

Growing in harmony



DEPARTMENT OF THE CAPITAL TERRITORY

Pine forests of the Australian Capital Territory are more than pretty places to picnic. Although their charms are many their real purpose is much more practical. They help provide Canberra with a reliable supply of quality water and keep seven local sawmills supplied with quality timber.

But they do more than that. They also provide a wide range of community needs and illustrate how government and private enterprise can work together for their mutual benefit.

Trees have always been good friends of Canberra. They have clothed and beautified the National Capital to create a garden city in which modern suburbs peek out from behind summer foliage; in spring, the various tree species challenge each other with the vividness of their colourful blossom, and then in autumn with the brilliance of their dying russet and gold leaves.

But trees brought more than beauty to the disciplined streets and gardens of this planned city. They brought green forests to the city's doorstep in the shape of a forest industry that ensures a reliable timber supply to private enterprise builders and timber mills.

That so many indirect benefits should grow from the simple act of planting pines around Australia's capital-to-be could not have been foreseen by the pioneer planners.



This stream gauging station in the Cotter catchment measures the run-off volume of water

Their plan was to reforest the overgrazed and denuded slopes of the new Australian Capital Territory which had been cleared of native timber by early settlers and overgrazed by sheep and rabbits.

The objective was to halt erosion and preserve the water quality of the Cotter River, which is still the only source of water for the city.

But forestry has progressed to such an extent that today it gives steady employment to more than 500 workers in association with private enterprise, and every year produces about 150 000 tonnes of logs worth more than \$3 million at the mill door.

Not bad for a scheme that originally set out only to improve water catchment areas! All cities need a reliable supply of water, both in quality and quantity. So Canberra's planners were early off the mark when they began their first tree-planting in 1915, only five years after the calico tents went up for living and office quarters for the officers surveying the Territory.

Trees help to stabilise the soil, first with their roots and then with their leaf litter allowing rainfall to filter slowly into streams and dams. Without trees topsoil is washed away to silt up rivers and aggravate flooding.

The importance of good forest practices in the water catchments may be judged by the volume of water harvested in 1976—120 000m³ per day, which is roughly the equivalent of sixty Olympic-sized swimming pools.

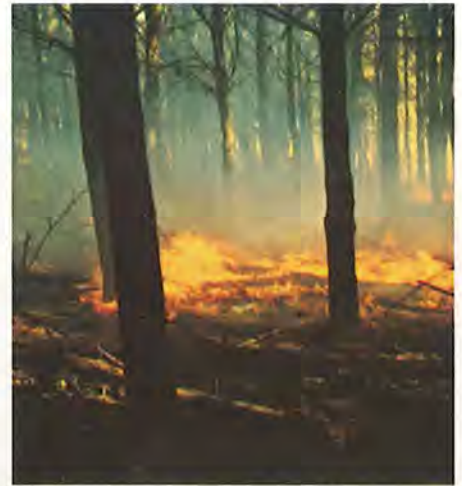
But first of all the foresters had to find the best trees to grow in the ACT. What species would be best suited to the climate and conditions of the Territory: Corsican pine, Scots pine or Mediterranean cypress? Canary Island pine, stately radiata pine and ponderosa pine from sunny California? Or splendid spruces from chilly Canada and Norway? All were given their chance and a few survivors of these early experiments still stand today as reminders of the foresters' world-wide search.

Canberra's weather and soil conditions defeated most of the introduced species while it was found that the Scots pine was a slow starter and grower which with its twisted branches produced too many knots in the timber. Knots may be pleasing to an interior decorator but to a carpenter building homes excessive knots are a weakness. This flaw is partly hereditary and could date from early times when landowners selected only straight trees leaving poor specimens to regenerate naturally.

Foresters say this failure to think ahead marks the difference between the early timber cutters who took what they wanted with no regard for the next generation, and modern foresters who select and restock methodically for the future.

If some of Canberra's hundreds of birds, the cockatoos, galahs and rosellas had been allowed to choose doubtless they would have picked the Corsican pine. They find its delicate seed-bearing cones easier to tear apart than the tough cones of other species.

The spruce, with its soft drooping foliage more suited to the heavy snowfalls of northern climes, can make an excellent Christmas tree but does not take to Canberra's dry slopes and hot summers.



Controlled burning such as this reduces the fire danger in ACT forests

The more drought-resistant radiata pine, however, does not like to get its feet wet and in ACT conditions grew at twice the rate of ponderosa pine and the others; the good texture of its timber promised easy conversion into sawn timber for house building.

As well as being relatively free from major disease in Australia radiata pine develops tough, thick, fire-resistant bark at ground level—an essential in its life in the ACT where controlled burning is carried out in the forests from fifteen years onwards to reduce fire danger. The wood wasp, *sirex*, is an example of an insect enemy. This wasp has been found in New Zealand, Victoria and Tasmania but fortunately not in the ACT.

So today radiata pine is the dominant species in the 14 450 ha under forest cultivation.

The seeds (about the size of a grain of rice) for the new forests came from South Australia and by a curious twist ACT timber is now exported back to the State of

A tractor is loaded with pine seed at the Duffy nursery



its origin. Seeds are obtained from cones at a seed orchard at Captains Flat near Canberra and planted out in a nursery at Duffy, one of the city's suburbs.

Cultivated pines see their first light of day in terraced seed beds generally raised slightly to improve the drainage of the sloping ground and to allow machines to sow and tend the seedlings. The beds are sheltered from prevailing winds by a belt of older trees.

Spring sowing in the nursery is from tractor-mounted seed drills with about seven lines per bed. Balanced fertilizer and watering by irrigation ensures quick germination and growth is encouraged to thwart feathered foes—the sparrows and pigeons who regard the tender plants as a free lunch. Weeds such as nut-grass which would suppress the seedlings are controlled by using chemicals.



Seed is laid in neat rows at the Duffy nursery



Machines and men work together in modern forestry operations

stock may be forced to nibble some green pine needles but this change of diet appears to have no ill effects. The only pine victims are a few trees which end up as scratching posts.

Forest visitors must often wonder why trees are planted so close together—apart from the obvious reason of getting more to the hectare. Close proximity limits branch growth so that all the growing strength goes into producing a commercial tree, tall and straight.

To minimise knots low branches are pruned, an old-fashioned crescent-shaped handsaw being used for this rather than the modern chain saw. Although the chain saw has removed much of the drudgery of logging—and in the passing has all but eliminated the romantic image of the logger with his shiny axe—one careless cut with a chain saw could scar a valuable tree for life.

Even rugged terrain in the ACT is planted although future logging will be by the more costly cable system rather than tractor logging. Planting-out time comes for the young plants when they are between 15 and 30 cm in height. Additional growth at this stage is no advantage for it only means more difficult handling and the carrying of fewer plants in the forester's planting bag.

Usually 1200 seedlings are planted to the hectare. If bad weather delays planting then the growing seedlings are trimmed mechanically by a mower specially adapted to cope with the back-breaking and time-consuming task.

The first summer after planting is critical for survival and the whole area is checked after only six months. A survival rate of 85% is good. It is very important to control competing grasses and eucalypt regrowth.

At the age of four the trees are strong enough to withstand the presence of stock and sheep and cattle are allowed in to graze. This keeps down grass and recycles nutrients. During prolonged droughts

Timber leaves the 2 m circular bandsaw



This stress grader colour codes the strength of timber

Many people are surprised to learn that about half the ACT, or 93 000 ha, is under forests. Of this about 80 000 ha is composed of native forest, but many forests are planted pine, some of which have passed their half century.

Planning a forest is now a cosmetic as well as a cost job. The severe geometrical patterns of yesteryear with trees marching across hillsides are of the past. The effect upon the landscape is now considered before a hillside is planted. Special efforts are also made to harmonise the different appearances of pine forests with any tracts of native forest, as trees in the latter have softer outlines and blend more readily with their background.

Local wildlife is encouraged to take up residence and a recent study on bird life in ACT forests shows that many birds can live in man-made forests. This is in contrast to some overseas countries whose Stygian forest interiors are so uninviting that only the farmer's grain-gobbling pest, the wood pigeon, and the ubiquitous squirrel can live in them.

From an age of twelve onwards the forests are thinned. Small timber is sold to a local impregnation plant for use as fencing material.

At the impregnation plant the thinnings are mechanically stripped of their bark and given a foil ticket noting their size and quantity and then left to season in the open air in bundles. When dried they are checked by a moisture meter before being immersed under pressure in a solution of copper chrome arsenate. This 100% penetration—unlike paint which treats the surface only—protects them from rot and termite attacks.

Wearing their new pale green preservative coat, these poles blend with their surroundings when used for landscaping at schools and in gardens and car parks, for fencing, sheep dips, advertising signs and sportsground seating. The stripped bark is much beloved by Canberra gardeners who find it aesthetically pleasing and use it on top of plastic sheeting to keep down the growth of weeds.



A log is lowered into a steaming hot water vat to make peeling easier for the veneer lathe

Larger logs are processed in saw mills in Canberra and neighbouring Queanbeyan. Here they are cut into a variety of products including building timber, battens, flooring and furnishing material, or they may be peeled into veneer for plywood.

Once a new plantation is well established the trees are judged robust enough to withstand the presence of the public. It was estimated that 300 000 visits were made to ACT forests in 1976. Orienteering, horse riding, picnicking, trail bike riding, car rallying, walking and archery are all permitted provided there is no clash of interest. Older foresters who once worried that vandalism and fire danger might increase now find their fears were unfounded—apart from isolated incidents of vandalism—and fully support the opening up of the forests.

Several further thinnings take place in the life of a stand and at about thirty to forty years after planting all the remaining trees are felled and taken to the local mills.

An operator pushes buttons to control the veneer lathe



The largest of these is owned by Integrated Forests Products Ltd which built a \$5 million plant on the outskirts of Canberra to cut and process ACT timber. IFP is part of Australian Paper Manufacturers, a 100% Australian-owned company, and has a twenty-year licence to process 90 000m³ of ACT radiata logs every year, with options to renew the licence for a further period.

The layout of sawmill, veneer and plywood mill and chip mill on this 30 ha site is planned so that the products flow systematically from raw material to finished article towards rail and road dispatch. From the tastefully wood-panelled office to the sawdust waste-burner (under way with installation of pollution control) there is a methodical air that nothing is wasted. Bark, chips, timber, plywood, peeler cores—all are sold or used. Even the sawdust is burned to help to provide power for the plant.

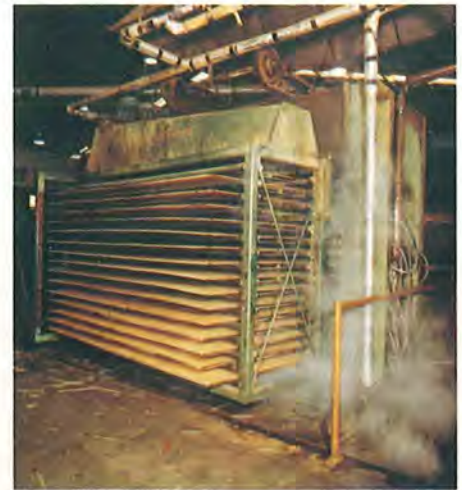


Centre-laying glued veneer for the manufacture of plywood

But it's not quiet efficiency—it's noisy efficiency with machines and saws and lathes, all high-powered and many high-pitched, so that ear-muffs must be worn as well as safety helmets, and planing machines have to be operated from soundproof timber cabins. Safety boots are issued and the girls who grade the ply in the mill wear leather gloves to combat splinters.

Such stringent safety precautions are effective. Sawmills once were bedevilled by accidents but today management emphasises safety. Each department at the IFP plant displays a blackboard showing a daily accident return (the best period of no time lost through accidents is 305 000 man hours).

Logs are first weighed and recorded at the government weighbridge before being debarked. Straight logs of specified length and diameter go to the veneer mill. The remainder goes to the sawmill to become structural timber with offcuts going to the chip mill.



A bell rings when sheets are ready for discharge from the hot press

To make peeling easier for the gigantic Finnish-made veneer lathe, logs are first soaked in a hot-water vat for anything up to six hours. This mill takes logs 2.54 m in length and up to 75 cm in diameter at the rate of thirty per hour. The lathe peels at 75m/minute and runs out a continuous ribbon of veneer either 2.54 mm or 3.3 mm thick. This then goes through five heating rollers each 80 m long at 180°C, and one cooling run to reduce the temperature of the dry veneer to 20°C. This can drop the moisture content from a maximum of 150% to bone dry. The veneers are then glued together, three, five, seven or more in a hot press oven which is set for temperature and pressure and rings a bell when sheets are ready for discharge.

Principal production is for houses and sheds, roofing, bracing, shelving, flooring, cyclone proofing, decking, cladding, and for containers, signs and hoardings.

For some special purposes such as in caravans which need lightness as well as strength, four-ply is used. The highest number of plies made so far is nineteen-ply (46 mm) for a very special job—to make platform shoes for women. The world of wood is truly wonderful.

