Highlights of the 2018 Kalgoorlie-Boulder Meeting

by Morris Lake #7634

This unique site for the IWCS Australasian Conference and Annual General Meeting, Sunday 16th – Saturday 22nd September, 2018, attracted 42 members to the great western woodlands of Western Australia for what turned out to be an exhilarating meeting.

Typical landscape for the Kalgoorlie woodland region of Western Australia

Members arrived by plane, train, four-wheel drive—with many towing a caravan—and Kalgoorlie was an unforgettable experience. Adding to this, no one expected to be entering a multimillion hectare "woodland" in the "dead heart" of the driest continent on this planet. David Munzberg pointed out, Kalgoorlie-Boulder is one of the most remote cities in the world (in the Goldfields region is south eastern WA). This meeting was possibly the most remote IWCS meeting held in the world—WOW. Also, most of us left home in a near record-breaking drought—and the two superlatives just never appear together—desert and woodland. Surprise number one. But here we were—so let's get on with the story.

On Sunday, for those arriving early, we all met at the Goldfields Art Centre, which was to be our conference centre for the week—and a beautifully apportioned community centre this was. The layout and preparations began, with greetings all-round.

Monday started with a visit to the Kalgoorlie Town Hall, where we were introduced to a bronze statue of Patrick "Paddy" Hannan who was the gold prospector whose lucrative discovery of gold on 14 June 1893, near Kalgoorlie, set off a major gold rush in the area.

We were then shown through the old Town Hall and received a comprehensive history of the 125 years of gold mining in the now city of Kalgoorlie and its surrounding 'flat earth'.

Bronze statue of Patrick "Paddy" Hannan on display in the Kalgoorlie Town Hall

During the evening session the Mayor of the City of Kalgoorlie-Boulder, John Bowler welcomed us and opened the meeting. John Lyons, the AustralAsia trustee, presented him with a gift (made of 17 species of wood from the Goldfields area) and thanked him for the generous contribution to the conference.

Mick Cotter, OAM (Order of Australia) and former MP (Member of the Parliament) for Kalgoorlie, spoke about the early days around Kalgoorlie. He told what it was like during his early life in the area as a pastoralist, miner, prospector and contractor before his election to Canberra in 1975. He introduced those present to the era of "woodlines".

View of Kalgoorlie from the Drilling Rig on the edge of town showing the extensive tree-planting in this 'green' city

The Great Western Woodlands and the History of Woodline Cutting

Notes from the address by Ian Kealley #9748

The first question I want to answer is: *"What is a forester doing in the Goldfields?"*

The answer, in the following presentation, I hope will explain this conundrum.

Professional forestry has a long history of involvement in this inland woodland because the southern interior of Western Australia includes extensive areas of woodland, forest, and inland deserts. Each of these contain potential timber species in varying quantities.

In summary form, there are an estimated 13 million hectares (32 million acres) of acacia woodland (mulga) and 8 million hectares (20 million acres) of eucalypt woodland and forest—and the area we are talking about was extensively harvested between 1900 to 1960. It was mainly clear-felled for mining timbers and fuel for the major mining centres and towns which developed following the discovery of gold in the 1890s.

Early mining centered on 16 million hectares. This contained 8 mil¬lion hectares of woodlands, 2.6 million hectares of mallee, 3.2 million hectares of sand plains and 2.2 million hectares of other land types.

The mining areas also contained many species, predominantly eucalypts, which have important economic value. The timber potential was a huge resource with unique properties. The wood contained grain, figure and colour—although their high density made sawmilling, drying and processing difficult.

There are 260 timber species within the Coolgardie, mallee and wheatbelt areas. Forty km (~25 mi) north of Kalgoorlie you pass out of the eucalypt area, and into the acacias. There are roughly 4,000 species of flowering plants in the Goldfields of Western Australia or 20% of the total known Australian flora species. The location is diverse with extensive fauna species. It also includes 160 Eucalyptus species, representing nearly 21% of Australia's 754 Eucalyptus species. There is also a rich fauna.

The economic values for the area, which include mining (iron ore and gold), pastoral (cattle and sheep), towns (including an arboretum), explorative (sandalwood), forestry (inland forestry), tourism and local government, contributed to development.

In the early days of gold mining everything was driven by steam, and the easiest way to create this power was by burning wood. As well as its use as a fuel, timber was used for mine props and other mining structural work. The timber was originally carted by trucks, which were eventually replaced by the construction of the Woodline Railway. It was specifically built to carry timber.

Between 1906 and 1921, 120 miles (~193 km) of woodlines were constructed. That meant everything within 120 miles of the mine was cut and carried to the mines. Also, it was necessary to carry water supplies for the steam trains.

Between 1900-1960, 3 million hectares of woodland were clear-felled, yielding 30 million tonnes of wood. Rows of logs were stacked on end ready to be loaded onto the Woodline. By 1940, 1,200 tonne/day of wood was being taken into Kalgoorlie. This accounted for 8 million hectares of woodland being clear-felled. Today, following regeneration of this area, there are 3 million hectares of 50-110-year-old woodland regrowth. Since 1965 most of the energy used for mining has come from electricity generation and diesel fuel engines.

Ian summed up his attitude to the use of timbers in this final three pieces of advice:

1. Wood has evolved as a functional tissue of plants in their need to survive - not as a material designed to satisfy the needs of woodturners.
2. If you are going to hug a tree you must have functional reference.
3. Don't trust a woodworker with a chainsaw!

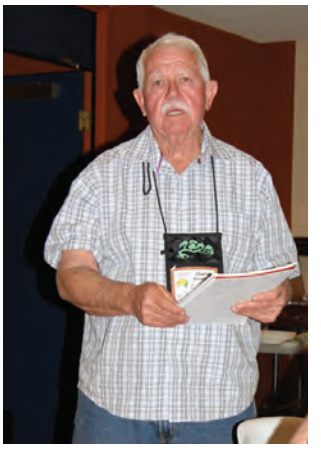
View over Kalgoorlie from 'waterworks hill'

Kalgoorlie Arboretum

On Monday afternoon, Charles Broadbent accompanied interested members on a tour of the Kalgoorlie Arboretum at Hammond Park where mostly eucalypts were planted during a period from 1955 to 1975.

The list of species along the Gallery Walk Trail (Trail 24) is as follows:

1. *Eucalyptus stricklandii* (Goldfields yellow-flowering gum)
2. *E. brockwayi* (Brockway's gum)
3. *E. griffithsii* (Griffith's grey gum)
4. *E. lesouefii* (Goldfields blackbutt)
5. *E. kruseana* (Kruse's or bookleaf mallee)
6. *E. gracilis* var. *yilgarnensis* (mountain grey gum)
7. *E. campaspe* (silver-topped gimlet)
8. *E. dundasii* (Dundas blackbutt)
9. *E. eremophila* (Eastern Goldfields horned mallee)
10. *E. salubris* (gimlet)
11. *E. woodwardii* (lemon-flowered gum)
12. *E. youngiana* (yarldarlaba)
13. *E. torquata* (coral gum)
14. *E. salmonophloia* (salmon gum)
15. *E. oleosa* var. *obtusa* (acorn mallee)
16. *E. torquata x E. woodwardii* (*Eucalyptus* 'Torwood', naturally occurring hybrid)
17. *E. ewartiana* (Ewart's mallee)
18. *E. transcontinentalis* (redwood)
19. *E. diptera* (false or bastard gimlet)
20. *E. websteriana* (Webster's mallee)
21. E. *camaldulensis* (red river gum)
22. *E. astringens* (brown mallet)
23. *E. caesia* (gunnunna, gungurru)
24. *E. clelandii* (Cleland's blackbutt)
25. *E. erythronema* (white-barked mallee)
26. *E. erythronema* var. *marginata*
27. *E. ebbanoesis* (sandplain mallee)
28. *E. eremophila* (Eastern Goldfields horned mallee)
29. *E. foecunda* (coastal dune mallee)
30. *E. flocktoniae* (merrit)
31. *E. gardneri* (blue-leaved mallet)
32. *E. gracilis* (kong mallee)
33. *E. intertexta* (smooth-barked coolibah)
34. *E. kondininensis* (black yate)
35. *E. kruseana* (Kruse's or bookleaf mallee)
36. *E. longicornis* (red morrel)
37. *E. oldfieldii* (Oldfield's mallee)
38. *E. occidentalis* (flat-topped yate)
39. *Acacia acuminata* (raspberry jam)
40. *Melaleuca hamulosa* (no common name)
41. *E. celastroides* (mealy blackbutt)



Charles Broadbent (#8489)

Our next stop was at the Two-up Shed—a "not too-salubrious" corrugated iron shed in the middle of "nowhere". It was an "alternative attraction" to the "skill" of finding "enormous pots" of gold. Instead, prospectors could win "large sums of money"—"with a little bit of luck", at a location "of very low capital expenditure", and as a "leisure time activity". It would seem obvious that the "winners" were also wise enough not to be tempted to reinvest their winnings in any dubious capital expenditure.

I guess the facilities were indicative of the whole process of gold mining! There were some winners, but mostly losers!

This Two-up Shed was simple to construct, low on maintenance, out of the way, but always full of hope! I think Charles has lost one of his pennies!

Commercial harvesting of Sandalwood

On Tuesday, we started the day with a tour to view the operations of the sandalwood industry. This involved a visit to a private property at Mt. Vetters station in the acacia area.

The sandalwood industry is under the control of the Forest Products Commission (FPC) and is based on a 250 tonne/year (~551,150 pounds US per year) harvest of sandalwood, which will yield a profit of A$14 or A$15 million per year. We were accompanied by two FPC officers.

There are 11 contract properties on Crown Land and all the properties being on a Pastoral Lease. Each property comprises around half a million acres, and the annual rainfall is 250-30 mm (10–12”) per year.

Sandalwood is a parasitic plant, which grows in association with an acacia tree as its host plant. Around 50% of the harvest is from green plants and 50% from dead plants, however the trunk must be a minimum of 127 mm (approx. 5”) in order to be harvested from Crown land. The harvest includes roots, butts and branches.

The tree is ripped out with the least possible disturbance of the host tree. The area around the tree is then prepared and three sandalwood seeds are then planted in the original hole. The resulting successful propagation results in 1-5% survival and the growth rate roughly averages 1 mm stem-diameter growth per year, which means an approximate 125-year harvesting cycle.

The seed is planted using a seeding machine and the seed consists of a mixture of 50% normal seed, 25% cracked and 25% cracked with an acid treatment to assist digestion of the seed. Planting is be¬fore winter, between November to April, and only following 25 mm (1”) of rain to germinate and bring the young plant to the surface. Following seeding, the area is subject to light grazing pressure with no goats present for two years after planting. The mature sandalwood roots spread up to 20 metres (~66’). The contract for this harvesting operation is to sup¬ply 70 tonnes of wood, and the average has been 60% green with 40% dead and 20% green roots.

The property area is broken up into cells and is harvested a ‘cell’ at a time. The sandalwood is dried and cleaned and packed in bins, each containing around one tonne. The approximate return is around A$10,000 profit per tonne from the final production of sandalwood oil. Of this return the grazier (rancher) receives around 25% or A$2,500/tonne. The grazier also has the opportunity to do all the contract harvesting work as part of his operation, but is required to supply the capital equipment.

Newly harvested sandalwood ready for cleaning and drying

Sandalwood packed in approximate one-tonne containers

Harry Dennis (on the left) presenting pens to Forest Product Commission officer and grazier Justin in the centre

A desirable mature sandalwood root with indications of a high oil content as determined by its age and maturity

Sandalwood Oil Extraction

Our next visit was to the Dutjahn Sandalwood Oil Plant in Osborne Park, where the plant manager, Mark Davis, guided us through the process of extracting the sandalwood oil from the dried and prepared sandalwood (*Santalum spicatum*) fibre.

After harvest, the raw sandalwood goes to Perth where it is crushed and then returned in 3-tonne bags for oil extraction.

There are three grades of sandalwood as follows:
• WASP (WASP= WA Sandalwood Plantations PTY Ltd.) sandalwood is harvested from 15-18-year-old trees and has a yield of approx. 10 kg of oil per tonne.
• FPS (Forest Products Sandalwood) is older growth wood and has a yield of 24-27 kg of oil per tonne.
• Kookaburra sandalwood, which is from 100-year-old-plus trees has an oil yield of 30-35 kg per tonne and, as a preground product, has a value of A$20,000-25,000 per tonne.

Sandalwood oil is extracted to an ISO standard, and can then be blended into batches in accordance with the requirements for its use. The pure oil has a market value of A$2,000/kg.

Each 6-tonne capacity batch can take from 4 to 10 days to process in the steam pots, depending on the oil content. The spent sawdust is used to produce incense sticks. For all that time, steam is passed through the pots and finally exits through a 'separator' where the oil rises to the top and can be decanted off as can be seen in the shot below. The steam process is automatic and operates 24 hr/day.

The spent 'charge'—now almost free of oil, is sold to produce joss sticks or goes to Thailand for the production of incense sticks.

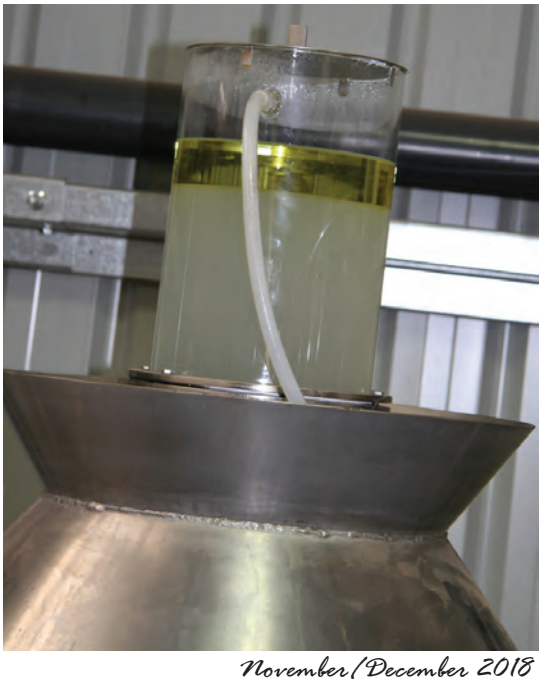
The oil is then tested for quality and is transferred into 20- or 50-kg aluminium containers ready for sale.

The volatility of sandalwood oil is lower than that of eucalyptus oil.

Bags of crushed sandalwood awaiting oil extraction

Sandalwood ready to be loaded into the steamer

Mark Davis discussing the operation of the steam pots on the left and, on the right can be seen the sandalwood oil which has collected in the glass bottle at the top of the separator



KCGM Gold Mine

It's difficult to describe adequately our visit to KCGM's (Kalgoorlie Consolidated Gold Mines Pty Ltd.) gold mine on Wednesday morning, because of the enormity of what we saw. First, this hole, super pit, is 3.5 km (~ 2.2 mi) long and 1.6 km (~ 1 mi) wide and is currently 620 metres (~2,035') deep but will get deeper and wider.

The original mine began with individual mine shafts which finally amounted to 4,000 km of tunnels, before they hit water and decided to send the trucks in.

They have now removed 156,000,000 tonnes of rock which has yielded 20,000,000 ounces (~ 57 tonnes) of gold at an average of one tonne of gold for each 2.7 million tonnes of rock—whew!

In the beginning, some of the early gold shafts were situated in the middle of hotels, i.e., the hotel was built at the top of the shaft, so that the miners didn't have to walk far to get a drink at the end of the shift—or something like that. When they got up to 80 mine shafts, the area became known as 'The Golden Mile". A couple of the mine shafts became too deep, and so they simply started to dig a bigger hole and tip all the non-bearing rock down the old mine shafts until they were full. Then they dumped the rock around the ever-expanding surface, so it's difficult now to detect the original 'ground zero', and you have to drive up a hill to get to the edge of the mine.

Also, the bottom of the mine has now reached a water-table of salt water, which was one of the major reasons for the beginning of open-cut mining in the first place.

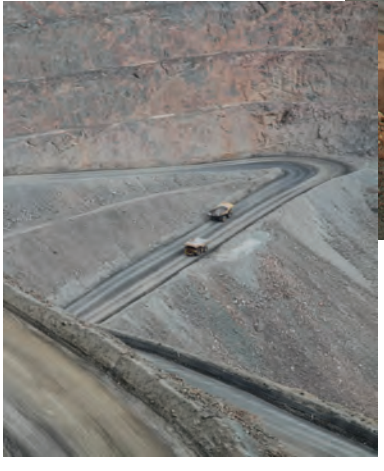
The rock, as it is mined is graded according to gold con¬tent, with the highest grade being extracted first, and the lower grades piled up around the top of the mine, ready for possible later processing as determined by the prevailing gold price.

In the second photo, you can see where there was a big 'slip' in June this year. It happened on a Sunday afternoon, and was accompanied by two earthquakes registering 2.6 to 2.9 on the Richter scale. Repairs to that area are now in progress. At any one time, 2 km of conveyor belts are carrying ore, and there are normally 1200 workers in the mine area and 70 workers, etc., at the base of the pit.

The Caterpillar trucks cost A$5m each, weigh 166 tonnes empty, and carry 250 tonnes of ore, bringing a load to the top of the mine in 25 minutes. Each Caterpillar will do 10-12 trips per day. These huge trucks have a 3,900-litre (~1,030-gallon) fuel tank, plus 270 litres (~70 gal.) of oil for hydraulics. A new tyre costs A$40,000, weighs 5 tonnes and takes an hour and a quarter to change.

Overall view of the mine. The white or orange coloured areas indicate quartz containing gold, while the grey indicates dolomite, but also with some gold, and the black stripes are carbon (burnt and compressed organic matter). There is currently no technology to extract gold from rock chemically, so the process is all down to grinding and separation on the basis of density.

On the right is the site of a big 'slip' which occurred in June this year.



Caterpillar trucks creeping up the slope towards the top of the mine

Logs and mine shaft supports from the old mine shafts which have been carted to the surface and will eventually find a home

Wood Auction

It's difficult to imagine an IWCS Annual Meeting without a wood auction. This auction, despite the distance travelled by members, netted the IWCS A$3,765. A great effort by all members, both buyers and sellers, it was also good fun, and David Munzberg brings interest and enjoyment to the whole show. Thanks to David and his auction crew.

This was supported by the magnificence of the items members displayed showing the work they had been doing. Later, they had the opportunity to tell us about their work.

Auction items for inspection prior to the auction

Members display items on show

Credo Station

On Thursday, we travelled to Credo Station, about 70 kilometres (~44 miles) north of Coolgardie, the home of Goldfields Specialty Timber Industry Group (GSTIG), where we were given a demonstration of slabbing.

Credo Station was originally owned by the Halford family until 1986. It later became a research station studying fauna and flora after pastoral station management ceased and recreation management took over. In 2007, the Goldfields Specialty Timber Industry Group, set up by the Department of Conservation and Land Management (CALM), were able to use the station, creating an interest in Goldfields timbers.

As the area was originally clear-felled, and since there was little information on Goldfields timbers, the regrowth timber provided an excellent opportunity for re¬search to provide such information.

Credo incorporates 250,000 ha (600,000 acres) and is 100 km (~62 mile) long and 40 km (~25 miles) wide, and is designated a Reserve. It's being used for research and field study of the effects of climate change on vegetation. The property is destocked and is watered by the decommissioned homestead dam (Burke Dam. The water table is very deep (>10 m or > 33 feet) below ground. The property formerly carried 10,000 sheep but has been cut because of the challenges in providing feed.

The cutting of salmon gum (*Eucalyptus salmonophloia*) commenced in 1843 to supply high density mine poles. This was followed in 1846 with cutting of redwood *(E. transcontinentalis*), gimlet (*E. salubris*), broom bush (*Eremophila interstans*) and western myall (*Acacia papyrocarpa*).

Because of the density of most of these timbers, a jet of water is sprayed onto the blade as it enters the wood, as can be seen in the shot on the right.

Members at the slabbing demonstration

A salmon gum (*Eucalyptus salmonophloia*) slab

Railway Museum
On Friday, we visited the Loopline Railway Museum in Boulder to view the restoration pro¬gram that has restored much of the early railway engines and wagons.

This was followed by time at the Chunky Timber Company in Boulder, which specialises in using everyone else's waste wood a for the manufacture of craft items—nothing is wasted in this community.

A restored early diesel locomotive

Restoration in progress for two early diesel passenger trains

Group photo of the conference attendees gathered at the Credo Station after having an agreeable lunch provided by the Goldfields Specialty Timber Industry Group