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(1A)

THE JARRAH and FORESTRY PRACTICE

(An Historical Record)

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JARRAH, Eucalyptus marginata ( ) is exclusively Western Australian, being endemic in that State. It would be naive to attempt a complete history of this forest for it may be nearly as old as the laterite formation on which it reaches its best development.

Practically nothing is known of its growth and development prior to the advent of white man in 1829 and very little is known of it in the first 100 years of settlement thereafter. Certainly it was first collected as botanical material near Albany by the Vancouver expedition of 1792, which claimed all this western land in the name of the Crown.

After the turn of the century perhaps the most often recorded observation of the Jarrah forest was of the great trunks which caused "fallers" to work at a height on springboards to overcome the butt swell near the ground. * In fact, prior to World War I this phenomenon was an attraction to visitors and others interested in the timber cutting operations, leading to export to many countries of the world.

It may therefore be worthwhile to record some observations which have been made in the past half century before they are lost into the passage of time, in the hope that such a step may stimulate thoughts in present-day foresters.

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* Photo -

Lieut. J. Beggs, 28th Battn. 1st Australian Imperial Force, as a young man in the Jarrah forest. His partner was C. Dohnt, a noted Jarrah "faller".

This period moreover has been of great importance historically because of the introduction of forest science associated with observation, experiment, and modern forest practices. The Forests Act, passed in 1918, paved the way for sound forest management.

In 1922 the Jarrah tree crowns in the lower quality virgin forest beyond the prime belt in which logging was taking place, ~~the crowns~~ were seen to be umbrageous with no marked abnormality. Even under the lower rainfall at the northern end of the Jarrah forest, the crowns were well developed, and apparently normal eucalypt crowns. Indeed, a feature was the wide sapwood, which with its greater width than in the higher quality forest, to the south, was unexpected.

The width then of wide sapwood regarded as an indication of the rate of growth of the tree was, it seems, a function of leaf area, and not of quality class as might normally be expected.

By contrast in the higher quality forest where trade cutting had been taking place for some sixty (60) years, the striking feature was the poor condition of the crowns of the mature trees. It was seen that they consisted of a gaunt framework of limbs which were dead for some twenty (20) feet or more from their extremities. Near the bole of the tree, from which these limbs had grown, epicormic branches had developed from the lower parts of the limbs to make a scanty leaf-top for the tree. The occurrence of prominent sapwood was indeed a rarity.

Attention was to be directed to this relationship later in dealing with the utilization of trees growing in partial clearings on farm-lands, where the scattered remaining trees had better crowns. Sleeper cutters

hewing sleepers from trees in farm paddocks, were unaccustomed to the thickness of sapwood prevalent, and found numbers of their sleepers rejected because of too great an amount of non-durable sapwood.

Marri (Eucalyptus calophylla) ( ) which grows in mixture with the Jarrah trees in the Jarrah forest, did not show the same severe malformation of the crown and carried small branches towards the extremities of the limbs. The whole crown of the Marri, however, could only be characterized as sparse.

Aerial photographs taken somewhat later (in 1926) by Capt. Stan Brearley, at much lower elevation than is adopted today, permitted an examination which could clearly distinguish Jarrah from Marri trees. These photographs confirmed that the observations made in 1922 on a naturally somewhat smaller scale, were still valid as applicable to a much greater area. The pictures showed the whitish dead upper limbs of each Jarrah tree somewhat like a clear star, in contrast with the darker Marri crowns which retained some branches and leaves on the upper limbs.

There had been considerable comment in writings, notes, and letters over the years on the natural occurrence in the past of fires in the Jarrah forest. The starting of fires by natives and by lightning were given as the most common causes.

Although this conclusion was possibly quite correct it seemed no serious thought had been given to the undoubted fact that, given similar weather conditions the severity of fires varied from moderate to severe. Eventually, however, the influence of forest fuels in relation to fire damage at last came to be recognized.

An early development following the introduction of forest management after the passing of the Forests Act, was the attention given to the minimizing of the damage caused by forest fires. In 1921 C.E. Lane-Poole (/) the then Conservator of Forests, instituted varying forms of fire control in two regions of the Jarrah forest and in the Tuart forest (Eucalyptus gomphocephala) ( ).

In 1923 the first positive steps were taken to deal directly with the forest fire fuels, and the specific damage these particular fuels caused. Initiated by the then Conservator, S.L. Kessell (2), a study was undertaken of the feasibility of removing piled logging debris from around the butts of the immature trees left standing under the minimum girth restriction then prevailing in the trade cutting.

Foresters L.N. Weston and J. Beggs were seconded for this work, and in 1923 Forester Weston read the first paper on the subject at a Conference of Senior Forest Officers of Western Australia. (3) (Forester Beggs did not attend this Conference as he was absent on this special assignment.)

Trials proved the efficiency of the cutting and removal of the logging debris to a distance of at least three (3) feet from the butt of the tree to be protected. With the subsequent provision for controlled burning of the cutting area prior to logging, the heaps of debris after logging were ignited separately in spring or autumn when the fires could not burn together. This procedure successfully prevented the fire-killing of good immature trees and avoided the damage caused formerly by indiscriminate burning of the logging slash. The results of this work were indeed spectacularly successful.

The operation was subsequently called "top disposal" and adopted into general practice in the Jarrah forest. This simple procedure must be regarded as the most forward single step taken in the task of seeking ways to reduce fire damage in the Jarrah forest.

~~The focussing of attention in this~~ This practice focused attention way, on the preservation of ~~the~~ immature trees, and illustrated the need for tree-marking to ensure the retention of fast-growing trees, irrespective of a rigid girth limit. Some years later when tree-marking did become general practice, the tree-marker indicated by the position of the axe blaze, the direction in which a tree must be felled to avoid damage to an immature tree. If it was deemed impracticable to avoid hitting a valuable immature tree, a potential mill log was withheld from cutting for the mill.

The change in the forest fire fuels, from the condition prior to the advent of white man was highlighted by the debris showing after logging for the sawmills. The holocaust brought about by the burning of the tops and litter in summer killed many and sometimes all of the remaining trees, including immature trees left under minimum girth restrictions, damaged others and led to the introduction of top-disposal.

This operation did not change materially with the introduction of tree-marking which permitted the retention of immature trees to a higher girth of 10 feet and above instead of the rigid ~~nine (9) feet~~ 90 inches under minimum girth control. But tree-marking did indicate the direction of fall of a tree and thus avoided the piling of debris against a tree desired for retention.

However, top disposal, successful though it was in its main purpose, could not remove the debris from the forest floor. The parts of the trunks not utilized, the big limbs and a considerable proportion of the branches remained to provide fuel for subsequent fires. Jarrah is a relatively fire-resistant timber. Each piece of Jarrah litter remains for many years, though successive fires do reduce the size of the piece gradually.

Penetration by ~~hot~~ SEVERE fires of adjoining virgin bush took place causing the killing of limbs and occasional trees, a process which was repeated again and again over the years. Thus a very difficult condition from that of former times was developed in large parts of the forest even before trade-cutting took place in any new section of a sawmilling permit.

The Department later became concerned about the damage caused to forest by land clearing nearby. With close scrutiny of each particular case in relation to fire hazard, in addition to objections to loss of good forest, alienation of small blocks within the forest perimeter was greatly reduced. It was some years later before the economic pressure to permit increase in area of an existing farm holding, could be withstood.

Studies begun about this time, and continued for several years, established the simple but important fact that no fire scars existed on the interior surface of recently cut stumps, but were to be found on or near the periphery of these stumps. Thus it appeared that prior to the coming of white man to the Jarrah forest, severe fire damage was not suffered by the Jarrah trees.

By the late "twenties" it was clear that wild fires among logging and clearing debris caused much more damage to the trees that fires running in virgin bush. The added fuel on the forest floor and weed growth were

the governing factors for the same weather conditions.

A marked vegetative change in this century had been the conversion in some places of paper-bark (Melaleuca pubescens) flats to swamps. As recently as the early-twenties a paper-bark overstory with a very sparse ground cover could be found along the upper reaches of some prominent streams in the north of the prime Jarrah belt. The white unblackened stems of the paper-barks were prominent. There were no ground plants, and the floor was merely a thin litter. This type did not support fire. By gradual attrition fires in heavy debris near the border (of the type) penetrated firstly the edges and subsequently deeper into these damp glades. The erosion of the type continued with time. With the deterioration of the local canopy and the rise in the water-table as a consequence of the dilapidation (breaking up) of the canopy of the forest on adjoining hills, conversion of the glades to swamps with tall reeds took place. After the development of the swamps the dead paper-barks could be seen for many years protruding above the rushes and reeds.

In 1926 Forester Weston reported, at Collie, the first recorded observations of the death of all the trees in a piece of Jarrah forest. This pehonomenon subsequently reported elsewhere ( ), and usually associated with winter water-logging of the ground, became known as "dieback".

Gradually the seriousness of the bush fire became generally recognized in the South-west of Western Australia and private land holders organized to combat and control the bush fires in co-operation with the Lands Department, and a Bush-Fire Advisory Council was formed.

By the "thirties" fire control measures by the Forests Department had been extended east towards the limits of the Jarrah forest, and south almost to the Southern ocean covering some four (4) million acres of forest. The forest was divided into A, B and C zones of priority for attention on the outbreak of fire.

The C zone covered the less accessible and, for the most part, poorer quality forest. It had the lowest priority for attention to out-breaks of fire and was also intended for extensive controlled burning to reduce summer out-breaks in these more distant areas. However, controlled burning which had to be done only in suitable weather conditions (and with very limited funds available) proved very difficult in practice. The operation developed in the main to sporadic and somewhat indiscriminate lighting in early summer and autumn of areas in which fires would run.

The A zone covered areas of high-quality forest, both virgin forest and regrowth resonably near forest district headquarters and settlements. Here forest workers were available to conduct controlled burning, forest maintenance and fire suppression. The aim was to put out the fires as soon as possible after out-break. The zone was not a compact whole but included outlying areas of high-quality forest as at East Kirup and Ellis Creek.

The B zone was mostly high-quality forest depending somewhat on boundary irregularities. It was, because of location, generally less accessible to the established fire gangs. Outbreaks of fire were attended early except when the priority of A zone prevented this action.

Fire control in the A zone was originally based in the burning of the outer fire chain strips of each 500 acre compartment making strips 10 chains wide in total.

The controlled burning of these strips between the fully protected sections became impracticable, and the attempt failed. With the modern equipment available today, when water can be played on burning hollows 70' to 80' above ground level, it may have been successful.

With the passage of time and the spread of sawmilling and land clearing into the lower quality forest south and east, forest crown deterioration followed there.

In the south the deterioration (break-down) of the Jarrah forest canopy with its reduction in leaf area led to a rise in the winter water-table at first in streams and hollows. Free water could then be seen in winter at levels formerly dry throughout the year. More recently, in the "early-fifties", this was striking south of a line from Busselton to Nannup. The winter appearance of free water on the surface at lower levels became more common. The Jalbarragup Road from Busselton south-eastwards to the Blackwood River, and long a landmark in the south-west, became submerged in water in parts during the winter rains. Crown deterioration, with which surface flooding is associated, became still more widespread. Exceptions occurred where the upper reaches of tributaries of the major river, the Blackwood, formed steep-sided gullies in which the Jarrah trees carried much better crowns in the well-drained formation.

In the north while the topography as a whole is gently undulating, the terrain is dissected for the most part by marked streams and water courses and is on the whole well-drained. Exception ~~also~~ ALLY excess water in the surface soil in winter could be found in small areas even near hill-top. Sufficiently wide-spread water logging in weak drainage areas north of Jarrahdale led to conversion then of the native forest to fine plantations.

The benefits enjoyed by forests generally from a forest floor and humus, or a decomposing litter layer are lacking. Could they be replaced temporarily by other means? The early work with fertilizers included trials with added potash in spot-sowing Jarrah seed in blanks after trade-cutting. This followed the determination of a high potassium content in Jarrah limbs and debris. Colour response to zinc salts was shown subsequently at Jarrahdale. Nitrogen would appear from the present litter lack to be an element worth trying now. Dense crowns are usually developed on Jarrah trees remaining in pastures though many die subsequently.

There do not appear to be many grounds for improvement in the Jarrah forest. In view of the sad deterioration over the past half century, is the Jarrah forest doomed to extinction over a large part of its habitat?

To add to this concern more recently a pathogen has been found to be associated with the roots of Jarrah trees. This is PHYTOPHTHORA CINNAMOMI ( ).

It is, however, some consolation to know that with the continuing prevention of fierce fires in logging debris, crown deterioration is not being aggravated in the prime forest belt and immature trees are retaining satisfactory crowns under present forestry practice.

Jarrah is a household word in Western Australia and the preservation of the high quality sections of this once great forest is very much to be desired. The means of doing this through the insight from knowledge of Foresters need to be provided now by the State Policy Group for those who follow.