

From Science to Heritage: the History of a Wood Collection

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There is a process by which scientific collections become heritage. The case of a wood collection, or xylarium, at the Australian National University (ANU) is discussed from its start in the Commonwealth Forestry Bureau in 1926, its association with the Council for Scientific and Industrial Research/Commonwealth Scientific and Industrial Research Organisation from 1928, its transfer to ANU in 1965, its manifold uses at ANU, and its decline and heritage assessment in 2011. The collection, consisting of 8,400 wood samples, microscope slides, panels and artefacts, was used for teaching forestry students, research into wood anatomy, and for identifying timber. Its future is uncertain.

Introduction

Science is ever-restless in proving new theories and disproving old, devising new equipment and shedding old, building reference collections and abandoning them when need or interest wains. Of course, it is not some reified ‘science’ that does so, but real scientists and institutions. In the crannies of their laboratories lie the detritus of their old collections and equipment that provide riches for historians of science to unearth. Viewed in this way, there is a process to reveal of how the apparatus at the vanguard of science is abandoned. It might be gradual, or it might be sudden, but it has a chronology and geography. Some of what is left has value for the future; it becomes a heritage for us to conserve or waste as we will. The material of science, or some of it, we argue, ends as heritage. It is not our intent to delve into the literatures of the scientific method, or what constitutes ‘heritage’; rather our intent is to describe the plight of one part of the nation’s scientific infrastructure. For our purposes, scientific collections of wood specimens are simply a heritage of physical artefacts inherited from the past that can have tangible and intangible values. Their significance as part of national ‘moveable cultural heritage’ can be evaluated by accepted protocols and can be subject to Australian legislation.¹ Although we focus on their

scientific significance, they can have historic and aesthetic significance.

We explore this thesis by looking at the history of one of Australia’s collections of wood, or ‘xylaria’, now held in the Australian National University (ANU). We trace its passage from its start in the Commonwealth Forestry Bureau in 1926; its transfer to the ANU in 1965; its declining use in research and teaching; and finally to its heritage assessment in 2011. Our ability to tell its story is limited by the lack of current users and the loss or deterioration of past records; both evidence for the passage we describe.²

Commonwealth Forestry Bureau Collection

Colonial and state institutions had collected specimens of wood from the 1850s, initially to promote timber use and later to create a scientific base for their identification. These collections had concentrated on the commercial species indigenous to their jurisdictions, and it was not until the 1920s that a national collection was started not only for identification, but also for other aspects of wood science that were becoming important. A national collection was also needed for training forestry students and this led to the associated and partly overlapping

national collection that is now the subject of this paper.

The need for a national policy to integrate the management of the nation's forests with their wood products, and to train Australian foresters scientifically, was argued forcefully by C. E. Lane Poole (1885–1970) in 1925.³ The Bruce-Page Government accepted much of his report and started the Forestry Bureau with its Australian Forestry School in 1926, putting him in charge as Inspector-General of Forests. The Bureau and School moved to new buildings in Canberra in 1927 with a professional staff of Lane Poole and three lecturers, of whom only C. E. Carter (1885–1976) had post-graduate training (Fig. 1).⁴ Even before it moved into its new building, Lane Poole and N.W. Jolly (1882–1954), the School's Professor for its first year, started the wood collection by asking the state forest services for specimens of their main timbers. These were to be 'hand specimen blocks' (228 × 114 × 5 mm), roughly the size of a book which when arranged on shelves looked like a 'wood library'.⁵ International connections were developed from the start, with a duplicate set of the blocks being sent to a museum in Gotha, Germany in 1926, for example.⁶ Echoing the older trade promotion of wood, boards were obtained to display the beauty of the Australia's finest timbers in their finished form.⁷ These and other artefacts were housed in the School's museum room. More fundamentally, the School itself was used to display Australian timbers in its flooring, fittings and furniture, and unseen in its construction.

Lane Poole had reported that the existing Forest Products Laboratory, then in Western Australia, was 'wholly inadequate in staff and equipment', and believed that it needed 'the vision of a qualified forester to direct its activities'. To his exasperation, the expanded laboratory was placed in the Council for Science and Industrial Research (CSIR) with the chemist I. H. Boas (1878–1955) in charge. CSIR engaged an adviser from the Indian Forest Service's products laboratory, sent two young chemists, J. E. Cummins (1902–89) and H. E. Dadswell (1903–64) to study in the US Forest Products Laboratory at Madison, and sent Boas to inspect laboratories in Britain and North America.⁸ It then established its Division of Forest Products in Melbourne, close to industry and major companies.⁹

All this took time, Dadswell and Cummins did not return until April 1929, and the new laboratories were not built until 1934 and 1939. In the meantime, the long task of collecting samples of every species of potential interest for its national collection needed to be started.

There were two problems: CSIR and the Forestry Bureau, as Commonwealth agencies had no right to collect in the states' jealously-guarded forests, nor did they have the staff to do so. In 1928 CSIR appealed to the state's forest services to provide it with specimens, and the initial response from foresters stationed in the forest regions was heartening; by June 1929, 650 specimens had been sent in.¹⁰ As only the Forestry Bureau was established enough to receive them and had already started its own collection, CSIR came to a temporary arrangement with Lane Poole whereby Carter, the Senior Lecturer in the Forestry School, was to spend part of his time organizing the collection and preparing the microscope slides needed for identification.¹¹ Carter took on the work whole-heartedly; not only was it scientifically important, the structure and identification of wood, the forests' prime commodity, it was a subject in the forestry curriculum. When Dadswell returned from America, he was posted to Canberra under the temporary arrangement with CSIR, but Lane Poole's animosity to Carter made for an unpleasant atmosphere so that once laboratory space had been found, Dadswell was moved to Melbourne.¹² Dadswell and Cummins needed the collection that Carter had been preparing, but the transfer to Melbourne in 1931 was brutal.¹³ After three years' work, Lane Poole gave Carter one day's notice to hand over the by then 1,100 wood samples, the associated botanical specimens, all the slides he had prepared—except for a set needed for the School—the records, and most galling of all his laboratory note books. We have not located evidence of how the wood samples were transferred to CSIR, but better sense must have prevailed so that somehow small samples were cut from the main samples. These with one set of the slides were retained, and the basis was set for there to be *two* national collections: one for CSIR in Melbourne, and one for the Bureau in its Forestry School in Canberra.

There is little doubt that the botanical specimens (buds, flowers, fruit, leaves, juvenile leaves and bark) that were collected with the wood



Figure 1. Australian Forestry School, staff and students, 1931. Left to right: Front row: A. Rule, C. E. Carter, C. E. Lane Poole, H. R. Gray, R. G. Kappler, M. Lindley; Middle row: R. H. Doggrel, A. G. W. Anderson, K. P. McGrath, F. S. Incoll, R. H. Luke, J. H. Barling, J. Cheel; Back row: D. A. Lane, W. R. Suttie, S. G. Jennings, D. A. N. Cromer; Australian National University Archives, ANUA137–19.

specimens would have been pressed, dried and mounted to herbarium standards. Lane Poole was experienced in this and had made training in doing so part of the curriculum. Dadswell and Burnell record that the first botanical identifications were made by Carter, probably to confirm those made by the foresters collecting the samples.¹⁴ After the transfer to CSIR, 'the botanical material for various samples was checked in the office of the Government Botanist of the State in which the samples were collected' and duplicate herbarium specimens were sent to the Forestry Bureau. The first formally planned collection was made in 1930 when CSIR came to an agreement with the NSW Forestry Commission to have an experienced forester and botanical collector, W. A. W. de Beuzeville (1884–1954), obtain wood and herbarium samples in that state over the next five years.¹⁵

We have reconstructed the history of the Bureau's collection from the two registers and

500 index cards (Figs 2, 3) that have survived.¹⁶ Illustrating the theme of this paper, the registers were only discovered recently during laboratory refurbishments. Three electronic databases on out-dated formats were retrieved by one of us (P. D. E.) in Canada, but their congruence with the cards and registers is unclear. The cards record the botanical family and species, the 'advice' being the person or institution sending the sample, the date, its source and the number assigned to it. The date is not always present, but given that numbers were assigned to samples in sequence (with a few exceptions), any missing dates can usually be inferred. They cover ~5,100 Australian samples (with a few from New Zealand and the USA) received between 1928 and 1954. The larger wood register records the same information for Australian and overseas samples received from 1950 to 1964, and the smaller wood register records less detailed information for overseas samples received in the

No.	Family	Name	Advice and Date	Origin	Our Number	No. of Bottle
1	<i>E. longifolia</i>		B. Moore Wyoong 7/19	S.F. 281 NSW.	1	
2	"		"	"	2	
3	"		K. F. M. Rae 7/12/29	Mallacoota V.	508	
4	"	heavy clay	B. Pissott 30/11/29	Eden NSW.	601	
5	"		"	Merredale NSW.	602	
6	"	swampy	"	Pool Creek (near Eden) NSW.	603	
7	"		J. Firth.	near Eden. N.S.W.	1310	
8	"		Studebarto 1/9/38	Lockhart NSW.	3154	
9	"		b. & c. Oct. 1948	b. & c.	3783	3783

Figure 2. Index card for *Eucalyptus longifolia* showing entries for samples received from foresters in NSW and Victoria in 1929, from J. Firth in NSW without date (1933 or 1934 inferred), Australian Forestry School students in NSW in 1938 and from C. E. Carter in 1948; Australian National University Archives, ANUA137-75.

<i>Diplocephis purpurea</i>	Leg.	Jalabu	Jan N° 46	Forest Dept. British Guiana	18/1/53	5372
<i>Epuma</i> sp.	"	Wallaba	48	"	"	3
<i>Swartzia bicolor</i>	"	Wamara	49	"	"	4
<i>Soristonia macrophylla</i>	Meliaceae	Mahogany	Aguano	Dep. de Proteccion, Amazonas Region	"	5
<i>Calophyllum brasiliense</i>	Sulphuraceae	Sassauba	"	"	"	6
<i>Nera crispata</i>	Euphorb.	Asaqui	"	"	"	7
<i>Simarouba amara</i>	Simarub.	Manifa	"	"	"	8
<i>Platydiscium ulii</i>	Legum.	Mocacuba	"	"	"	9
<i>Carapa guianense</i>	Meliac.	Andiroba	"	"	"	5380
<i>Nectandra elaeagniflora</i>	Laur.	Isara inhamuim	"	"	"	1
<i>Cedrela odorata</i>	Meliac.	Cedro Vermello	Ed. cedar	"	"	2
<i>Scaevola guianensis</i>	Hamamelid.	Sabranama	"	"	"	3
<i>Mytilinus itamba</i>	Laur.	Itamba	"	"	"	4
<i>E. scabra</i>	Myrt.	White Stringy.		APF School Camp. C.D. Hamilton 7/4/53	29/53	5
<i>E. pellita</i>	"	Red mahogany		"	Bonanda SF	6
<i>E. saligna</i>	"	Blue gum		"	"	7
<i>E. gumifera</i> (Camden)	"	Red bloodwood		"	"	8
<i>E. pilularis</i>	"	Blackbutt		"	"	9
<i>E. longifolia</i>	"	Woollybutt.		"	Mogo SF	5390
<i>E. consideriana</i>	"	Yatchuk		"	Barkman	1
<i>E. goniacalyca</i>	"	Mountain gum (Monkey ?)		"	top of Obyle	2
<i>E. muelleriana</i>	"	Yellow Stringy.		"	Maha Re Salama	3
<i>E. botryoides</i>	"	Bangalay		"	Durao lake	4
<i>E. rostrata</i> (Camden)	"	Red Gum - river		"	A. Hill Makoura 7/53	5
<i>Eucalyptus moorei</i>	Eucalyptac.	Batemans Bay area		J.E. Gray gully species. 6" 4" 76"	1/53	6
<i>Janahalia platyphylla</i>	Conif.	"		F. Gray 80 miles W. Atherton 6" 4" 76"	1/53	7
<i>Pinus monticola</i>	"	Woollybutt pine		S. Lugton A	29/53	8
<i>E. rubida</i>	Myrtac.	Candle bark		R. Free Swan Hills SF. 651	"	9
<i>E. robertsoni</i>	"	Names E. Deparmit		"	Bago SF.	5400
<i>Pinus Strobus</i>	Conif.	White or Clear Pine		"	"	1
<i>E. monticola</i>	"	W. White Pine		"	60-70 Maudsl. 1933 by A. Hill	2
<i>Wormia alata</i>	Dilleniaceae	"		F. Gray CS-110. No. unperf.	2/54	3
<i>Alphitonia whitei</i>	Myrtac.	"		"	"	4

Figure 3. Wood register showing entries for samples received from: British Guiana, Amazon region, Australian Forestry School students in NSW, F. Gay (a CSIR collector) in Queensland in 1953, and others in 1954; Australian National University Archives, ANUA137-72.

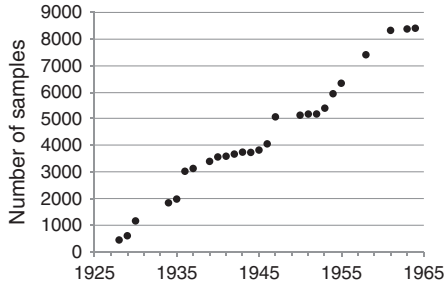


Figure 4. Size of the wood collection, 1928–64.

1950s. The cards and registers record a total of 8,400 samples. The largest sample number of those that have dates recorded provided a key for charting the growth of the collection (Fig. 4). We inspected the cards and registers to determine the origin of the samples and as far as we could determine, the likely background of the collectors. In what follows, we discuss rate of growth, institutional base and geography in four periods: the starting period, the wartime period, the post-war period to the mid-1950s, and the expansion to the mid-1960s.

Starting Period, 1928–39

The success of the appeal for wood samples continued in spite of the hiatus of transferring the larger wood samples to CSIR's laboratory in 1931, and in spite of the severity of the economic depression. The collection grew by an average of 284 samples a year before the Second World War, the highest rate of the four periods. That so many were collected was doubtless due to the dispersed network of the forester/collectors. Although the appeal was made through the state forestry departments, an examination of 296 card entries in this period showed that 75 per cent were named individual forester/collectors and only 8 per cent were forest services. The foresters of the time had gained their skills in identifying the species through training systems that included a degree course in South Australia, a diploma course in Victoria, cadetship systems in NSW and South Australia, personal study and long observation in the forest.¹⁷ Most of the individuals sent one or two samples from the forest area where they were stationed, but a few sent samples from widely separated areas. For example, P. J. McCormick (1874–1951) sent ten samples in 1929 and

1930 from different parts of the Tumut-Snowy Mountains region of NSW, and A. C. Ure sent samples from Central and South-west Victoria. The list of those who sent samples in the first few years included foresters who later became leaders of their institutions.¹⁸

Two-thirds of the samples came from Victoria and New South Wales, the states with the largest, well established forest services. In the initial spurt, Victorian foresters had been particularly active, possibly due to many of them knowing Carter from his previous position as Principal of the Victorian School of Forestry at Creswick. However, the Victorian government resented Lane Poole's denigration of its forest service and very few samples were sent after 1931.¹⁹ The other states continued, although the rate at which samples were sent appears to have slowed as the economic depression of the 1930s deepened.

The samples sent from Queensland by the state's forest service, and by C. T. White the Government Botanist, were probably duplicates from their existing collections. Overseen by Carter and Lane Poole, the students at the Australian Forestry School collected samples as part of their field work. A notable contributor who started as a student was L. D. Pryor (1915–96) who subsequently provided samples from the ACT and Queensland, became an authority on the eucalypts, and in 1958 was appointed as the foundation professor of botany at ANU. Although the collection was primarily of Australian species, the Forest Products Laboratory in the UK sent a collection of samples from Commonwealth countries in 1938, and Professor Garrett at Yale, where Carter had been a post-graduate student, sent a collection of North American conifer woods.

As the collection grew, other government agencies and individuals asked the Bureau to identify pieces of timber, rather than having to send them to CSIR in Melbourne, or to the major state collections in Queensland and New South Wales. Although most requests came from Commonwealth agencies, such as the Post Office, the Department of Interior and the Controller of Stores, some came from forest services.²⁰ All were dealt with by Carter who also started a research project to study the cell walls of various species in relation to the problems of drying timber and making paper pulp.

Wartime Period, 1940–45

Collecting slowed during the war when many foresters were serving in the army's Forestry Companies. However, Carter, the few students, and some individual foresters provided samples, as did R. W. Grimwade (1879–1955), a keen supporter of both the Australian Forestry School and CSIR's Division of Forest Products. Together, they added over 400 samples. Carter continued to identify timber samples for government agencies and individuals, except for a period in 1941 when he was lent to the Department of Munitions.

Post-war Period, 1946–55

The institutional climate changed in the post-war period as Lane Poole retired and was succeeded in the Forestry School by the widely-respected M. R. Jacobs (1905–79). Carter stayed on, teaching wood technology and looking after the wood collection until 1955.²¹ The collection increased steadily at almost the pre-war rate, and although individual foresters, Carter and the students continued to contribute, the most important increase resulted from the expansion of CSIR's botanical research. Re-named as the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 1949, it started systematic collecting programmes for a national herbarium.²² Some programmes collected wood samples for the Division of Wood Products, and provided duplicate samples for the Forestry School. Notably, it started a programme, based in Atherton, to collect samples in the tropical forests, and another to collect across dry inland areas of Queensland.²³

Although the collection had some samples from Papua and New Guinea (Australian Territories until 1975), it was not until the forest botanist at Lae, J. A. Womersley (1920–85), sent a collection of 407 samples in 1954 that the School had a substantial holding. This was important scientifically and for training Commonwealth students who would work there. The School started training students from New Zealand in 1949 and obtained wood samples from the New Zealand forest service to add to its teaching collection. This process was repeated during the 1950s as students arrived from Burma, The Philippines, Malaya, Thailand and Indonesia. British Commonwealth countries—India, Ceylon, British Guiana and Cyprus—sent

samples of their timbers, as did New Caledonia, Russia, Japan and Abyssinia.

Expansionary Period, 1956–64

Australia's economic expansion during the 1950s and 1960s was reflected in an expansion of the state's forest services, increased numbers of students in the Forestry School and increased funding for research. CSIRO expanded its Division of Forest Products laboratory where Dadswell and his co-workers developed a convenient timber identification system based on card-sorting keys.²⁴ The Forestry and Timber Bureau formed its Forest Research Institute in 1963 to consolidate its increased research activity.²⁵ However, its status within Commonwealth departments was uneasy and it was eventually transferred to CSIRO, becoming its Division of Forest Research in 1975.²⁶

The School's collection expanded quite rapidly from the mid-1950s primarily due to large batches of samples being received from CSIRO and overseas countries.²⁷ The eclectic nature of its international component increased with 500 specimens arriving from the forestry department in Dutch New Guinea in 1961 (ahead of its accession to create Indonesia the next year), and others arriving from South Africa, Nigeria and Fiji. Burma and Malaya, that had students at the School, sent further samples of their timbers. Following Carter's retirement, we assume that W.A. Heather took responsibility for the collection when he was appointed in 1956 as a lecturer to teach wood technology, forest pathology and some of the silviculture. By 1964 the collection had grown to contain 8,400 samples and was clearly much larger and more complex than was needed to teach forestry students. Although much of it duplicated CSIRO's collection, it contained independently contributed specimens. The extent of duplication/independence between the two national collections is presently unknown.

The Australian National University

The model for the Australian Forestry School consisting of a two-year science course in a state university, followed by a two-year course in the government's forestry school was unsatisfactory for the higher standards of education expected in the 1950s and 1960s. It was closed in 1964 and

a Department of Forestry was opened in ANU the next year to continue forestry education.²⁸ From the start, the University established its new department with academically qualified staff. It recruited a woodland ecologist, J. D. Ovington as the inaugural professor, and a British-trained biochemist/microbiologist, P. Rudman from CSIRO's Division of Forest Products.²⁹ It recruited Heather from the Forestry School, and other staff from both Australia and Britain. Wood technology and identification remained a core subject in the undergraduate curriculum, and wood science was to be an important strand in the Department's future. It took over the Forestry School's wood collection when it moved into its new building on the campus in 1968, and it continued the wider concept of the collection by taking over the display boards and other artefacts, and by using different timbers in the panelling, fittings and construction of the building. Many of these were donated by British Commonwealth countries, notably in the 'British room' where thirteen large boards hung from walls panelled with European beech and English elm. International connections were evident in the laboratory benches of Burmese teak, and in the wooden sculptures from Laos and Indonesia that greeted visitors in the foyer. As well as being used in teaching, identification and research, these forms of collection emphasised the connection between forestry and wood production. After Rudman left ANU in 1971, wood technology and identification continued as a core subject in the curriculum taught by Heather and others.³⁰ In addition, the Chief Research Scientist in CSIRO's Forest Products Division, W. E. Hillis (1921–2008) became a part-time Visiting Fellow to teach chemical aspects of wood processing.³¹ This arrangement changed in 1985 when one of us, P. D. Evans, a British wood scientist, was appointed. Throughout the period from 1965 to 2001, the wood collection was under the care of academic staff, supported for much of the time by technical assistants who among other things made microscope slides for teaching, sorted loose collections of small blocks by country of origin and prepared a digital catalogue in the early 1990s.

Only a small part of the collection was used for teaching. The large hand specimen blocks, kept in a 'wood library' room, were handed to students to illustrate their physical

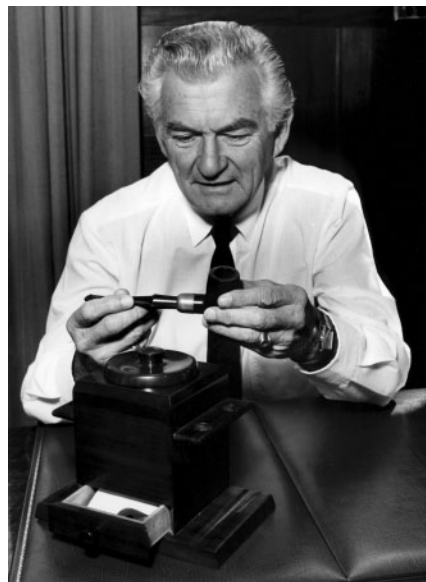


Figure 5. Bob Hawke examines Ben Chifley's pipe and pipestand, 1991. Australian National University Archives, ANUA225–526–1, Photographer: Graham Thomson, News Limited.

characteristics. Microscope slides, made from slivers excised from the small blocks (and occasionally from the backs of the large blocks), and a separate small teaching collection of small blocks were used to teach wood anatomy and identification. This collection contained softwoods, 'exotic' (mainly African, English and Asian) woods, eucalypts and other Australian hardwoods, and was augmented from time-to-time to meet the needs of students from Asia and the Pacific. We have not located any records of its sources.

Department's wood scientists identified wood as an occasional service for colleagues at ANU and national institutions, using the collection's slides and blocks for verification. This raised the profile of the Department most notably when a grateful prime minister, Bob Hawke was photographed holding Ben Chifley's correctly identified wooden pipe holder (Fig. 5).³² Other identifications for the Australian War Memorial, the Bureau of Air Safety Investigation, the National Museum of Australia, and particularly the forensic identification of wood and fibres for the Australian Federal Police, stimulated the

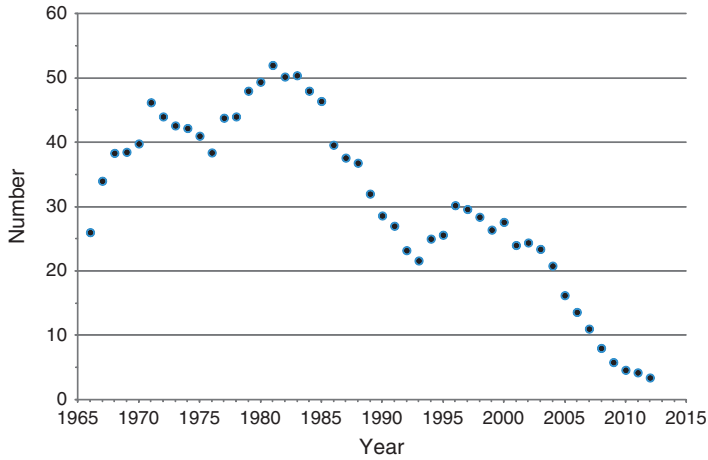


Figure 6. Rolling five-year average of the number of students graduating from ANU with BSc (Forestry), 1965–2012 (includes honours degrees, excludes the few double degrees). Source: Australian National University, *Annual Reports*.

students' interest in a subject that some found insufferably dull.

Teaching and identification requests stimulated research into the anatomy of Australian timbers. For example, research by one of us (P. D. E.) and R. D. Heady (1938–2013) on the wood anatomy of cypress pines (*Callitris* spp.) developed when undergraduate students were unable to find callitroid thickening in sample blocks that purported to be *Callitris glaucophylla*, but were blocks of *Callitris intratropica* that had been incorrectly labelled. This episode raised questions about the occurrence of callitroid thickening, and triggered a comprehensive study of the wood anatomy of the genus, the related genus, *Actinostrobus*, and other Australian softwoods including *Wollemia*.³³ Research also developed from industry needs for more accurate ways to distinguish between anatomically similar woods which had different processing characteristics, such as between *Eucalyptus muellerana* and *E. sieberi*.³⁴ Such research could only use the collection occasionally because its samples were not accompanied by herbarium vouchers. Instead it had to obtain authentic wood samples by extracting small 5 mm diameter cores from living trees in the field.

Decline of Wood Science

Forestry and wood technology had flourished in ANU for twenty years with substantial

funding for staff and facilities, and a buoyant demand for its graduates. This changed gradually from the 1980s as the number of forestry students fell (Fig. 6), while the number choosing a new resource and environmental science degree increased.³⁵ The decline was exacerbated in the more technical forestry subjects, including wood science, because many courses became optional and funding for them was increasingly linked to student numbers. However, there was still a strong interest in wood science across the campus as a component of the science and engineering of materials, and postgraduate numbers and research funding remained buoyant. Although this interest continued into the new millennium, the hours allotted to teaching wood science and identification to forestry students had been halved, technical support disappeared, and the wood scientist on the academic staff (P. D. E.) left in 2001. After seventy-six years, there was no longer a qualified full-time scientist responsible for the collection.

Wood technology and identification continued to be taught on a voluntary basis by a Visiting Fellow (P. D. E. until 2005) and by sessional lecturers (K. E. Semple and Heady) until 2009 when it was discontinued for lack of enrolments. Although teaching petered out, Heady continued research and identification work and made some use of the collection until building renovations and laboratory re-assignments in 2010 made it

inaccessible. Although the hand specimen blocks in the wood library room were unaffected, the small blocks and microscope slides that comprised the major part of the collection were put into storage, as were most of the timber panels and artefacts.

Transition to Heritage

Our thesis of the transition to heritage is evidenced first in an unexpected episode in the life of ANU's wood collection. The original samples of wood collected for CSIR in Australian forests from 1928 were $\sim 600 \times 115 \times 50$ mm in size, larger than the small blocks cut from them for its reference collection. CSIR had also accumulated many large pieces of wood, used in other investigations but no longer required. At some stage they were transferred to La Trobe University in Victoria where A. B. Wardrop (1921–2003), a former wood anatomist in CSIRO's Forest Products Division was the Foundation Chair in Biological Sciences.³⁶ Wardrop cut specimen samples from the blocks, but afterwards the blocks lay neglected in a basement until 1995 when they were accepted by ANU, and small reference samples were cut from the blocks and added to the ANU's collection. With their return to Canberra, the wheel had turned full circle, but it was with art, not science that it was celebrated. Eighteen artists fashioned objects of elegance and value from selected blocks of species native to each state. They were first shown in Canberra in 'The Rings of History' exhibition, timed to coincide with the centenary of Federation in 2001.³⁷ The exhibition subsequently toured Australia and generated great interest amongst the viewing public. It was not, however, the end of the blocks' scientific life. Only some had been used by the artists, and with the decline of wood science at ANU, they were no longer wanted there. The wheel took another half-turn in 2011 when they were sent back to the University of Melbourne in the care of members of the International Wood Collectors Society, a non-governmental organisation. They cut small specimen blocks of 356 species that they presented to supplement the University's existing collection at Creswick.³⁸

Our thesis is evidenced from ANU's main collection after it was put into storage in 2011. By

that time forestry had lost its institutional identity in successive re-organisations, teaching it had withered, and research no longer used the collection. What was the value of the collection? A heritage assessment was commissioned from Roslyn Russell Museum Services, a Canberra-based consultancy.³⁹ It reported on its historic, aesthetic and research significance, its degree of completeness and integrity, and its interpretive capacity. Its high degree of research significance was thought due to its extent and potential to be used in further investigations. It was considered to be of national historic significance due to its connection to the history of forestry education and prominent people, such as Lane Poole. It was also significant for its links to the built heritage in the ACT. Its interpretive capacity, noted in the report was confirmed subsequently by the use of some of the display boards in an exhibition in the High Court, and of an artefact in the 'Glorious Days, Australia 1913' exhibition in the National Museum of Australia.⁴⁰

Heritage may be recognized, but as we noted at the start of this paper, it may be conserved or wasted. At the time of writing, the future of the ANU collection described is uncertain, but not unique. However, we suggest that the sense of a national purpose that imbued its start might well be invoked to conserve it for the future. A first step might be to harmonise the indexes to Australia's eleven collections so that the extent of specialisation and duplication could be evaluated. A stronger approach might be to amalgamate ANU's collection with CSIRO's two collections (formed in its Forest Products Division and the National Herbarium). The combined national collection would need to be curated by an expert in wood anatomy who can respond to the demands from national institutions (Australian Federal Police, Australian National Museum, Australian War Memorial, National Gallery of Australia, and others) for wood identification. The curator should be expected to further the science of wood identification, liaise with curators at home and overseas, and help train future scientists. Considerable skills are needed for high standard wood identification, particularly of the eucalypts; we need to ensure that they are not lost forever. Surely a developed nation such as Australia can afford to take a national approach? Can it afford not to?

References

1. Collections Council of Australia, *Significance 2.0: a Guide to Assessing the Significance of Collections* (Canberra, 2009); *Movable Cultural Heritage Act 1968* (Cwlth).
2. This investigation is part of a larger project to review the history and status of Australia's eleven public wood collections.
3. His arguments were presented in C. E. Lane Poole, 'Forestry Position in Australia', Commonwealth of Australia, *Papers Presented to Parliament, 1925*, paper 73. For a biography of Lane Poole, see John Dargavel, *The Zealous Conservator: a Life of Charles Lane Poole* (Crawley, WA: University of Western Australia Press, 2008).
4. C. E. Carter had a BSc in Agricultural Science (1913) and a Master of Forestry degree from Yale (1922) that included four courses in Forest Products that covered wood identification, mechanical properties of wood, wood preservation, and the classification and structure of wood, Manuscripts and Archives, Yale University Library, Accession 1983-A-0200, Box 2, folder 4, information kindly provided by Andrew Berger, Archivist, Yale University.
5. Australian National University Archives (hereafter ANUA) A3056 1926/1/19A 'Timber Samples WA', 25 Nov 1926 lists 24 samples provided; 1926/1/19C 'Timber Samples Victoria', 14 July 1926 notes two sets of 50 hand blocks being prepared, and that Victorian standard size was 6" x 3" x 2 1/2" (150 x 76 x 98 mm); 1926/1/19C 'Timber Samples New South Wales' 26 June 1926, requests sets of 45 species; 1926/1/19F 'Timber Samples Queensland', 20 September 1926 details 88 species.
6. ANUA A3056 1926/1/19C 'Timber Samples New South Wales' 26 June 1926 notes that a set for the Museum at Gotha was required as well as one for the Forestry School.
7. From the appearance of the way the boards were prepared, we assume that the initial collection consisted of 99 boards of Australian species. 46 boards of important imported species appear to have been added later.
8. C. B. Schedvin, *Shaping Science and Industry: a History of Australia's Council for Scientific and Industrial Research, 1926–49* (Sydney, 1987). The adviser, A.J. Gibson, spent three months in Australia in 1927 and recommended keeping forest products research in CSIR and forestry research in the Forestry Bureau. National Archives of Australia, A9778 F5/3/59, I.H. Boas, 'Tour of England and America and Recommendations for the Organisation of Forest Products Research in Australia', n.d. [1929]. Cummins specialised in ways to preserve wood, and Dadswell in the micro-analysis of wood structure, for which he added a short course with Kodak on micro-photography.
9. Lane Poole resented not having forest products research in the Bureau, a decision that he felt was 'the worst blunder yet made in forest policy' Lane Poole to A. C. D. Rivett [CSIR's Chief Executive Officer] 7 August 1929, cited by Schedvin, *Shaping Science and Industry*, p. 106. His resentment bubbled over from time to time, as Rivett, noted his Chairman, Julius; National Archives of Australia, A9778 F5/3/49b, A.C.D. Rivett to Sir George Julius, 11 December 1934 '...it is not difficult to see that he is again in this [the standardisation of names] voicing his disapproval of the Division'.
10. National Archives of Australia, A9778 F5/3/40, "Research into Structure and Identification of Commercial Woods of Australia" report by C.E. Carter, 1 August 1929. Anon. 'An appeal for wood specimens', *Australian Forestry Journal* 12(2) (1929), 39.
11. Lane Poole had experience in collecting wood and herbarium samples in Sierra Leone, Western Australia and particularly in Papua and New Guinea—John Dargavel, 'From exploration to science: Lane Poole's forest surveys of Papua and New Guinea, 1922–1924', *Historical Records of Australian Science*, 17 (2006), 71–90.
12. Lane Poole's personal antipathy to Carter was so severe that they communicated only by correspondence—John Dargavel, *The Zealous Conservator*, documents Lane Poole's conflicts with Carter and the heads of state forest services.
13. Not surprisingly, Carter complained to the Secretary of the Department of Home Affairs and hence to the Public Service Board. National Archives of Australia, A1, 1931/3951, 'Wood Technology Branch, Forestry School, Transfer to Melb.'
14. Dadswell and Burnell, p. 13. When the Bureau appointed its own botanist, R. D. Johnston in 1951, he registered about 8,000 specimens in its herbarium. These formed the start of what was to become a great collection, particularly of the eucalypts, in CSIRO's Forest Research Institute and now in its Australian National Herbarium—G. Chippendale, 'A Brief History of the Botanical Collections in the Forest Research Institute, Canberra'. *Australian Systematic Botany Newsletter* 7: 4–5 (1976). Day, M. F. C., in collaboration with H. Hewson, M. Fagg, J. Doran, J. Turnbull, J. Illic, S. Jeffrey, P. Last and A. Graham, T. Chesser and N. Bougher, 'The Biological Collections in CSIRO: a National Heritage?', *Historical Records of Australian Science* 15 (2004), 1–19.

15. Anon, *Australian Forestry Journal* 13 (4) (1930). H. E. Dadswell and Maisie Burnell 1932, *Identification of the Coloured Woods of the Genus Eucalyptus*, pp. 12–14, detail the protocol to ensure that the specimens were botanically authentic and duplicated. It is not clear whether the protocol was fully developed from the start of the national collection.
16. Australian National University Archives, ANUA 137.
17. John Dargavel 2012. 'Contested Forestries, Contested Educations: a Centenary Reflection'. *Australian Forestry* 75(1) (2012), 16–21. Michael M. Roche and John Dargavel, 'Imperial ethos, Dominions Reality: Forestry Education in New Zealand and Australia', *Environment and History* 14 (4) (2008), 523–543.
18. For examples: F. G. Gerraty sent two samples in 1930 and became Commissioner (1947–48) and Chairman (1948–54), Victorian Forests Commission, or F. M. Bailey (grandson of a Queensland Government Botanist) who sent a sample in 1929 became Commissioner, Forests NSW (1970–71).
19. Dargavel, *The Zealous Conservator*, details this and others of Lane Poole's conflicts. Victoria also stopped sending students to train in the Australian Forestry School.
20. Commonwealth Forestry Bureau, *Annual Report*, 1936, 1937, 1939. The enquiries from 'forest services' were presumably not from Queensland or New South Wales that had their own collections.
21. Carter continued for five years after the normal retirement age of 65 under a special arrangement.
22. See Day *et al.* 2004.
23. F. Gay CSIRO and R. A. Perry were named on the 'Advice' entry in the cards and registers for these collections.
24. The merits of the Australian card sorting system for the identification of wood, which 'had been in use for some two years' was discussed at a meeting of Australian wood anatomists held in the CSIR Division of Forest Products. Those present were M. B. Welch and W. J. Rosling (NSW Forestry Commission), E. J. Semmens (Victorian Forests Commission and Principal of the Creswick Forestry School), C. E. Carter (Commonwealth Forestry Bureau and Lecturer in Wood Technology at the Australian Forestry School) and H. E. Dadswell, D. J. Ellis, A. M. Eckersley and H. D. Ingle (all CSIR Forest Products). *CSIR Monthly Newsletter* no. 92 (September 1939), 4–5.
25. L.T. Carron 'A History of Forestry and Forest Product Research in Australia', *Historical Records of Australian Science* 5(1) (1980), 7–57.
26. It was located in: the Department of the Interior 1946–1964, the Department of National Development 1964–72, the Department of Primary Industry 1972–4, and the Department of Agriculture 1974–5. Brad Collins, *Fields of Discovery: Australia's CSIRO* (Crows Nest, NSW, 2002), pp. 253–254 describes the transfer and the cultural differences that entailed.
27. The largest of those from CSIRO consisted of 1,085 specimens. It arrived in 1958.
28. L. T. Carron, 1985, *A History of Forestry in Australia* (Canberra, 1985) and S. G. Foster, *The Making of the Australian National University, 1946–1996* (Canberra, ANU ePress).
29. Heather completed his PhD in 1965. L. T. Carron was also appointed from the staff of the Australian Forestry School and completed his PhD in forest mensuration in 1972. Rudman completed his PhD at University of London in 1955 and joined CSIRO Division of Forest Products where he was as a research officer (1956–60) and then senior research officer (1961–5) in the Timber Preservation Section. He was given a leave of absence in 1965 to take up a Leverhulme Visiting Fellowship at University of Leeds before joining ANU. His research focussed on wood durability, preservation, cell wall structure and growth-ring analysis. Australian National University Archives ANUA53/2.1.8.4 (1) Department of Forestry, *Annual Report* 1966; ANUA 53/2.1.8.5 (3) Department of Forestry, *Annual Report* 1967; ANUA 53/2.1.8.6 (3) Department of Forestry, *Annual Report* 1968; Balodis, Vilnis, 'Division of Forest Products Staff Lists 1928–1971' (Melbourne: CSIRO, 2009, CD). Division of Forest Products Staff Lists 1928–1971 2008, (CD), CSIRO, Melbourne.
30. Several academics from within the Department contributed to the course including Heather, C. Hamilton, K. Groves, D. Stoddart and J. Wilkes.
31. Ilic, Jugo. 'Obituary William Edwin (Ted) Hillis, 6 February 1921–3 February 2008', *Australian Forestry*, 71(2) (2008), 160.
32. Anon., 'Alight on the Hill', *ANU Reporter* 22 (15) (25th September 1991), 1.
33. Roger D. Heady, Ross B. Cunningham, Christine F. Donnelly and Philip D. Evans, 'Morphology of warts in the tracheids of cypress pine (*Callitris* Vent.)', *International Association of Wood Anatomists Journal* 15 (3) (1994), 265–281; Roger D. Heady and Philip D. Evans, 'Callitroid (callitrisoid) thickening in *Callitris*', *International Association of Wood Anatomists Journal* 21 (3) (2000), 293–319; Roger D. Heady, John G. Banks and Philip D. Evans, 'Wood anatomy of Wollemi pine (*Wollemia nobilis*, Araucariaceae)', *International Association of Wood Anatomists Journal* 23 (4) (2002), 339–357; Roger D. Heady and Philip D. Evans, 'Wood anatomy of *Actinostrobus* (Cupressaceae)', *International Association*

- of *Wood Anatomists Journal* 26 (1) (2005), 79–92; Roger D. Heady, Ross B. Cunningham and Philip D. Evans, 'Differences in the ultrastructure of their large warts allow white cypress pine (*Callitris glaucophylla*) to be distinguished from black cypress pine (*C. endlicheri*)', *Wood Science and Technology* 42 (4) (2008), 313–323.
34. Philip D. Evans, Roger D. Heady and Ross B. Cunningham, 'Identification of yellow stringybark (*E. muelleriana*) and silvertop ash (*E. sieberi*) wood is improved by canonical variate analysis of ray anatomy', *Australian Forestry* 71 (2) (2008), 94–99.
 35. The reasons for the decline are beyond the scope of this paper but included the cessation of cadetships offered by state forest services, a decreased demand for foresters due to their increased productivity and reduced areas of state forests, competition from a new forestry course at Southern Cross University.
 36. Richard E. Williamson, Huntly G. Higgins and Bruce A. Stone. 'Alan Buchanan Wardrop 1921–2003', *Historical Records of Australian Science*, 18 (2007), 113–136.
 37. Craft ACT, *Rings of History: Contemporary Craft from Historical Timbers* [Exhibition catalogue] (Canberra: 2001).
 38. I. McLaughlin 'Report to persons who once had an interest in the CSIRO wood once in storage at the ANU in Canberra', Unpubl. The IWCS also made about 3,000 samples for its members in Australia and the USA, and sent off-cuts to an archeologist in the University of Queensland. The 1½ tonnes remaining was used as firewood.
 39. Roslyn Russell Museum Services, 2011. 'ANU Forestry Wood Collection: Significance Assessment'. Canberra. Mss.
 40. In 2010 and 2013 respectively.