is greater than its own value.

The present and future importance of these catchment areas to the State generally is so great that we cannot afford to take any risk of sacrificing the general welfare to merely local interests. Over most of Victoria the prosperity of the lowlands is very largely bound up with the wise management of the highlands. The catchment areas must therefore be managed with a full sense of responsibility as regards their importance to the lowlands, and with a full realization of the necessity for conserving water supply and minimizing erosion and flood risk.

I may say that in discussing burning of bush country with numerous country dwellers and graziers, I have usually raised the question of soil erosion, and have found that very few of them have given it much thought. An interesting sidelight on this question is that it is in the settled areas in and adjoining grazing districts - e.g. at Mansfield and Omeo - that much of the worst water erosion in the State is to be found. If the grazing community cannot recognize erosion on their own properties, or do not think it worth while to check it, it appears reasonable to assume that they would not bother about it on public lands of which they have a temporary tenure. I believe therefore, that it would be dangerous in the public interest to allow graziers to control the catchment areas of the State unchecked, or to
control those areas in the interests of graziers alone.

I believe that the most satisfactory solution of the problem is that grazing of selected portions of the catchments should continue, such as for instance the High Plains, but controlled so that its most objectionable features are removed. To this end, for instance, I favour the agistment system for grazing on public lands rather than the system of leasing to individuals or companies large areas at comparatively low rentals.

The same need for control applies, of course, to timber getting mining, and all other industries carried on in the catchment areas. It must be recognised that all public lands are a State asset, and should be put to whatever use is of the most benefit to the State over a series of years, and that their exploitation should not be regarded as the prerogative of any one section of the community.

I recognise that this has implications going beyond the immediate question of bushfires. I maintain, however, that no solution of the fire question satisfactory in the broadest national sense will be obtained until the whole question of land and catchment utilisation is reviewed and put on a sound basis.

As an immediate step, I recommend that the proposed Soil Erosion Committee or some similar body be constituted so that it may fully investigate the question of catchment area utilisation and advise what steps should be taken for its regulation in the public interest.

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STROM.
IMPROVEMENT OF PRESENT POSITION:

Pending the suggested general investigation, measures should be taken to lessen the fire risk. These will probably be dealt with more fully by other witnesses, I desire, however, to offer the following comments.

It will never be possible to prevent bush fires. If more are prevented, however, and the spread of those which occur is more rapidly checked, the loss from uncontrollable fires will be greatly lessened.

I may say here that, having made inspections of various portions of the burnt areas, and interviewed various eye-witnesses of the fires which occurred during the week of 8th to 14th of January last, I am unable to suggest any feasible means by which fires once alight could be controlled under conditions such as then obtained. Eye-witnesses in various districts agree that the fires on the 10th and 13th had features rarely or never seen to the same extent in other fires — the extremely rapid advance, which deceived even experienced bushmen, the almost simultaneous ignition of large areas, especially of slopes facing the advance of the fire, and the existence of clouds of gas flying before the fire and bursting suddenly into flame with almost explosive force. The last phenomenon may easily account for the other two.

There are, however, large areas of timbered land in Victoria which were not burnt during that bad week, even though atmospheric conditions therein on the terrible days of the 10th and 13th must have been nearly if not quite as bad as in the burnt areas. It is fair to assume, therefore, that the outbreak of fire under these conditions was not inevitable and that had there not been fires already burning in the bush before the bad week came on, it might have passed off with much less loss. As similar conditions may occur in future summers, I consider that one lesson at least is obvious, that every fire in the summer months,
however small it is, should be regarded as a potential enemy, to be suppressed as soon as possible.

Measures to lessen the fire risk may be classified under five headings:

1. Reduction of the number of fires.
2. Measures to prevent risk of spreading of possible fires.
3. Extinction or control of any unauthorised fire in the early stages.
4. Combating fires which have reached dangerous dimensions.
5. Measures to lessen risk of loss of life when fires get out of hand.

Fires may be due to natural causes, such as lightning or to human agency. The natural ones can hardly be prevented; they can only be watched for, and dealt with as they arise.

Those due to human agency are caused accidentally or deliberately. Of the former, a few may be due to inadvertence, e.g., phosphorous baits, backfiring of motor vehicles, etc. Most, however, are due to carelessness. Here the only remedies I can suggest are intense public education into the danger of fires and their cost to the general taxpayer as well as to the immediate victims; supervision of campers, etc., by fire rangers, paid or honorary; and prosecutions in all bad cases.

Deliberately set fires may be tentatively classified as avoidable and unavoidable. To reduce the number of deliberate fires, wherever possible the incentive to light them should be removed. As an example, as stated earlier, I favour the agistment system for grazing of public lands rather than the leasehold system; also the impounding or confiscation of all unauthorised cattle found on public lands.
The present distribution of population increases fire risk. In former years there appears to have been less discrimination in the alienation of land. Settlers were allowed or encouraged to establish themselves singly or in small groups in areas more suitable for forest than for settlement. Many have long since gone; but some linger on in small, unprosperous-looking holdings surrounded by timbered areas. These settlers and the forests constitute a mutual danger, and during big fires the safety of these settlers is a consideration which complicates the task of firefighters. If these holdings were resumed, the general fire problem would be simplified.

I am prepared to agree that there may be occasions when the use of fire is necessary and legitimate, e.g. in the original clearing of private lands, the burning of safety areas to restrict the spread of fires or to safeguard towns, the clearing up of logging debris, etc. On the other hand, an example of an unnecessary fire is one lit on public land for the purpose of private gain.

Necessary fires should be controlled and regulated and unnecessary fires discouraged or eliminated. To this end, I would favour more systematic and unified control of fire questions. Some public bodies, e.g. the Board of Works and the Forest Commission, have already made effort in that direction. The care taken by these may, however, be nullified by the neglect or negligence of others. It is important that the whole of the State should be covered by some unified system. Fire control should be planned as carefully as the defence of the country against an outside invader.

The final determination of the form of any organisation to give effect to such a system would need more careful consideration than I have been able to give hitherto the question. It is probable that conference and discussion would be
necessary between the various interests involved, followed by the necessary legislation. My present opinion, however, is that I would favour one central authority to co-ordinate fire control activities, with local committees, co-operating or identical with the Bush Fire Brigades. These committees should prepare plans for fire control in their respective areas, and submit them to the central authority for approval.

To avoid too narrow or sectional view on the part of the local committees, there should be one or more representatives of the central authority on each committee; say the local Forest Officer and Crown Lands Bailiff.

Local brigades should be subsidised through the central authority as regards equipment, etc., out of funds provided by Government grant or any special taxation. The question of payment or a retainer to brigade members should be considered. This should be per annum, not per fire.

Landholders should be individually and fully informed of their rights, duties, and restrictions as regards burning off. Assistance should if necessary be made available to them to control burning off operations.

With regard to safety measures, these would include such things as the provision of more exit facilities; the removal of timber which might fall and block roads; and the provision of dugouts. These are matters on which the local could be asked to advise.

With regard to dugouts, I have inspected some of those which were occupied during the fires. I consider dugouts can be made reasonably safe. I would suggest: (1) that dugouts be preferably tunnel, not cut and cover; (2) that dugout construction should be done by an experienced miner; (3) that the dugout should face on to cleared land, away from any house, mill, or inflammable debris; (4) that
the entrance to the dugout should be down steps, or that a bank of earth be erected a few feet in front of the door; (5) that dugouts be made in the form of an "L" or "T", having a cross gallery at the inner end; (6) that if possible a separate exit be provided, with provision for tightly closing if necessary; (7) that if possible water be laid on to the dugout, by buried pipes, and provision made for spray at the door.

I understand that several witnesses have advocated a policy of general burning through the forests and timbered areas of the State regularly every few years.

I have given this matter much consideration. With respect to the effect of such a policy on the forests as timber-producing areas, I speak as a layman in matters of forest culture, though as one who has always been interested in forests, and has taken the opportunity to inspect and discuss them in various parts of Victoria and elsewhere. Speaking thus, I do not believe that in the long run the effect of such a policy can be anything but harmful to any forest as a permanent producer of sound timber.

It is from the point of view of water supply, erosion prevention, and flood control, however, that I consider that this policy would be most objectionable. I have endeavoured to show how frequent burning-over of sloping land depresses the vegetative cover and increases erosion, siltation, and flood risk. If burning were confined to flat areas, such as the terrace country in the coastal areas of Gippsland, no great harm might ensue. The regular burning of sloping country, however, is a very different matter. I believe that extensive burning practised for many years past in various hill areas of Victoria has very largely contributed to the deterioration of the vegetative cover on these areas and to the resultant increase in erosion, siltation, and flooding. I believe, further, that the adoption of regular
burning of timbered areas as a constant policy would inevitably increase this action, with ultimate disastrous results, not only to the lowlands, but to the hill areas themselves.

The reason generally given for the proposal to burn timbered areas regularly is that it is necessary to do so to clean up the forest floor and so avoid the risk of big fires. A second reason which I do not think has been stressed so much in evidence at this enquiry, but which has often been mentioned to me in conversation with graziers even as late as three weeks ago, is that it is necessary to burn to get feed.

As far as public lands go, I consider that the latter motive may be dismissed forthwith in considering the advisability of burning. From the national point of view, I am convinced that the loss by catchment deterioration far outweighs any temporary gain in feed value, especially when that gain is for private profit. For that matter I believe that sooner or later the burning for feed of private lands in catchments will have to be stopped, not only in the interests of the catchment, but ultimately in the interests of the landholder himself.

The plea of increase in safety warrants further consideration. From my inspections and enquiries in the recently burnt areas, however, I believe that under the conditions of the 10th and 13th January the policy of regular burning would not have had much effect on the spread of the fires which occurred then. I have been shown areas which I was assured had already been burnt over before the big fires, and yet were burnt again to what looked as bad a state as the rest. Again, the fire swept through areas of poor timber, as parts of the country between Aberfoyle and Waikawhia where the ground between the trees must have been almost bare, judging by the unburnt patches which were sheltered.
from the fire by their southerly slope. Even paddocks almost bare of grass showed where the fire had swept across them.

In the case of a less violent fire, it is possible that regular burning might lessen the tendency for the fire to spread. I regard this, however, as by no means always certain. In fact, I believe that a light fire may under some conditions leave an area for some time afterwards in a state more favourable to the passage of a large fire.

Mention has been made of "controlled" general burning. I believe, however, that the control, in the true sense, of such fires, especially in the more rugged or thickly forested mountain areas would be too difficult and expensive a matter to be practical.

One great difficulty is the climate. If at the right time every year there was a spell of favourable weather which could be relied on to last for several weeks, burning off would be greatly simplified. Weather conditions in Victoria, however, change with notorious rapidity. Conditions one day may appear quite safe for burning; a day or so later they may have become highly dangerous, making it extremely difficult to control the extensive fires which would be necessary to cover the required area; especially so in say the high rainfall mountain ash areas, where the period when burning is both possible and anywhere near safe is in any case short.

Summing up, I am strongly opposed to the policy of regular general burning of timbered areas, and regard it as a counsel of despair. I believe that it is possible to devise methods whereby the same degree of safety may be obtained as by the adoption of general burning, without the expense of that method and without its grave ultimate consequences.
In general, any burning in a catchment is undesirable from the water supply point of view. Where it is deemed to be necessary for special reasons, it should be reduced to a minimum, and should be restricted as stringently as possible to areas chosen for their low erosion potential, consistent with suitability with regard to fire control strategy.

**UTILISATION OF LAND IN CATCHMENTS:**

From the point of view of water conservation, and of flood control, the idea is that any catchment should be left in its natural state, and kept entirely free from any human occupation or use.

The State Rivers and Water Supply Commission, however, conserves and distributes water supplies from catchments which together cover so large an area that the complete realisation of this idea, for all its catchments is economically impracticable. In fact, considerable areas in various catchments had already been alienated from the Crown before any large works for artificial conservation and supply of water were undertaken.

The Water Commission is forced, therefore, to accept this position, and to modify the idea to a greater or less extent depending on the circumstances of each catchment.

The catchment of the Otway Waterworks District, for example, is a small one, and used exclusively for town supply. Here the Commission believes that the exclusion idea should be approached as nearly as possible, in order to maintain purity as well as adequate supply.

The catchments of Hume and Eildon Reservoirs, on the other hand, cover several thousands of square miles, and the water from these storages is released into rivers which receive contributions from numerous other streams flowing through alienated country. In such cases, the Commission agrees that it is not reasonable to expect complete exclusion of human
activities from the catchments. It adopts the attitude that in such cases the lands in the catchment areas may be utilised for production to the maximum extent compatible with the preservation of the areas in a suitable condition to fulfil their functions as catchments.

The Commission stresses, however, that in view of the importance of water supply to the State, such preservation should take precedence over other considerations, and a utilisation of the catchment areas should be planned and controlled with that object in view.

Summing up:

1. The artificial conservation and supply of water plays a very large part in the economic life of the State.
2. The higher rainfall or mountain areas of the State form the catchments from which this water is derived;
3. These catchments have usually an importance as suppliers of water very much greater than for their own direct production;
4. While industries may be carried on in some large catchments, they should not be allowed to interfere with the value of the catchments as suppliers of water;
5. Erosion in catchment areas causes siltation of streams and reservoirs, and increase in flooding;
6. Such erosion has already in parts reached serious dimensions;
7. Fire is one of the principal causes of erosion. The more frequent the fire, the greater the erosion risk;
8. Any fire in a catchment, if unavoidable, should be regarded as an unavoidable evil;
9. As far as possible, the incentive to light fires should be removed;
10. All fire control and firefighting activities should be co-ordinated by some central authority, supplemented.
by local committees.

(11) Any fires not approved should be treated as potential enemy and promptly extinguished.

(12) Regular general burning of timbered areas is harmful and dangerous, and should be strongly opposed.

(13) A body should be appointed to investigate carefully use of lands in catchment areas, so as to advise as to the best management in the public interest."

This evidence is necessarily highly generalized because it is very difficult to gather in a brief space the questions which arise out of the utilization of the hills, which vary so much, and where the inhabitants vary. One point I should like to make clear at this stage is that in my statement I refer to the casual attitude of many country dwellers I have met to the existence of these ordinary summer fires. I wish to make it clear for Mr. Swindon's benefit I am not reflecting on the Bush Fire Brigade. I have attended Bush Fire Brigade Conferences, and have been very struck with the keenness of the members. I was referring generally to what we might call "average country dwellers".

THE COMMISSIONER: I think we have encountered that spirit ourselves.

I think we would have understood what you meant.

LUNCHEON ADJOURNMENT.
MR. GOWAN: On page 6 of your statement, you refer to a map of Victoria on which various areas are indicated. Have you that map available?---Yes. I describe it as a map showing the major catchment areas in which the State is interested from the point of view of water supply, with the exception of the catchments in which the Metropolitan Board of Works and Geelong and Ballarat authorities are interested for city supply.

EXHIBIT CC..........................EXHIBIT CC..............Map of Victoria.

The areas marked in red on the map are not intended to suggest areas under the control of your body or any other body, but are merely areas that can be properly described as catchment areas?---That is so.

On page 13, you refer to five soil samples taken on the 9th of March last. Do you produce those samples, and/or refer them to His Honour with your explanation of them?---Yes. No.1 sample was taken from a heap of material which had been washed into a stump hole, apparently recently. As you can see, it appears to have a large percentage of charcoal. No.2 sample was taken from the slope a few yards away and is the average soil of the slope. There is very little, if any, charcoal in it. It appears that the charcoal on that area after the fire has been washed off it. No.3 sample represents soil taken from a patch alongside No.2, but it is apparently of poorer quality verging more on the sub-soil. No.4 was taken from a heap of material which had been washed down alongside the Wood's Point-Jamieson Road near Gaffney's Creek. It is somewhat similar in general character to No.1. No.5 sample was obtained from the slope a few chains above the area from which No.4 was taken. The samples were taken after the fire, and after a 5 inch to 7 inch rainfall.
The purpose of obtaining the samples was to show that on those slopes the rain had had a kind of washing and sorting effect. No sample had been washed down the slope and deposited in the stump holes, or against logs and all over the place. The soil heaped up in that way probably only represented a fraction of the total soil on the slope, because where there was no obstruction that soil would go down into the streams, thence into the rivers, which would help to account for the discoloration of the streams after heavy rains.

On page 10 of your statement, you state that you gathered there were several schools of thought among graziers on the question of burning timbered country. Some are convinced that it is absolutely necessary to burn the bush frequently. Others recognised that burning in the past has caused gum suckers and scrub to grow where formerly there was good feed. They maintain that in areas that have got into that condition, it is necessary to keep on burning to keep down the scrub. A third school of thought does not believe in burning at all. Do you see any particular virtue in any of those schools of thought?—From a water supply point of view, I am inclined to favour the third school, and as a general thing I would definitely favour the third school. That brings up the question of whether or not burning is advisable in a catchment area.

You have dealt with that in a later part of your statement?—Yes.

On page 22 you say you believe that the most satisfactory solution of the problem is that grazing of selected portion of the catchment should continue, such as on the high plains, but controlled so that its most objectionable features are removed. First of all, what do you regard as the most objectionable features of the system of grazing and, secondly, how do you suggest they can be removed?—From a fire point of view, the tendency to which I object most is the repeated burning of areas held by graziers.
believe that that repeated burning will ultimately gravely deteriorate the country which is burnt, not only from the point of view as a water catchment, but also from the productive capacity of the area itself.

How do you suggest that feature can be removed while you are still allowing grazing on the high plains?—I go on to say that I favour the agistment system for grazing on public lands, rather than the system of leasing to individuals or companies.

That is the only suggestion you make about it?—That is my principal suggestion so far as the fire question goes. The reason for that is if you lease a man an area without restricting the number of stock he can put on it, if he is there on a short term lease, his natural tendency is to exploit that area while he is on it. He is not concerned with what is going to happen to it 50 or 100 years hence. Naturally, he desires to make what profit he can from that area. Therefore, the more stock he can put on while he has it, the better it suits him. On the other hand, if he is only allowed to place a certain number of stock on that area and cannot put any more on it, he has not the incentive to burn the area or otherwise interfere with it, with a view to increasing the amount of feed. I may say that from what study I have made of the question of grazing I believe the graziers' main point in burning is the production of feed and not that of safety.

On page 6, you say, 'I am prepared to agree that there may be occasions when the use of fire is necessary and legitimate.' You set out certain cases where you think that would apply. You then proceed to suggest some form of unified control.

Your present opinion is expressed as being in favour of one central authority to co-ordinate fire control activities with local committees cooperating or identical with the bush fire brigades. Without testing that too far, do you
think if you had some system such as that the actual application of the system of fire control might possibly run athwart to the principles set out in your statement, namely, that it may lead to greater erosion or to water systems being affected with impurities, and so on. If you are going to have some kind of central organization, and the steps that organization suggests are to be put into operation by local bodies, do not you think that possibly in those circumstances you might get the very thing you are trying to avoid—That is why I feel that local bodies or local committees should be under the control of a central authority.

THE COMMISSIONER: How would you constitute that central authority?

That is a point on which I do not feel qualified to give a clear or detailed statement, because I feel that to do so I would have to give it much more consideration. I would have to consult the various interests concerned, the existing authorities, to find out what are their powers and responsibilities, and generally to go into the matter much more deeply than I have been able to.

I feel the same way as you do. The suggestion appears to be one thwart with great difficulty, to get the suitable authority constituted in such a way that it would work instead of stalemating itself and the time. Where you get several interests, you have conflict, in spite of the happy hopes of some people on the subject—-I feel that the more conference and discussion there is between the various interests, the greater hope you have of arriving at the compromise which would be acceptable to everybody.

That is not the end exactly, is it? That is not the way to stop bush fires, to have all the departments in a happy state of mind?—There are various methods for stopping bush fires and each has virtues, from one point of view or another, but all of which appear to tread on somebody's toes.
I believe there must be some system, if it could be evolved, which would provide the greatest good for the greatest number. I find it very difficult to set out such a system definitely.

You have not got that all to yourself. I am not saying it would be done in my report, but assuming it might be done, now is the time to discuss it?—The point I had most in mind was, you have on the part of certain bodies an attempt to control fires. The Board of Works has its firefighting organization, and the Forests Commission has its organization for that purpose, although covering a vast area, it naturally has more difficulty with regard to finance. I believe the bush fire brigades have done excellent work and where they operate in firefighting, the fire question has been greatly minimised. There still remains a large area in Victoria where there does not appear to be any systematic measure taken to prevent fires. I want to see some general system applied to bring them into line with areas.

MR. GOWAN: Does that mean that the ultimate of your scheme as suggested in your statement in general lines is that it shall not apply to areas which are at present controlled by water authorities, nor to areas which are at present within the exclusive control of the Forests Commission, but only to such areas as are outside the control of authorities of that kind?—Tentatively, yes, although I believe that if there were some central body which could confer and discuss on such points, it might be possible to persuade each of those authorities to modify its practice. They might find it advisable to modify their practices.

Has there been attempt in the past to try to persuade them to modify their practices?—I am not prepared to say that.

I suppose you are aware that there has been a body of criticism levelled at both of those authorities, since 1928, although
it may be it is an uninformed body of criticism. Do you know whether there has been any suggestion on the part of either of those authorities to modify the policies that they have adopted and put into practice in the past?—I cannot say. Have you any hope that they will do so in the future?—I presume those bodies are governed by reasonably intelligent men, and if they fail to see the necessity for alteration of their policies, they would not be willing to adopt an alteration.

That does not get us very far. You heard a witness suggest this morning that there should be some such authority as this. He was prepared to place the areas at present under the control of the Board of Works and the Forests Commission under the control of an authority such as is suggested. Would you go that far, or do you belong to the other school of thought that says, "Leave them alone, they are sacrosanct"?—I belong to the latter school, because I see the difficulty, in that these bodies are responsible to Parliament for their various operations. They have been composed by Parliament to carry out certain work, and they have that responsibility. To that end they adopt methods which they think fit. If their methods are going to be altered compulsory by some outside body, then I believe they are justified in taking up the attitude that their responsibility goes by the board.

To that extent, it is a choice between maintaining their authority and responsibility in their own areas and leaving them to adopt such fire protection methods as they think fit, and putting somebody else in to take control of their areas so far as fire protection is concerned. There is no half-way house?—I cannot think of any at present.

On page 28 of your statement, you refer to the fact that as you understand it, several witnesses have advocated a policy of general burning through the forests and timbered areas
of the State regularly every few years. May I take it you mean by "general burning", indiscriminate burning?—How do you mean "indiscriminate"?

Not discriminating between any particular areas, but burning wherever it is possible to burn. Is that what you are referring to?—

Do you mean as regards the whole of the timber areas, or one particular area?

I wish you to define the term "general burning" as you have used it in that paragraph?—I should say general burning would be more or less complete burning over the whole area. Supposing there was an area of timbered land surrounded by settlement—no matter how large the area of timbered land—by general burning I take that to mean a policy of burning the whole of that timbered land over every few years.

Now you know there are other witnesses who have eschewed that policy altogether and have said, "No, we are not in favour of general burning in the sense of burning over the whole of the area, but we are in favour of regular systematic burning of particular areas which can be regarded as being of use from the point of view of fire protection". Do you think that comes more into line with your ideas—patch burning, strip burning, burning along the ridges, and in places where it is most desirable to burn from the point of view of fire protection, but short of burning the whole area?—That is to say, there would be a portion of the area never burnt.

(Continued on page 1683.)
Would you favour some schemes like that, provided it was carefully and intelligently carried out with the approval of the authorities concerned in those areas?—I consider any burning in catchment areas is an evil, but it may be advantageous to set aside certain areas and sacrifice them for general burning. I should say that burning in these areas would be unavoidable. There might be some cases in which it would be necessary to burn, even in catchment areas?—Yes.

Quite apart from the question of emergency?—In the case of emergency, burning may have to be done which is not advisable as a regular thing, but in burning such as you have mentioned, such as patch and strip burning, that should be planned ahead and done in a controlled fashion under the best conditions. That should be part of a general plan of fire control.

At the bottom of page 29, you say "Mention has been made of "controlled" general burning. I believe, however, that the control, in the true sense, of such fires, especially in the more rugged and thickly forested mountain areas would be too difficult and expensive a matter to be practical." When you referred to "controlled general burning", you were not referring to the type of burning we were just discussing?—No, not strip and patch burning, or whatever name you call it; that is repeated controlled burning of specially selected areas, with a view to fire protection. That would be easier to control than general burning, because you would select an area or areas having that aspect in view, but the broadcast burning of large areas would take up so much time, with so much risk owing to variation in conditions, that an army of men would be needed to control such work.

Do the same remarks apply to the second paragraph on page 30, wherein you state — "Summing up, I am strongly opposed to the policy of regular general burning of timbered areas, and regard it as a counsel of despair. I believe that it is possible to devise methods whereby the same degree of
safety may be obtained as by the adoption of general burning, without the expense of that method, and without its grave ultimate consequences." Once again, in using the term "general burning", you are not referring to systematic strip or patch burning previously discussed?---No, I was referring to general burning there. In speaking of these methods, I had in mind the adoption of a certain amount of strip and patch burning to be used where considered necessary for fire control purposes, but to be reduced to a minimum.

Going back to page 29 of your statement, you state: "From my inspections and enquiries in the recently burnt areas, however, I believe that under the conditions of the 10th and 13th of January, the policy of regular burning would not have had much effect on the spread of the fires which occurred then. I have been shown areas which I was assured had already been burnt over before the big fires, and yet were burnt again to what looked as bad a state as the rest." Can you tell us whether these same areas pointed out to you had been burnt in the spring or in the autumn?---What I had most in mind was that the leaves had been burnt in the spring or a little before.

We had pointed out to us various places where areas had been burnt in the previous autumn - that is, places which were not burnt by the recent fires in January - although the same thing did not apply to the January fires. Do you think it is possible that areas burnt in the autumn would escape fires in the spring?---It is possible, but it would depend on the intensity of the fires, as well as the wind, and other conditions.

Some areas I saw at Tanjil were right in the centre of the fire; other areas were burnt by fires working quietly across or against the wind, and these areas were not burnt in the main on the 13th of January.

In the course of your experience, have you ever seen areas previously burnt in the autumn burnt out again in the following summer?---
I may have, but I do not recollect any such case at present.

MR. GOITAIJS: (To the Commissioner): I understand, sir, that the erosion report is also referred to in the statement put in by Mr. Strom, and, therefore, I put in this report as an exhibit.

.........EXHIBIT..............EXHIBIT "DD" = Erosion Report.

MR. BARBER: Referring to controlled burning, is this the position—that any sort of controlled burning in practice must be strip burning or patch burning, and that you cannot control general burning at all. When I say "in practice", I mean that such a method would involve a large number of men, quite apart from the question as to whether it is desirable for other reasons. Undoubtedly, controlled strip and patch burning would be very much better than controlled general burning.

Perhaps that is so. At the foot of page 15 of your statement, you say—

"From the erosion prevention point of view, therefore, a large fire every twenty or thirty years is almost certainly less objectionable than a smaller fire over the same area each year." Would not the same reasoning and the same conclusion be arrived at, taking some period rather less than twenty or thirty years, as you have done here. In fact, we have these large fires a good deal more often than every twenty or thirty years. Can you put a limit on the time?—I should say more frequent fires result in more chances of rain falling on bare ground, which is the most immediate cause of erosion.

So that the same principle would apply no matter what period separates the big fires, provided that these big fires come less frequently than every two or three years—In fact, the big fires come every six or seven years, apparently, and they are still better from an erosion point of view than fires every year?—Yes. A very hot fire would cause a greater cleaning of the slopes than a slow fire, but the slow fire would still leave the ground bare, or else there would be not much use lighting it. A slow fire, on the other hand, would not burn away so much of the larger undergrowth, hence it does not leave the slopes so bare.
On the other hand, there is a curious effect at certain periods, in that, if the fire is not too intense, the leaves fall and cover the ground very rapidly, producing an erosion cover in a few weeks.

That would not apply in the case of slow, deliberate burning—Not to the same extent. Generally speaking, I would say every eight or nine years would be the average.

Yes, I wanted you to say whether you were prepared to reduce the period to something more like that obtained under actual conditions. Now, on page 31 of your statement, you refer to the need for investigation of the use of catchment areas. Do you think some general scheme of land classification should be a fundamental basis of national conservation of water and other national resources—That is what I was driving at. Take the question of fire control alone; it is greatly complicated by the present system of land utilisation and distribution mix of population, and I am convinced that there is need for some systematic investigation such as I have outlined, to decide, firstly, what the effect will be of further development, and secondly, what steps, if any, should be taken to alter the existing utilisation of land, with a view to facilitating fire control, erosion control, and so forth. Although this may appear to be a reflection on the Lands Department and the Forests Department, the Lands Department being the authority in charge of all Crown lands, and being naturally concerned in the present and possible future use of this land, and whether it should be alienated and so forth, I desire to make it quite clear that I believe that the Lands Department manages these lands with intelligence and with a view to obtaining the best results from a national point of view, as far as its information goes, and as far as it can go under general government policy, but I believe...
an investigation such as that suggested would be of value to the Lands Department in dealing with land questions generally, including the question of fire protection?—Yes. As a sidelight on the question of forests generally, I consider that forests can only be grown to the best effect in certain areas, and it may be necessary to treat these areas as reserved of forests, and then build the rest of the economy of the hill areas around them. That is a matter I can only indicate; I cannot dogmatise at present. It is a matter requiring further investigation, in order that further light shall be thrown on it.

On page 22, you refer to grazing and the action of some graziers. Are you sufficiently familiar with the grazing industry to be able to say whether the grazing of the High Plains is of more economic value than the grazing of the foothills and slopes?—That is a point on which I cannot speak.

It is a fact, is it not, that erosion is more intensive on the slopes than on the high plains?—Generally speaking, yes, but every area varies according to different factors.

And the slopes of the foothills leading up to the high plains would be more liable to erosion?—Yes, but it would depend on the geological character and various other factors relating to such land.

Do you think it would be good economics to remove the grazing from the foothills and thereby minimise the fire risk and the risk of erosion?—I think I covered that by saying that the grazing of selected portions of the catchment areas should continue, such as, for instance, at the High Plains. Some authority is needed to investigate the whole question of grazing and of erosion. If it could be shown that grazing was causing erosion, and that grazing could not be carried on without continuing to cause erosion, then areas affected should be closed to grazing. Where it can be shown that grazing is carried on without erosion, or
that, with an alteration in method, it can be carried on without erosion, then by all means, let grazing continue.

You will go this far, you will say that, from your experience, grazing is less likely to be harmful, from an erosion point of view, on the high plains than on the lower levels?—I believe that is so.

On page 24, you refer to the fact that fires were already burning in the bush prior to the bad week. We have heard that stated frequently, but I am not aware of any very direct evidence about that. Do you know, from your own knowledge, that any fires were, in fact, in existence prior to January?—I have seen the smoke of various fires.

In this year?—Yes.

In what part of the country?—Generally from the north-east. That is a large area from Mansfield to the source of the River Murray. I have seen so many fires and so often, that I have given up taking particular note of any one fire. I have noted fires with a view of investigating them later, but I encountered so many more fires, that I finally gave it up.

Your experience is that fires have been burning in that part of the country at any rate in the early summer?—Yes.

MR. KEI.SG: Questions have been put to you, Mr. Strom, distinguishing the term you used "controlled general burning" and "strip burning" and "patch burning". What is your mental picture of strip burning and patch burning when you say you are more or less in favour of that and not in favour of controlled general burning? There is apparently some difference in your mind. What is there particularly in your mind as to the element of control in general burning?—Controlled general burning, I take to mean that fires are started in large timbered areas and burnt right through them, and are prevented from breaking away to areas where the settlers do not desire that they should go. Strip burning or patch burning, I take to be the selection of
certain defined areas which are burnt under such conditions as to make them more safe. I am not altogether in favour of just burning fire breaks. I would prefer that, where a break is to be established, the scrub or vegetation should be cut and allowed to dry for a few weeks, and then burnt, while the rest of the forest is still in a comparatively wet condition.

Is that your conception of strip and patch burning in a general sense?—

I consider it better, when burning off areas, to have the scrub cut first. I recognise that that means a considerable expense, and that it may not be financially feasible to treat all fire breaks in that manner. There would need to be treatment according to the locality. You would have to restrict your cutting operations to narrow breaks, and use them as control breaks to burn across the larger breaks.

If you do not do something of that sort, strip burning, when the weather becomes dangerous, might result in uncontrolled burning. There is always a difficulty in lighting fires in the bush. You may light a fire under ideal conditions, and before the fire is through, the weather conditions may change so much that the fire may become very dangerous.

In regard to strip burning, you would require a number of men to be present all the time. Preferable, yes.

Then, without this being even a matter of preference, it is a matter of necessity, otherwise would not the proposal you are making simply result in setting fire to the bush and letting it go?

In speaking of control burning, I understand that to mean that sufficient men would be present to prevent any reasonable risk of fire getting away.

And some form of fire break would be necessary to help them? I suggest a narrow fire break, to be cut first, the larger portion to be based on that narrow break.

Coming down to practical policies, that can only be used in the vicinity of very important fire risk areas, otherwise it would be
too costly, Strip and patch burning as you suggest really comes down in the end to a very limited amount of that class of work in places where there are very special reasons; it would depend on what amount of money was made available. In cases of towns and mills, and other important areas near by, it would be financially possible to spend much more money on fire protection than on fire precautions for large areas of second rate timber. The greater the importance of the area you are to protect, the more thorough your methods, and, therefore, the greater the amount of money available to spend.

Do you think it is feasible to carry out hundreds of miles of that type of burning in the limited time available?—It will cost a fair amount of money, and I am not prepared to suggest any details at the moment.

There is a lot of difficulty in carrying that out generally. Passing on to another matter; you were asked a question about fires in the early summer. Is it not a fact that every person who travels through the bush has the general knowledge that, during November and December, the months during which the forests are most likely to burn—parts of the forests generally catch fire and amount to small fires, perhaps, but, nevertheless, it is a common feeling among all persons concerned that this is so. Is that not in keeping with what you have seen yourself and what you know from discussion with other people?—I have very frequently heard that aspect mentioned by numerous persons, particularly students and others, whose inclination takes them into the bush.

If that is so, it is obvious that one of the troubles is that fire has caught a hold in the bush long before the critical period arrives?—Undoubtedly that is so. I am very keen that all fires occurring in the bush, unless lit for some definite and approved purpose, such as for fire breaks, should definitely be suppressed at the first opportunity, and I believe that if that were done there would be much
less danger from big fires. I will go further, and say that I believe that if every fire has been suppressed this year, there would not have been such big fires.

And not the same risk of big fires? Small fires provide the seed for big fires. In most cases, small fires dwindle away and do no harm, but, if conditions come along as on the 10th to the 13th of January last, small fires often create dangerous conditions, and extend on a big front before you have a chance of dealing with them.

That is so. On the bad Tuesday, fires already had a hold in places on a ten and twenty mile front. You would expect greater fires, when fire risk conditions increase? Yes. It is easy to put out the small fires, than fires on a ten or twelve mile front.

You believe the Forests Commission's slogan is a right one - "Put out small fires, and there will be no large ones"? I do, and that is where I consider the attitude of a great many bush dwellers is not understandable, because they see forest fires in the distance, and they do not seem to regard them as being of any danger to themselves. If the same men saw a snake on the road, they would go to some trouble to kill it, not that the snake would threaten them, but merely because they regard it as a potential danger. Small fires in the distance are of the same potential danger, and of greater danger, in many cases.

(Continued on page 1695)
THE WITNESS (CONTINUED): That is why I want to see the work of the bush fire brigades and similar bodies encouraged as much as possible to develop a system whereby small fires can be promptly suppressed as soon as they show the least sign of smoke. If that were done, it would go a long way to limit the occurrence of big fires.

Did you make any enquiries into the practice in that regard in New Zealand?—I do not definitely remember their practice, but I am under the impression that they follow such a practice in the forests wherever possible. They are under the same difficulty there with regard to unalienated lands. Fires occur occasionally on alienated land and spread to the forests. Incidentally, in New Zealand they have a system of fire boards, but they are merely local bodies. One interesting point is that the insurance companies are required to contribute to the fire boards and they have representation on them, but there does not appear to be any general fire control body for the whole of the Dominion.

THE COMMISSIONER: Where could we obtain some information about their constitution?

MR. GOWANS: I have that information.

MR. KEIL: (To witness): I gather that you are personally in accord with the idea that at any rate from the local point of view for the purpose of water supply the natural condition of the catchment is best—that is to say, the condition in which the forest has developed in the natural way—Yes.

Would any interference with that natural condition—I do not say there might not be good reason to interfere—involve danger in one direction or another?—Without using so strong a word as "danger", I would agree that any interference with the natural forest would tend to depreciate its value as a water catchment, and that the larger the interference the greater the depreciation.

MR. SWINDON: You have been present at conferences in the Victorian
Bush Fire Brigade Association?---Yes.

You have heard the discussions and seen the class of men who go there. Do you not think that those men would be a good sample of men to exercise the powers proposed to be given to the board suggested by Mr. Sambeall this morning?---I believe the Fire Brigades Board represents a body of keen and intelligent men and I believe they show a strong sense of responsibility, but I would prefer to have their efforts co-ordinated by some other body. However keen a local body may be, it may not realise the full implications of its actions in the wider field of the State as a whole.

THE COMMISSIONER: Mr. Swindon is suggesting that certain representatives of the bush fire brigades would be good representatives to have on any central body that might be constituted?---Undoubtedly.

MR. SWINDON: You have never heard any insane, mad, proposition put up at any of the conferences?---I have not heard anything absolutely insane, but suggestions have been made that were impracticable. On the whole it struck me that they conducted their functions with a great deal of common sense.

You mention in your leaflet that you are in favour of a yearly retainer being paid to members of brigades. Members are only too willing to give their services and do not ask for any retainer. Would you favour men being paid to patrol fire areas in Crown lands?

THE COMMISSIONER: I do not think that is within Mr. Strom's province. I think he has come here more as a technician.

THE WITNESS: If I may offer a personal opinion, I should say that these men should be paid, but I am not prepared to say by whom. Due regard would have to be given, however, to the danger of the men sighting fires in the expectation of being employed in putting them out.

THE COMMISSIONER: Your mind is not entirely academic?---I was reading recently an extract from New South Wales Hansard in which
that point was mentioned.

MR. BARBER: Except in remote areas, such as in the north-east, did you see any fire in the bush in the late spring or early summer this year that was burning without being controlled? I am putting it to you that there were no fires except in the remote bush that were not dealt with or controlled in the early summer?—

—When you see a fire in a timbered area in the bush, it is hard to know whether anybody is present or not.

I am not suggesting that there were no such fires, but have you any reason to believe that any fire was left to look after itself and was not under the control of some authority?—There was a fire early in November not far from the Elidon Weir. It was burning quietly. I did not see anybody anywhere in the vicinity. That would be private land?—I am not sure. I did not have a map and did not investigate that point.

Is that the only one you can recall?—That is the only one where I passed through the fire without seeing anyone present. I have seen a number of fires this summer on the hillsides in the distance, but I did not investigate them.

You realise that Forestry Officers have been fighting fires since as far back as September, 1938?—I can quite believe it. Many of the fires were miles away from any forest that I knew of.

MR. GOWANS: When you referred to the fire boards in New Zealand, were you referring to the system of fire districts?—Yes.

That is a system by which certain districts are constituted fire districts for State forests and private land, and certain powers are given persons in control of the areas?—I believe so. I have not studied the question in detail. I raised the point as a possible avenue for exploration.

I have a pamphlet issued by the New Zealand State Forest Service in which it is stated that—
"A fire district as constituted in terms of the Forests Act, 1921-22, consists of any area of Crown or private land which, for the purpose of securing the safety of State forests from damage by fire, has been declared by notice in the Gazette to be a fire district. The fire-district principle has for four years formed an important feature in the forest-fire protection policy of the State Forest Service, and has proved so successful that provision was made in the Forests Amendment Act, 1925, for its extension to provide protection to forests on private or other lands of an area not less than 200 acres.

"Local bodies, afforestation companies, and private individuals may now avail themselves of the provisions in the Act for the protection of their plantations."

Actually, as I read it, a private company may apply to the Conservator of Forests for the appointment of a fire district in the area controlled by the company. That company is then given certain powers with regard to fire control and fire prevention, and it may even carry out fire prevention measures in the area immediately around. That is done apparently at the risk of the particular company in whose area the fire district is constituted. The company, for instance, lights a fire for fire prevention purposes, and if the fire gets outside its own area, the company becomes responsible. That is made part of the conditions of the application. The pamphlet further says as to the advantages of the fire-district system:

"Although the danger to plantations from fire may be lessened considerably by efficient external and internal fire-breaks, by the use of proper appliances, and by good organization, for the prevention and control of fire within a plantation, the fire-district system gives a plantation-owner the power to extend the
organization to adjoining lands in order to control the lighting of fires on those lands during the closed season.

The plantation area and all adjoining lands comprise the fire district, and, once it is constituted, any period or periods of the year when, owing to weather conditions, the fire danger is greatest may be declared closed seasons.

"The honorary ranger in charge of the fire district, having granted permits, knows when fires are to be lighted, and can then take steps to prevent damage to the plantations should the fire get out of hand, even though all the precautions prescribed by him are carried out. Should any outbreaks occur, he may summon aid from the surrounding district.

"The system is also of great benefit to the owners of land adjoining plantations, though at first they may consider any control a hardship. Any owner of land is liable for damage caused by a fire lighted by him which spread from his property. No protection measures are required on the part of the owner of an adjoining property, nor is he compelled to take any precautions whatsoever for the protection of his property. It rests with the owner who lights a fire to prevent its spread to adjoining lands, and he has no authority to demand help to do so. Hence as efficient fire-protection measures on a plantation area are necessary before a fire-district will be constituted, adjoining owners gain a distinct benefit at no expense and with little hardship to themselves. The system calls for co-operation between the plantation-owner and the owners of adjoining properties, and the successful working of the system is of mutual benefit to all concerned."

1697.
THE WITNESS: I think there is wider provision than that in the fire district system.

What other material are you referring to?---I have here a local authorities' handbook of New Zealand which I borrowed from the New Zealand Government trade agents. If Your Honour pleases, I will leave it with you for perusal of the relevant portions.

THE COMMISSIONER: Do you think you have authority to lend it?---(Witness:
Perhaps Your Honour might like to make the application.

I think you had better lend it to me and we will see what happens.

You seem, Mr. Strom, to have given a great deal of thought and gone to a lot of trouble in this matter. I thank you for your evidence and your attendance.

(The Witness withdrew).

THE COMMISSION ADJOURNED UNTIL 10 A.M. ON

WEDNESDAY, 22nd, MARCH, 1939,

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Author/s: 
Victoria. Parliament

Title:
Transcript of evidence and Report of the Royal Commission to inquire into the causes of and measures taken to prevent the bush fires of January, 1939, and to protect life and property and the measures to be taken to prevent bush fires in Victoria and to protect life and property in the event of future bush fires.

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