

Maxwell Frank Cooper Day 1915–2017

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Max Day (1915–2017) entomologist, scientific diplomat and conservationist, was a national scientific leader across the twentieth century, a time that spanned the rise of the idea of the environment and of concern about ecological limits. He was a pioneer in Australia of integrated, cross-disciplinary science and an important advocate of evidence-based policy-making. His fundamental disciplinary work in entomology, virology, ecology and forestry focused on nationally significant problems and their international context.

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Early life and education 1915–37

Maxwell Frank Cooper Day (Fig. 1) was born in Sydney on 21 December 1915, the eldest and only son of the three children of architect Harry Cooper Day and Marguerite ('Daisy') (née Reichenbach) (Fig. 13 see Supplementary Material). His grandfather was also a distinguished architect, Mark Cooper Day.¹

By the time Max was seven, he had two younger sisters, Philippa and Stephanie, and the family was living in 'Virginia', a new house designed by his father at 20 Wentworth Road, Vaucluse, in Sydney's eastern suburbs (Figs 14, 15, 16 see Supplementary Material). 'Virginia' had views across to Manly and up the harbour to the city. There was plenty of bush nearby, and Max's early interest in natural history was reflected in his note to Santa in 1922, requesting a 'butterfly net and a killing bottle'.² He also carried a scar on his foot for life from this period, because a doctor had tackled what he thought to be a snake bite. The older Max believed it was a spider bite in fact, but the scar was certainly evidence of early rambling in the bush. He loved to collect things, creating a museum in the tool shed at the bottom of his garden for his prized bird skins (a gift) and his own dissections of local lizards and other treasures.

All this changed abruptly in 1925; Max writes:

At the age of nine I was sent off to boarding school [at] ... 'Hayfield', ... a preparatory school to [The King's School in north Parramatta] ... I have one vivid memory of the place. In my second year there, we slept on a large, upstairs veranda. One night the telephone rang, which was most unusual. I heard Old Jim [Tait, the head teacher] answer and say 'I'll tell him in the morning'. It must have been a Sunday and it was to say that my father had been killed that day by a vehicle whilst he was walking with my mother. Old Jim did not tell me why I was put on the train at Carlingford for Central Station early the next morning and it was not until I was met by Professor Wilkinson [their Vaucluse neighbour and friend] that I



Figure 1. Max Day, ~1980 (courtesy of Jon Day).

learned the reason for my trip. Not surprisingly, this awful event had immense impact on the whole family, not least on me. My mother was covered in bruises and scratches, for it appears that my father had hurled her out of the way of an approaching truck being driven by a drunk man. He had been pinned between the vehicle and a

¹ Mark Cooper Day is remembered for two buildings on the Queensland Heritage List, the Stock Exchange in Charters Towers (1888) (<https://www.nationaltrust.org.au/places/stock-exchange-building-and-arcade/>) and the Queensland Building (1891), built for Burns Philp Insurance (104–106 Flinders St, Townsville). Although Sydney based, Day's reputation had been enhanced when he designed 'Gowan Brae' at Pennant Hills for James Burns (now part of The Kings School, Sydney). See Robin and Day (2017) suppl. 1, p. 6.

² Robin and Day (2017) suppl. 1, p. 7.

telegraph pole and died before reaching hospital. After a couple of days, I went back to school.

The next I knew, 'Virginia' had been sold and the family moved into my grandmother's house at Wahroonga.³

There was to be no King's School for Max. While his sisters were able to attend Frensham in Mittagong, as planned, because his father had undertaken architectural work for the school, Max spent the years between 1928 and 1933 as a day boy at Sydney Church of England Grammar School (Shore), which he described as 'an unmitigated disaster', by which he meant that he did not excel academically there.⁴ However, taking the train to school had one important consequence for his scientific future. One day, Max met another butterfly enthusiast, drawn to him by the fact that Max was carrying caterpillars of the Blue Triangle swallowtail butterfly in his straw 'boater' hat. Douglas Waterhouse introduced himself and told Max that his uncle knew all about butterflies.⁵ Doug was the nephew of Dr G. A. Waterhouse, author of *The Butterflies of Australia*.⁶ Doug and Max lived in the same suburb and became firm friends. Max soon met 'GA' (as Gustavus Athol Waterhouse was known) and was invited to view his insect collection and to join weekend field trips with Doug and GA's son, John, in the bush around Sydney. Max commented that, 'By the time I left school, I knew more about the insects of the Sydney district than I have ever known since. We learned about life-histories, bred our own larvae, were provided with the best equipment available and we had an instructor who was the world authority!'⁷ When Max was aged 16, GA gave him a copy of his new book *What Butterfly Is That?* and inside it GA wrote: 'If you keep on as you have begun, you will make many new discoveries' (Fig. 17 see Supplementary Material). Max recollected, 'it was, until then, the proudest moment of my life!'.⁸

The wisdom of the bush, and the companionship of the Waterhouse family inspired Max to choose science at the University of Sydney, where he and Doug both enrolled in 1934 (Fig. 2). During his university years, he continued his field studies through his work as honorary secretary of the Biology Society for two years. Max gradually 'learned how to study', as he put it. Despite a slow start, each year his results improved, finishing his third year with two high distinctions, and allowing him to do an honours year in entomology under the supervision of Anthony Reeve Woodhill.⁹ Max's thesis on termites demanded a knowledge of bacteriology, so he took a course in the School of Tropical Medicine in order to learn how to culture the anaerobes that digested cellulose in the termite gut. The chemical analysis for his thesis was guided by the physiologist Frank Stanley Cotton,¹⁰ who volunteered his gas analysis equipment, and enthusiastically supported the termite project. Max's thesis was outstanding—and so was Doug Waterhouse's. They were



Figure 2. Max at the time he commenced at University of Sydney, ~1934 (courtesy of Jon Day).

joint winners of the university medal in 1937. It was an unprecedented event for two entomology graduates to share a medal for the entire Faculty of Science.

Max and Doug initially started work with the Council of Scientific and Industrial Research (CSIR) in Mooroopna, Victoria, and were soon offered jobs with CSIR in Canberra (Fig. 18 see Supplementary Material). They both worked on major projects, such as the urgent need for trained entomologists in a country that relied on agricultural exports but knew very little about its local pest fauna. Max recalled that in 1938 he and Doug 'shared a room in an abysmal boarding house over in Ainslie', and that the pay was very poor.¹¹ Building on his honours thesis on termites, Max worked with G. F. Hill and Fred Holdaway in a project for the Post Master General's Department that tested the resistance of various timbers to termite attack.¹²

CSIR opened up unexpected new opportunities for young Max. In his first year there, Professor Lemuel Roscoe Cleveland¹³—Cleve for short—from Harvard University, visited Australia to

³ Robin and Day (2017) suppl. 1, p. 8.

⁴ Robin and Day (2017) suppl. 1, p. 9.

⁵ Day and others (2000).

⁶ Evans (1990).

⁷ Robin and Day (2017) suppl. 1, p. 10.

⁸ Robin and Day (2017) suppl. 1, p. 10.

⁹ Anonymous (1965). Anonymous (1968).

¹⁰ Nairn (1981).

¹¹ Robin and Day (2017) suppl. 1, p. 15.

¹² Much later in his career, Max's knowledge of timber became relevant again in 1976, when he became the Inaugural Chief of the CSIRO Division of Forest Research (1976–80).

¹³ Trager (1980).

study termites, and Max was asked to assist him. Cleve needed a new research assistant in the United States of America (USA) and subsequently offered Max the job. Max recalled it was ‘\$1200 pa, which seemed princely’ and included ‘half time to do course work’.¹⁴ This opportunity established new international connections for Max. Entomology was becoming a locus for applied science, and applied science itself was increasingly an international endeavour.

An Australian abroad 1938–47

Max, aged 23, sailed in 1938 to the USA (Fig. 19 see Supplementary Material), travelling via Cape Town and London, where he was ‘aghast to see evident preparations for war. We had been unaware in Australia of the feeling that Hitler was already on the move and it was scary’.¹⁵ Cleve met Max off the ship when it arrived in Boston after a stormy crossing of the Atlantic. Max’s arrival was timed for the start of Harvard’s academic year that commenced in September. CSIR Entomology had granted him a year’s leave without pay to take up Cleve’s offer and attend lectures at Harvard. By 1939, however, it was impossible to get back to Australia because of the war. Max resigned from CSIR, and took up a Lehman Fellowship, which enabled him to work full-time on his doctorate (Fig. 3). Constrained by limited funding, Max worked very hard and completed his thesis on termite protozoa in just three years, significantly shorter than the usual time given to Harvard dissertations.¹⁶

In 1941, Max embarked on a new career as lecturer in cytology at Washington University in St Louis, Missouri. His teaching load was heavy, but he found time in the summer for research, studying the local mosquitoes for the Health Department of St Louis County, which was concerned about the possibilities of a malaria outbreak.¹⁷ He was not long into his second academic year, when, on 7 December 1941, the Japanese bombed the United States Navy base at Pearl Harbour in Hawai’i, and the USA entered the war. Max abruptly found himself co-opted to join Australian War Supplies Procurement (AWSP), a purchasing agency for the Australian Government, based in Washington DC. His role was to procure scientific equipment from the USA for the Australian war effort.

Although this was a busy job with new demands, Max found he had his evenings free—and arranged to work in the excellent library of the US Department of Agriculture. He produced a ‘massive bibliography’ of insect histology with a view to eventually writing a textbook.¹⁸ Max kept a notebook while in Washington listing the scientific projects he worked on and lectures he proposed, (Fig. 20 see Supplementary Material) including: wartime developments in insecticides; use of radioactive tracers; the work of the British Commonwealth Scientific Office and the Australian Science and Research Liaison Office in war and peace; and a general overview of ‘trends in science in the US’.¹⁹ The War Supplies Procurement



Figure 3. Max in Cleve’s laboratory at Harvard, USA, ~1940 (courtesy of Jon Day).

group worked closely with the Australian Scientific Liaison Office (run by CSIR) and its British Commonwealth counterpart, and while the job of ‘placing orders’ with appropriate firms—sometimes with seven copies of each—was tedious, the connections were important and laid the groundwork and networks for his subsequent career in international scientific diplomacy.

Most significant of the North American connections in this period for Max was a Canadian called Barbara Bishop. Max and Barbara met through a mutual friend and were soon engaged. They were married in Washington on 19 February 1944, and their first child, Pamela was born in 1945 (Figs 21, 23 see Supplementary Material). During the war years, Barbara worked as the personal secretary to Sir Charles Hambro at the British Raw Materials Mission. Barbara and Max never discussed their respective jobs during the war, and it was only many decades later that the family learned that the British Raw Materials Mission was a ‘front’ for top secret work bringing uranium into the US for the atom bomb, and ensuring other countries had minimal access to uranium. Barbara had an extremely high security clearance during her time with Hambro, but even until her death in 2012, she said very little about her role during the war.²⁰

¹⁴ Robin and Day (2017) suppl. 1, p. 16.

¹⁵ Robin and Day (2017) suppl. 1, p. 17.

¹⁶ Day, M. (1941). See also list of publications Appendix 1, Supplementary Material.

¹⁷ Day (1943).

¹⁸ This did not materialize—but the bibliography was published as a book by CSIR in 1948. Day (1948). Max’s diaries and work notebooks from this period are held with the family papers.

¹⁹ Robin and Day (2017) suppl. 1, p. 26.

²⁰ Robin and Day (2017) suppl. 1, p. 28 (note by J. Day). Max and Barbara were married for 68 years.

In 1944, Max was appointed scientific liaison officer, in the Australian Scientific Liaison Office, Washington, where he worked until 1947. His role there was to help Australian scientists during their US visits, to liaise with other international colleagues working in the USA, and to advise the Australian government through the embassy on scientific and technical matters. Until the 1940s, 'science' tended to mean physics and chemistry, but new trends were developing where biological expertise and understandings were becoming relevant. Max told a story in his memoir about the rarity of awareness about conservation among the global citizens and scientists who established the Food and Agricultural Organization (1945), and the implications of this for the way they developed their charter:

In October 1945, by an unexpected series of events, I was appointed as a member of the Australian delegation to a meeting in Quebec, Canada that established the Food and Agricultural Organisation (FAO) of the United Nations. While there were some eminent Australians on the delegation, no one else knew anything about fisheries or forestry, and I found myself on the committees dealing with both areas. I was horrified to find that all other members from about a dozen or so nations wanted to draft regulations about whaling that paid no attention whatsoever to conservation, and I said so. The others seemed rather taken aback and put me on a small drafting sub-committee. I guess the resulting document did not have any lasting effect, but at least it gave some breathing space for the International Whaling Commission to do a more effective job at a later time. This episode left a lasting impression on me, and I think gave me a new insight into what might be accomplished by an individual willing to speak out.²¹

There was a shortage of hotel rooms in Quebec because of the big FAO meeting, and Max found himself sharing with eminent economist, J. G. (JG or Jack) Crawford (1910–84), five years his senior (Fig. 22 see Supplementary Material). Max wrote 'this led to a long friendship, as well as a fantastic learning experience for me, as JG was a remarkable man'.²² Crawford was a major figure in Canberra and his friendship with Max proved important in connecting science, economics and government in the 1940s, 1950s and 1960s. Jack and Max ended up living on the same street (Melbourne Avenue, Canberra) and Crawford became a regular member of the extraordinary group of influential men who played tennis on Max's court every Saturday (Fig. 4).²³

The concept of the environment was very new in the 1940s. It was part of a rising awareness of the social responsibility of science in international contexts. Max's concern about whaling was one of many instances raised in the new global organizations of 1945, FAO

and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The biologist, Julian Huxley was UNESCO's first director. He and Joseph Needham, a biochemist and sinologist (who was the first head of UNESCO's Natural Sciences section) were responsible for adding the 'S' for science to what had been proposed as the United Nations Educational and Cultural Organization.²⁴ As part of the 'social responsibility of science', they saw possibilities for international and 'universal' outreach in a scientific secretariat within the United Nations. Although science was a late addition, UNESCO programs established in partnership with the International Council of Scientific Unions (ICSU) nurtured the development of ideas about the environment and conservation, and placed them on a global footing.²⁵ Developing international principles for managing the environment proved to be among the scientific tasks, even though scientists did not describe themselves as 'environmental scientists' until the 1960s. Note that 'environmentalism' came even later, in the 1970s, and was quite distinct from the conservation advocated by Max and others in the 1940s.²⁶ At this stage the concern was for conservation of natural resources and unspoiled places. The environment was being damaged by human activities and science led the call for its careful management.

Back in Canberra 1947–65

The Day family returned to Canberra, Australia, in 1947 when Max was appointed a research officer in the CSIR Division of Entomology. He worked in the insect physiology group, studying the practical problem of how moths digested woollen keratin, leaving holes in clothes, a concern close to the heart of the nationally important wool industry (Fig. 24 see Supplementary Material). It was a difficult time to find accommodation. In 1948, senior CSIR entomologist, Francis Ratcliffe,²⁷ lent his Acton home to Max and to the family of another young entomologist, a moth-specialist, Ian Common. Both Max and Ian had young daughters but they had no grandparents in the new town of Canberra, so their wives helped each other with their families while they awaited the building of new housing. When Ratcliffe returned from study leave in 1949, Max and Barbara moved to a house in Griffith just in time for the arrival of their second daughter, Stephanie in 1949.

Significant in Max's work at this time was his collaboration with the eminent ANU virologist Frank Fenner, working on mosquitoes and the transmission of viruses. Max built on his mosquito work in St Louis,²⁸ and combined his unusual experience in insect

²¹ Robin and Day (2017) suppl. 1, p. 29

²² Crawford was director of research in the Department of Post-War Reconstruction and was present at the FAO event as he was advisor to Prime Minister Chifley on soldier settlement, and other agricultural development initiatives. He had moved to Canberra in 1944 and became foundation director of the Bureau of Agricultural Economics in 1945. Later he was foundation director of the Research School of Pacific and Asian Studies, and fiscal advisor to the Australian National University (Miller 2007).

²³ Over the years 1961–2002 the regular Saturday afternoon tennis group included various interesting and influential colleagues, many of them notables in the academic or medical fields, or distinguished public servants: Jim Allen, W. Bill Andrews OBE, Commodore H. P. (Paul) Berger LVO RAN, Dr Bill Conner, Sir John Cornforth AC, CBE, FRS, FAA, Emeritus Prof. David Craig AO, FRS, FAA, FRSN, Tom Crayke, Sir John 'Jack' Crawford AC, CBE, Sir Neil Currie CBE, Owen Davis, Dr Max Day AO, FAA, Jon Day PSM, Bill Doe, Prof. Frank Fenner AC, CMG, MBE, FRS, FAA, John Grant, Bill Holford, Alfred 'Alf' Maiden CBE, Emeritus Prof. Russell Mathews AO, CBE, Bruce Miller, Hans Mung, Dr Paul Nestel, Rowen Osborn, The Hon. Rex Patterson, Roy Peachy, Colin Plowman, Dr Keith Powell MBBS MPH FRACP FAFPHM, Dr S. Ralph Reader CMG, MB, FRACP, FRCP, Dr Doug Waterhouse CMG, AO, ForMemRS, Sir W. Alan Westerman CBE, Dr Bruce Whyte MBBS, Prof. H. Malcolm Whyte AO, FRCP, FRACP.

²⁴ Archibald (2006).

²⁵ Selcer (2018) pp. 1–26, 72–75. On Day's role in conservation and the environment see Robin and Day (2017).

²⁶ Warde and others (2018).

²⁷ Robin and Griffiths (2007).

²⁸ Day (1943).



Figure 4. The Saturday tennis group, Max's home (12 Melbourne Ave, Canberra) had a tennis court at the back, about late 1980s. L–R standing: Max Day, Malcolm Whyte—sitting: Keith Powell, Bill Geolot (Max's brother-in-law), Russell Mathews (courtesy of Jon Day).

physiology and histology (undertaken at Harvard) with his entomological expertise. At this time, the famous trials of *myxoma* (a virus designed to selectively attack rabbits), were under way. Myxomatosis research was the beginning of Day's life-long friendship with Fenner (Fig. 28 see Supplementary Material).²⁹ They worked closely together on the mechanisms for the transmission of 'myxo' for five years until the mid-1950s (when Max again lived in Washington) and then on conservation and environment matters until Fenner's death in 2010. Max maintained the work he did with Frank on the myxomatosis virus was the most satisfying achievement of his long career, given the enormous ecological and economic impacts that rabbits had caused.

National parks and conservation

Canberra was a very small city at this time, but its international connections were strong, and it was rich with expertise. Appointments to the public service, to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and to the new Australian National University (ANU) (established in 1948) went to people with international distinction, some returning Australians and many others from abroad. Making such people welcome was something Max and Barbara were already familiar with, through their Washington years.

The continuities were strengthened by a second stint in Washington in 1955–7, when Max was scientific liaison officer in the Australian Scientific Office in a rather different era.³⁰ By this time, the United States of America led a new internationalism in ideas about national parks: some described the national park as 'America's Best Idea'. While living in Washington, Max and the family (now three children, Fig. 5) spent vacations visiting national parks in North America. The American model of the national park was also under discussion at the Australian Academy of Science, to which Max was elected Fellow in 1956 (while he was in the United States of America) (Fig. 25 see Supplementary Material). He and Frank Fenner corresponded extensively on how the academy could provide scientific leadership for conservation and national parks in Australia.

Max's international investigations about national parks started to place Australia's national parks in an international context. In March 1958, soon after he arrived back in Australia, Max wrote to the academy suggesting that it establish a formal committee 'to study National Parks, Wildlife and Archaeological Reserves and Primitive Areas within the Commonwealth'.³¹ This was the first *national* initiative for so-called national parks. Action at this time was prompted by opposition to a development proposal in the Kosciuszko high plains.³² Before this, the states and territories

²⁹ Boyden and others (2013). Fenner and others (1952). Fenner and Day (1952). Day and Fenner (1953).

³⁰ In 1955, when Max and Barbara ventured to their second three-year posting to the Australian Scientific Liaison Office in Washington, their three children (Pamela, Stephanie and Jonathan) accompanied them.

³¹ Robin (1994) p. 4. Quote: M. F. Day to Assistant Secretary, Australian Academy of Science, 20 March 1958, Academy Archives, File 1002. The letter suggested that the committee should include members of the Academy and CSIRO officers (Robert Carrick, Wildlife Survey Section, and A. B. Costin, Division of Plant Industry, were named), and that it be empowered to co-opt suitable people to undertake research at State level.

³² Robin (1994). See also Slattery (2010).



Figure 5. The Day family at Washington DC, 1956. L–R: Stephanie, Max, Pamela, Jonathan, Barbara (courtesy of Jon Day).

had been entirely responsible for managing land and natural resources; later ‘environment’ became another state responsibility. There were, however, great differences between the states in their capacity to protect reserved areas, and many natural areas suitable for reserves crossed state boundaries. Thus, the academy had advocated a more uniform ‘national’ approach that would enable Australia to respond to international enquiries as to how the national parks and reserves system worked.

When the National Parks Committee of the Australian Academy of Science was established at its May 1958 annual meeting, Max was invited to be its chairman. He then led the Australian delegation and represented the Australian Academy of Science at the first World Congress on National Parks in Seattle in 1962.³³

One of the academy’s National Parks Committee’s first tasks was to consider a lengthy proposal for a ‘Kosciuszko Primitive Area’ prepared by a group of scientists, mostly CSIRO officers, including Max himself. The ‘Canberra-Kosciuszko Committee’ sought formal academy endorsement for their submission, as it took on the mighty Snowy Mountains Authority that was planning a dam that would flood the ‘important glaciological sites’ around David Moraine and

Mt Twynham.³⁴ The scientists’ campaign was successful; the Spencers Creek dam was never built. The delicate negotiations were achieved without undoing the Snowy Mountains Authority’s considerable support for the CSIRO Alpine Ecology Unit on its doorstep.³⁵ Max, and several colleagues including Alec Costin and Robert Carrick, were quietly persuasive in pointing out the importance of conservation and care for the environment in the creation of hydro-electric works, at a time when engineering progress was paramount on the national agenda.

Max continued his interest in protecting the alpine biota of the Kosciuszko region for many more decades. Graeme Worboys, an ecologist with the National Parks and Wildlife Service, recalled that when he was undertaking the conservation planning of the Kosciuszko Summit Area in 1979 and the Kosciuszko National Park (KNP) Plan of Management in 1982, Max was serving on the Kosciuszko National Park Advisory Committee, and offered scientific guidance, especially on the insects and lichens of the park. Max never forgot the smaller and less charismatic biota in his vision for conservation. Graeme recalled that Max ‘reinforced the importance of science, and the importance of Kosciuszko’.³⁶ Max understood

³³ Robin (1994). Nash (1982). In Seattle, Max met many of the world leaders in conservation, and was particularly impressed by Stewart Udall, author of *The Quiet Crisis*, who was a keynote speaker. Udall (1963).

³⁴ ‘Proposed Kosciuszko Primitive Area’ (mimeo report, undated, but probably March or April 1958), Australian Academy of Science Archives, File 1002. Scientists present at Canberra meeting 4 February 1958 and Sydney meeting 13 March 1958 were listed in an appendix. Robert Carrick and A. B. Costin were present at both meetings: 36 of the 41 people present in Canberra were from CSIRO, including Francis Ratcliffe, Carrick’s immediate superior. The Sydney meeting comprised nine scientists (apart from Carrick and Costin), four from the University, three from the Museum and one each from the Forestry Commission of NSW and the Herbarium. The covering letter was signed by Carrick (Vice Chairman) on behalf of R. M. Moore, the soil scientist and Chairman elected by the Canberra group.

³⁵ Robin (1998a).

³⁶ Robin and Day (2017) suppl. 1, p. 42

the importance of all aspects of biological diversity that related directly to national and international conservation priorities.

Canberra was also the centre of a major conservation initiative to establish a fund for undertaking scientific studies of endangered species and improving their habitat. In 1963, in preparation for a forthcoming Australian visit by the Duke of Edinburgh, Ian MacPhail, campaign director of the London-based World Wildlife Fund (WWF) approached Francis Ratcliffe, Harry Frith, Max (as Chairman of the Academy's Committee on National Parks) and Geoff Yeend to suggest that an Australian branch of WWF should be formed. The Duke of Edinburgh was patron to the WWF and could promote this idea. The Australians formed a committee in March 1964 to discuss this plan, but came to the conclusion that Australia had its own share of conservation concerns and efforts—in fact half a century later, it is now described by scientists as one of the world's biodiversity hotspots.³⁷ Max, with his international perspectives, and an awareness of how things worked in the United States of America, proposed that conservation efforts needed to be focused in Australia. Rather than setting up a trust to aid conservation efforts elsewhere in the world, Max advocated that Australia needed its own foundation with a strong focus on the issues for its own continent. On 18 September 1965, the Australian Academy of Science in Canberra hosted the first meeting of the Australian Conservation Foundation (ACF). The Duke of Edinburgh supported this initiative.

Many academicians were stalwarts of conservation and became foundation ACF councillors, including Canberra-based Francis Ratcliffe, Max Day and Harry Frith from CSIRO and Alfred Dunbavin Butcher, director of Fisheries and Wildlife Victoria (1949–73).³⁸ The strong original connection with science and with the academy is something still valued by ACF. In November 2015 Kelly O'Shanassy, (chief executive officer of ACF) invited Max to attend the ACF jubilee celebrations. O'Shanassy acknowledged that 'Dr Day was an extremely significant figure' in the foundation's history, since 'it was largely at his suggestion that the Foundation was formed 50 years ago'.³⁹

CSIRO Executive 1966–75

In 1963, Max was appointed assistant chief of the Division of Entomology (Figs 26, 27 see Supplementary Material), and through this and his National Parks work, he was increasingly involved in managing science for national and international priorities, rather than undertaking research himself. Late in 1965, this took a new turn when Max, now aged fifty, was invited by the chairman of CSIRO, Sir Fredrick White, to join the CSIRO Executive, where he replaced the retiring distinguished biologist, Sir Otto Frankel (Figs 29, 30 see Supplementary Material). The strategic management of scientific research for a big organization like CSIRO took more experience than any single discipline could provide. With customary

pragmatism, Sir Fred told Max that his job was simply to 'recognize good science and when you see it, support it'. Max reflected:

To recognize good science was easy in entomology; but to do it in plant physiology, soil science, fisheries, all the other areas which became your concern as a member of the Executive, was an entirely different matter. CSIRO was not a pure research organization; we were set up in order to assist Australian Industry. As the Executive member, one had to understand science in the Divisions with which you had primary concern, in my case most of the ones dealing with plant and animal sciences. Then you had to know something of the industries they served; agriculture, food production and processing, for example. Then there was a not inconsiderable element of personnel management. You had a group of very able but sometimes opinionated Chiefs to deal with and ... the personnel problems of their Divisions ... So you really had to know the industry, the science and a large slice of human management.⁴⁰

Mastering the balance between disciplines, interest groups, powerful divisional chiefs and the public interest was never easy. Most delicate of all was the relations with the minister for science. CSIRO dealt with the government through the minister for science, and it was a portfolio that shifted rapidly. In his time on the executive, 1966–75, Max worked with eight different ministers.⁴¹ The business negotiations were also a major part of the work of the executive (Fig. 6). Max was part of the negotiations that established the agreement between the Australian Wheat Board and CSIRO in 1970, for example⁴² (Fig. 31 see Supplementary Material). The job demanded much more than understanding how sciences could work together in an 'integrated' way; it was also about managing people and projects, and the delicate relations between Australia's flagship science, government and important business groups. Max had an admirable talent for connecting people and using his courteous style and human warmth to build relationships where scientific research could flourish and inform policy.

Among Max's responsibilities on the executive was a review of the format of the CSIRO annual report, so among his suggestions were more visual depictions of inter-disciplinary research. Max always admired the work by Robert Ingpen (for example, 'New perspectives in insect control' that depicted CSIRO's work on Integrated Pest Management, 1960s–70s, as a large wall mural in the Division of Entomology (Fig. 32 see Supplementary Material), and Ingpen contributed to many CSIRO publications, including subsequent annual reports.⁴³

The executive also looked to international models. In 1970, Max undertook an international fact-finding mission to the United States of America, United Kingdom and Europe to consider what CSIRO should do about 'the environment', especially as it was increasingly receiving so much attention from the mass media at the time. It was also a key interest of the minister for science, Malcolm Fraser (later prime minister). Max later described Fraser as the science minister with whom he got on the best during his time on CSIRO executive,

³⁷ Lindenmayer and Burgman (2005).

³⁸ Robin (1994) includes a full list of the ACF Executive Committee and councillors appointed at the 1965 meeting.

³⁹ Robin and Day (2017) suppl. 1, p. 37.

⁴⁰ Robin and Day (2017) suppl. 1, pp. 39–40.

⁴¹ Malcolm Fraser was minister twice in this period; his total of 37 months in the job (in two blocks, 1968–9 and 1971–2) was much longer than any of the others, and Max worked particularly well with him.

⁴² Robin and Day (2017) suppl. 1, p. 54.

⁴³ For example, CSIRO (1976). The wall mural depicting inter-disciplinary insect control in the Division of Entomology regrettably no longer exists.



Figure 6. Meeting of the full CSIRO executive at head office, mid 1970s. This meeting included the chairman, four full-time executive members (including Max, third from right), three part-time executive members and three CSIRO divisional secretaries (courtesy of CSIRO).

at least partly because ‘he was the first to see the importance of environmental issues and I was the member of the Executive most concerned [about that subject]’.⁴⁴

Max’s world trip in 1970 coincided with the preparations for the famous United Nations World Conference on Environment and Development, the 1972 ‘United Nations Stockholm conference’, best known through Barbara Ward and René Dubos’s important book, *Only One Earth*.⁴⁵ Many of the world’s most influential scientists were involved directly and indirectly in the lead-up to this event, including Dennis Meadows, co-author with Donella Meadows of the Club of Rome report, *Limits to Growth*. Max met Meadows in Boston at the Massachusetts Institute of Technology where Meadows showed Max the advanced mathematical modelling being developed for the report.⁴⁶ Ultimately, Max recommended that CSIRO should not establish a single division to address all aspects of the environment, as the environment was already an important cross-cutting part of the research of so many of its existing divisions. This view concurred with that of French-American microbiologist René Dubos, who at the United Nations Stockholm Conference commented that ‘environmental science included all sciences’ and more. He argued that if there was no ‘discrete problem in need of a technical solution’, then in fact ‘there was no role left for scientists after they had brought governments to

the table’.⁴⁷ The environment by the early 1970s was beginning to be interwoven with social structure, poverty, pollution, development, economic systems and environmental justice. These went beyond the mission of CSIRO. Max did, however, recommend that CSIRO should produce a semi-popular summary of the total environmental efforts across the organisation, and so the magazine *ECOS* was born in 1974.

Max’s role on the executive at CSIRO furthered his international thinking especially in relation to environmental science and ideas, but also across a wide spectrum of scientific concerns that were close to the national interest. He led the Australian delegation to the five-year review of the Commonwealth Agricultural Bureaux (CAB) in London in 1973. It happened to be Australia’s turn to chair CAB and Max accepted the position of chair for the two-week international meeting. It turned out to be extremely challenging because of internal tensions, and Max recalled ‘it was one of the most difficult meetings of my life’. However, with the help of an excellent vice-chairman, Max and the meeting managed to achieve several substantial changes to CAB which were of far-reaching significance.

Max assisted the academy in fulfilling its role in promoting science for national priorities through his networks within and beyond CSIRO. Sir Gus Nossal (as academy president) wrote: ‘(Max) was the

⁴⁴ Robin and Day (2017) suppl. 1, p. 48.

⁴⁵ Robin and Day (2017). The typescript of Max’s 1970 report to the executive is included in full as Supplementary Material 2 to the paper in reference. Ward and Dubos (1972).

⁴⁶ Meadows and others (1972).

⁴⁷ Quoted in Selcer (2018) p. 225.



Figure 7. Max speaking at the Australian Academy of Science, ~1980 (courtesy of Australian Academy of Science).

driving force behind the Academy's increasing involvement in the environment and his voice was always one of authority, common sense and restraint⁴⁸ (Fig. 7). Max was chairperson of the academy's National Committee for the Environment, and hence the Australian representative on SCOPE (Scientific Committee on Problems of the Environment). He was also appointed a member of the Board of ICLARM (International Center for Living Aquatic Resources Management) when it was first established in 1975, and he later chaired the Executive Committee and the Finance Committee.⁴⁹

Australian Institute of Marine Science 1970–8

Max was asked by the Minister for Science, Malcolm Fraser, to chair the Interim Council of the Australian Institute of Marine Science (AIMS). This council comprised six members and was established by the *Australian Institute of Marine Science Act 1970* that was proclaimed to establish both the council and the institute. The very brief piece of legislation stated that 'the seat of the Institute shall be at or in the vicinity of Townsville in the State of Queensland', leaving it to the interim council to develop the details.

The interim council held twelve meetings around Australia, including interviews and discussions with key scientists. It prepared and circulated 190 working papers as a basis for discussion, and received information, advice and comment from numerous individuals and institutions, both in Australia and in other countries.

In addition, Max visited marine science institutions in the United Kingdom, the United States of America and Canada to learn from their experience. The task of chairing the interim council included numerous discussions including: where AIMS should be located (favoured options at the time were Cape Pallarenda, Magnetic Island or closer to the port of Townsville); whether AIMS should deal only with tropical waters and tropical resources or provide marine science for the whole of Australia; and whether all Commonwealth activities in marine science (and particularly the CSIRO Division of Fisheries and Oceanography) should be brought together under a single agency or directorate (for example, AIMS). The interim council's 63-page report on these questions, *Marine Science in Australia*, was released in July 1971. The report recommended Cape Pallarenda as the location for the Institute, but subsequent investigations indicated problems with this site, so Cape Ferguson was the final choice.

After the government accepted the report, a new Act had to be proclaimed and a new council had to be appointed. The drafting of the full Australian Institute of Marine Science Bill was a challenge for the interim council to ensure it addressed many of the above issues in a politically acceptable way. The then minister for science determined that Max would have a conflict of interest if he were to be AIMS chairman and at the same time remain on the CSIRO executive, so the minister appointed Sir Henry Basten as the chairman of the new AIMS council when the *Act* was finally proclaimed in June 1972. Max subsequently served as a member of the AIMS council, 1972–8.⁵⁰

⁴⁸ Robin and Day (2017) suppl. 1, p. 46.

⁴⁹ ICLARM subsequently moved to Malaysia and today is called the World Fish Centre.

⁵⁰ Robin and Day (2017) suppl. 1, pp. 52–53, including notes provided by Charlie Veron, AIMS first research scientist.

The complexities of Max's work as an interdisciplinary scientist, policy advisor and strategic thinker were recognized formally in 1977, when he was appointed an Officer of the Order of Australia for services to biological research (Figs 34, 35 see Supplementary Material). The breadth of Max's expertise, and his capacity to hold both a sense of the bigger vision, and the scientific detail necessary to achieve it, was a particular gift, something that became important when CSIRO ventured into a new area, just as Max's second five-year term on the executive came to a close.

Forestry at CSIRO 1976–80

Environmental politics took a new turn in the 1970s, distancing conservation concerns from science.⁵¹ In Australia, it was marked by a 'coup' in the Australian Conservation Foundation (ACF) in 1973, when most of the council, including many original founders like Max, stepped aside. Spurred by the loss of Lake Pedder, the ACF wanted stronger lobbying powers, and was less inclined to initiate its own science for campaigns, preferring to draw on science generated in other ways.

The scientific group most affected by the changing spirit of 'environmentalism' was forestry; there was a rising number of conflicts about how Australia's forests should be managed. The Commonwealth-funded program of *Pinus radiata* plantations built on a century of South Australian forestry policy. Plantations were important in other states too, and there was wide support for the Commonwealth expansion to this initiative in 1966, especially as agriculturalists were offered a subsidy to repurpose their land for plantation forestry after the drought years of the 1960s. Then rather abruptly in the mid-1970s—after the wettest years of the century—subsidising radiata plantations became unpopular. It was criticised by the new 'environmentalist' activists on both aesthetic and economic grounds.⁵²

Forestry was a tightly held profession, with only two specialist schools in Australia. The Victorian Forestry School was established in Creswick, Victoria in 1910 and the second, the 'national school' (later part of the Australian National University), was established in 1927 when the commonwealth government moved from Melbourne to Canberra as part of the Commonwealth Forestry Bureau. The Commonwealth Forestry Bureau (which later became the Forest and Timber Bureau, and then partly the Forest Research Institute) also undertook research through the Forest Products Division of CSIR, and collaborated with other divisions such as Entomology, for projects such as the one Max worked on in the 1930s. Forestry was 'government science' and foresters were conservation

leaders.⁵³ They were shocked and surprised when 'conservationists' with different philosophies argued against their professional conservation efforts.⁵⁴

This was the context in which it was decided that CSIRO would take over the Forest Research Institute (a federal government agency previously part of the Forestry and Timber Bureau) and establish a new Division of Forest Research that would focus on the science in the broadest possible context. Max put a lot of work into preparing for the move, including appointing a new chief for the division. However, in 1976, the new chief declined the appointment, just two weeks before he was due to commence. Jerry Price, the then CSIRO chairman turned to Max, and asked him to take on the role on a temporary basis until a new chief could be found.⁵⁵ Max certainly knew how CSIRO worked, but he was not a forester, and there were major challenges introducing the CSIRO ethos and turning a 'government department' into a professional research group. This included uniting the work of forestry field stations in North Queensland, Victoria, Tasmania, South Australia, Western Australia and in Darwin.⁵⁶ There were significant unfilled vacancies at the time Max took over, and some staff then left because they were not happy with the changes from the old Forest Research Institute. Max recalled:

I was dissatisfied with the quality of most of the forestry applications and so I set about appointing specialists without forestry degrees. This move was condemned for a time, but eventually the existing staff began to see how a specialist could bring new ideas into their specialist field and the new appointees in nutrition, entomology, plant pathology, system's modelling and so on were welcomed. I did not set out to change the directions of the research in most respects, but I was keen to see more work on native species than had been done before and generally this was welcomed by most staff.⁵⁷

Max had a very international view of what forest research should be. He had begun by educating himself in the new field through attending the International Union of Forestry Research Organizations (IUFRO) Conference in Oslo in 1975. The IUFRO conference and an ensuing trip to see how large forest research organisations operated in the United Kingdom, Canada and the United States of America built new ideas.⁵⁸ The international aspects of forestry became very important, enhanced by the many international visitors to the division. Max's broad sense of what 'forestry' might encompass, including scientific expertise beyond that offered in traditional forestry courses, mapped out a very different style of forest science for CSIRO, one that complemented the excellent work undertaken by various states (Fig. 8). In 1977, the division published *A Directory of CSIRO Research Programs Relating to Forestry and Forest Products*, to facilitate collaboration between

⁵¹ Warde and others (2018) note 26.

⁵² Routley and Routley (1975). Authors later known as Richard Sylvan and Val Plumwood. Richard Sylvan worked closely with the Australian Conservation Foundation around 1973, when it became more 'activist'.

⁵³ Foresters from Australia sometimes trained overseas (with support from their State or the Commonwealth), but the profession was, by the 1970s, strongly dominated by a small leadership group trained either in Canberra or Creswick.

⁵⁴ Robin (1998b) pp. 117–119.

⁵⁵ This also suited Jerry Price who was keen to reduce the size of the CSIRO executive. The recommendation to reduce the Executive was formalized in the report by Birch (1977).

⁵⁶ These field stations transferred to CSIRO from the Forest and Timber Bureau at the time of establishment (1 January 1975): Gippsland regional Station (OIC (Anthony) Rod Griffin), Northern Territory Regional Station (OIC David Cameron), Queensland Regional Station (OIC Geoff Stocker), South Australian Regional Station (OIC Brian Mitchell), Tasmanian Regional Station (OIC Trevor Bird) and West Australian Regional Station (OIC Jan Titze).

⁵⁷ Robin and Day (2017) suppl. 1, p. 63.

⁵⁸ Robin and Day (2017) suppl. 1, p. 64.



Figure 8. Max Day (chief, CSIRO Division of Forest Research) with the minister for science, c. 1979. L–R: Jerry Price, Allan Brown, Jim Webster (minister), Max Day (courtesy of CSIRO).

CSIRO researchers spread throughout Australia, as well as consumer and industry groups.⁵⁹

Max brought in people with international experience like the agronomist, Sadanandan Nambiar, who continues as an important leader in the field of sustainable forestry, and forests for environmental services.⁶⁰ Nambiar was first sent to Mt Gambier in 1976, to look scientifically at the *Pinus radiata* plantations that had been the centrepiece of Commonwealth forestry for a decade, but which had raised public concern, and developing ways for such forests to serve new national interests.

Max's own emphasis was on moving the focus of research from *Pinus radiata* to eucalypts, but he also supported new work on plantations by Nambiar and others. Max commented: 'It was surprising how little was known about eucalypt nutrition, physiology, pathology and so on, and I am glad to say that the overall position has greatly improved since 1976'.⁶¹ Max's understanding of forests as so much more than timber, was essential to framing this new research. He recognised the practical need for wood too—from large questions such as the quality of water supplies for major cities (which depend on forests in their catchments) to the small everyday 'wood products' such as 'newspapers, documents, chairs and tables' and even wood 'to boil the billy'.⁶² Although his appointment to the new division had been for one year or 'until a new Chief could be

found', Max enjoyed his five final years as a public servant at the Division of Forest Research before his statutory retirement age of 65 (December 1980). At the helm, he nurtured practical forest science to be both sensitive to emerging political concerns and useful to big interest groups such as timber industries and water management authorities (Fig. 39 see Supplementary Material). He welcomed the return to biology that this work demanded and found that this prepared him for yet another career in biology in retirement, when he returned to his roots in entomology, and pressed on with his interest in the environment (Fig. 9; Figs 37 and 40 see Supplementary Material). Retirement also allowed Max to spend more time with his family (Figs 33, 36 see Supplementary Material).

Strategic thinking for the environment: returning to basic science 1980–2017

In April 1980, Max wrote an opinion piece for the *Weekend Australian Magazine* about the environment in which he argued: 'Probably the most important contribution that any Australian can make to the environment in the 1980s is being more aware of it, of how its quality relates directly to the quality of human life and pursuing that awareness to ask questions of scientists and decision-makers.'⁶³ His retirement offered new opportunities for direct and

⁵⁹ The directory is mentioned in *Division of Forest Research (1977–8)*, p. 7.

⁶⁰ E. K. Sadanandan Nambiar, 'Max's role in the CSIRO Division of Forest Research', presentation at A Celebration of the scientific life and work of Dr Max Day AO, FAA, Australian Academy of Science, Canberra, 19 March 2018. 'Recollections about my first chief in CSIRO', republished in *Robin and Day (2017)* suppl. 1, pp. 65–68. See also *Sadanandan Nambiar and Ferguson (2005)*.

⁶¹ *Robin and Day (2017)* suppl. 1, p. 63.

⁶² *Anonymous (1980)*.

⁶³ *Robin and Day (2017)* suppl. 1, p. 83.



Figure 9. Max was always happy to be in the bush with his butterfly net, ~1987 (courtesy of Jon Day).

indirect interventions. He contributed the entry on ‘The Environment’ for the *Australian Encyclopedia* in 1983 and revised and updated this in 1988. He also contributed several other short entries to the 1996 edition. He undertook international advisory roles and consultancies for the World Bank, the International Board for Plant Genetic Resources and the Commission on the Application of Science to Agriculture, Forestry and Aquaculture (CASAFA). Closer to home, Max and Jack Crawford had worked with Frank Fenner to establish the Centre for Resource and Environmental Studies (CRES) at the Australian National University in 1973. In 1987, Max, aged 71, chaired the first major review of CRES. He also chaired a special committee on soil erosion established by the Bureau of Rural Resources in 1983 on the initiative of the then Minister of Agriculture, John Kerin, which led in time to a new Bureau of Rural Sciences. In 2004, Max, aged 88, reviewed the state of all the working national scientific collections and published a major paper on his findings in this journal, with all the different managers and curators as co-authors.⁶⁴

Meanwhile, Max pursued various scientific interests in parallel. He co-convoked a major workshop on ‘Rates of Evolution’ in Canberra.⁶⁵ He also worked with his entomological colleagues describing several insects new to science.⁶⁶ Taxonomy and systematics were often understaffed areas in museums and CSIRO

and the contributions of retired scientists enabled them to press on with the task of documenting Australia’s vast fauna. One of the most charming stories is of Max’s initiative to understand how ‘scribbly gum moths’ made the mysterious calligraphy that is a feature of various Australian eucalypts. The scribbles were famously part of the *Snugglypot and Cuddleprie* stories of May Gibbs from 1918. Some twenty six species of *Eucalyptus* are now known as ‘scribbly gums’, and those found in the Australian National Botanic Gardens had inspired a short paper by a local schoolgirl, Julia Cooke.⁶⁷ Max had encouraged this work and followed up with an approach to Marianne Horak, a colleague at CSIRO Entomology, to take on the task of a more detailed study (Figs 10, 11). She recalled that:

Beetle larvae had been thought to be responsible for the scribbles, but in 1934 Tom Greaves from CSIRO Entomology reared a few small moths from snow gum scribbles in the Brindabellas. [Greaves’ specimens] were described as *Ogmograptis scribula* by Meyrick ... at the British Natural History Museum in London, but even he could not confidently assign them to any known moth family. In 1991 Ebbe Nielsen referred the scribbly moth to the family *Bucculatricidae* in *Insects of Australia* ... but Ian Common ... had omitted them from *Moths of Australia* [because of insufficient information].

... It was only thanks to Max’s dedication and perseverance [that] what had started as simple curiosity about the life history of a common Australian moth, ended in the discovery of a novel insect/plant interaction and elucidation of the phylogeny of an enigmatic moth family with Gondwanan roots While much work remains to be done, we added eleven new species to the single one known before, among them the very pretty *Ogmograptis maxdayi*⁶⁸ (Figs 48, 50, Appendix 2 see Supplementary Material).

Barbara and Max occasionally travelled overseas (Fig. 38 see Supplementary Material) and made various trips around Australia, visiting the two of their children, who by this time, lived interstate. Pamela still lived nearby, but Stephanie had her family in Perth and Jonathan (Jon) was in north Queensland (Figs 41, 42 see Supplementary Material). Pamela and Stephanie had both worked as teachers; Jon’s career was in conservation and natural resource management that meant he and Max had many similar interests.

The family home in Melbourne Avenue, Canberra was sold in 2002 when Max and Barbara moved into a unit that was part of St Andrews Village in Hughes, another suburb of Canberra. It was around this time that Barbara’s health began to deteriorate. In 2009, Barbara was moved to a nearby nursing home, Brindabella Gardens, not far from St Andrews. Max visited Barbara almost daily, even after she was no longer able to recognise who he was. After 68 years of marriage, Barbara passed away 9 June 2012.

Max remained an Honorary Fellow with the CSIRO Australian National Insect Collection and continued living in the St Andrews unit for a further two and a half years after Barbara’s passing (Figs 43, 44, 45 see Supplementary Material). In 2015, Max moved into Harrison House (Figs 46, 47, 49, 51, 52 see Supplementary

⁶⁴ Day and others (2004).

⁶⁵ This led to the book, Campbell and Day (1987).

⁶⁶ Day (1993) pp. 10–11; Day and Fletcher (1994); Day and Pullen (1999); Day (1999); Shcherbakov and others (2000); Fletcher and others (2003); Percy and Day (2005).

⁶⁷ Cooke and Edwards (2007). Cooke went on to pursue a career in environmental science and is now teaching at the Open University in England.

⁶⁸ Marianne Horak, ‘Scribbly Moths’ in Robin and Day (2017) suppl. 1, pp. 80–82. See also Horak and others (2012) and Appendix 2 in Supplementary Material.

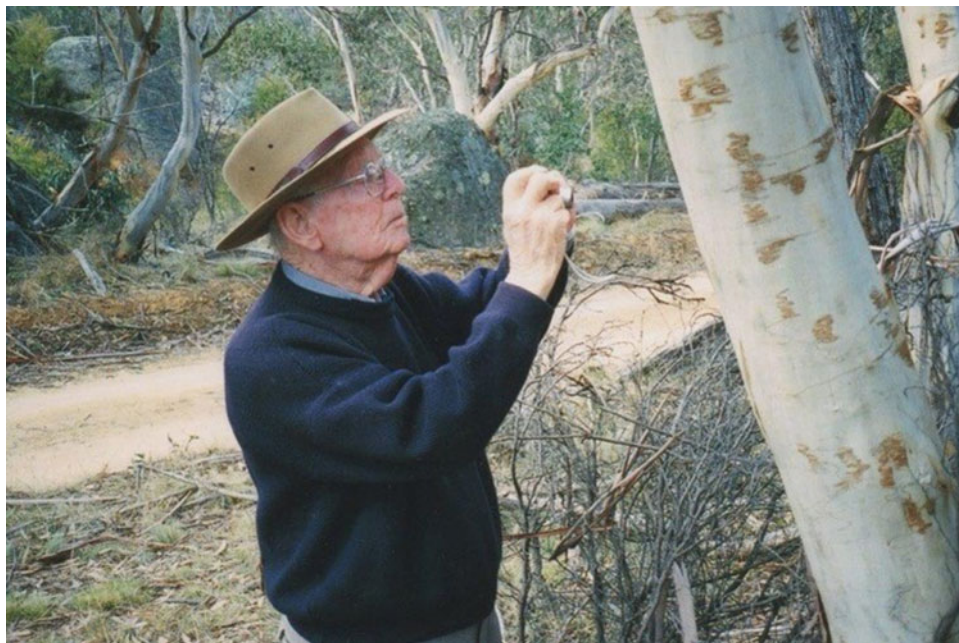


Figure 10. Max photographing scribbles on a eucalypt, 2008 (courtesy of Virginia Berger).



Figure 11. Max with Marianne Horak at the CSIRO National Insect Collection, 2016 (courtesy of Jon Day).

Material), the nursing home within St Andrews; it was there that he passed away on 31 July 2017.

Max Day Environmental Science Fellowship Award

In 2016, Jon worked closely with Max and the Australian Academy of Science to establish the Max Day Environmental Science Fellowship Award.⁶⁹ Max made a major donation to the Academy for this annual award, acknowledging the support that he himself had received as a young researcher when he travelled overseas for his PhD at Harvard. Max, therefore, decided to sponsor the award to help early stage PhD students or early career researchers, particularly those who are able to demonstrate a multi-disciplinary approach to their research (following Max's strong belief that such a multi-disciplinary approach leads to more effective research). In May 2017, Max, aged 101, presented the two inaugural awards at a special event at the Academy (Fig. 12). In March 2018, the Australian Academy of Science hosted an event specifically to celebrate Max's life.

Conclusion

Max Day remained interested in the environment all his life, always near the cutting edge of the action. During his forty one years with CSIRO, Max symbolised the best traditions of Australian science and was a much respected 'scientific elder' whose passion for science, the environment and conservation influenced many others. Questions such as global warming and climate change did not really join the list of environmental causes until the late 1990s. Max spoke

⁶⁹ More information is available at <https://www.science.org.au/opportunities/research-funding/max-day-environmental-science-fellowship-award>.



Figure 12. Max (aged 101) with Dr Marta Yebra, co-recipient of the inaugural Max Day Environmental Science Fellowship Award, May 2017 (courtesy of Australian Academy of Science).

at one of Australia's earliest conferences on the effects of climate change on biodiversity and published on this subject in 1997 and 1999.⁷⁰ He grasped 'big picture' issues quickly, yet never lost his attention to detail. His love of the bush, of being out with nature and its curiosities, developed as a young boy chasing butterflies, underpinned his extraordinary international career. His broad contributions to Australian science were truly outstanding (Appendix 3, Fig. 16 see Supplementary Material). His science was imbued with a passion for natural history, and this informed his strategic thinking in his own life, for national science, for international diplomacy and for Australia's place in the world.

Conflicts of interest

The authors declare no conflicts of interest.

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⁷⁰ Day (1997); Day and De Deckker (1999).

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