
THE UNIVERSITY OF QUEENSLAND
Accepted for the award of
Doctor of Philosophy
on March 8, 2004

WINGS AND WINDSOCKS: ARCHERFIELD AERODROME WITHIN THE AUSTRALIAN AIRPORT SYSTEM 1920-1988

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A thesis presented as a requirement for Doctor of Philosophy
(School of History, Philosophy, Religion & Classics)

University of Queensland
June 2003

STATEMENT

This thesis of 100 000 words is my own work and has not been submitted in any form for another degree or diploma at any University or other institution of tertiary education. Information in the text and a list of references is given.

I also declare that I am familiar with the rules of the Department and the University relating to the submission of a thesis.

..... Date 5 March 2004

ABSTRACT

In Australia from 1920 two large technological systems evolved when people believed aircraft had the capacity to redress the tyranny of distance. The first was the system of air transport; the second was the airport system. In loose combination they constitute today's aviation industry.

As aviation has a wide, generalised appeal, segments of these systems have been studied from different directions by a number of people. Some have focused on the 'actors' involved, to a large extent popularising the myths surrounding the nation's early pilots, especially those who disappeared. While the achievements of these aviators should not be forgotten, the study of aviation history must be more than just this.

The history of aviation is more too than the assiduous collection of data concerning individual aircraft types. Technological advances in aircraft design, while important, were not the only influences on how the Australian air transport and airport systems developed.

At first the tension between Federal and State politics decided air routes and the placement of Commonwealth-owned aerodromes. In the interwar years, regulation of intrastate aviation became a constitutional matter requiring debate and resolution. Postwar legislation was used to control airline competition.

Fiscal policy influenced the rate at which new technology was introduced. Both the Commonwealth and air-service companies grappled in particular with the 1930s Depression. As time progressed the costs associated with the system's artefacts—the latest aircraft and the infrastructure required to protect and serve them—spiralled. Over the period though, economies of scale and improved technological efficiency made journeys cheaper by comparison. As aviation lost its novelty value, airminded Australians adopted flying as the quickest means of crossing this vast continent.

In the early 1980s, American historian Thomas P. Hughes advocated that the study of large-scale technological systems should not be conducted in scientific isolation, rather in combination with the political, economic and social forces which were influential to that development. While clearly an approach from within the discipline of technology, Hughes' 1983 text on the evolution of electrification systems provided a model which historians studying other technology-based industries could use.

Hughes' system model is applicable to a study of the Australian airport system, and by association to that of air transport. However, just as historians of technology and the sociology of technology since Hughes have considered variations to this approach, so too has this thesis. A close study of the development of civil aviation administration and the commercial success or otherwise of air-service companies provides the social construction behind Australia's aviation development. Investigation of the origins of the system artefacts—specifically the hangars and other special-purpose buildings on the case study site of Archerfield Airport—reveals how difficult was the task of providing up-to-date ground infrastructure for an evolving technology. A consideration of environmental factors, those features beyond the control of system managers, proves they were just as unpredictable as the directions in which technology was developing, and equally as important.

Other more traditional themes also underlie the role played by political, economic and social forces in the development of the air transport and airport systems in Australia. Initial funding was justified as essential for communication and defence purposes. Subsidies were granted to companies to establish air routes which reduced isolation. The Second World War hastened technological growth of aircraft, highlighting the need for commensurate improvements in civil airport buildings and runways, the most important of which, like the exclusively military installations, were owned by the Commonwealth.

Australian air transport matured into the separate spheres of international and domestic operations. The latter split again into regular public transport (RPT) and general aviation (GA). Each had different requirements. This channelling was part of the evolution of the airport system and is evident in the buildings on Archerfield Airport, and within the written documentation concerning Brisbane's other airport facility at Eagle Farm.

This thesis concludes that Hughes' system model, with modifications to allow for the importance of aviation administration and commercial organisations, provides a most suitable means through which to explore the nature of Australian air transport. How the Australian airport system developed proves individual sites are more than just patterns of concrete runways and utility buildings. The evidence indicates that places where aeronautical activity is focused, such as Archerfield Airport, are worthy of serious study.

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Preface

The Archerfield Airport of today is a site easily overlooked as semi-industrial and not of great interest. Nothing could be further from the truth. Amongst Australian airports its history is most significant as today, unlike other sites such as Mascot Airport, the built fabric remains to tell the story.

This analysis had its genesis in a short postgraduate study undertaken in 1997. That assignment indicated a lack of analysis of airports in relation to their local area or city. Only a minor study, it was not able to consider what the airport system has contributed to the economic health of the country, nor analyse its importance in relation to national defence and improved communication. A rich vein of social activity related to aviation was only just glimpsed too in that research. This thesis has been written partly to redress the notion that aviation history is all about the machinery of flight, rather than the reasons why and the means by which people made use of the technology.

Important to the research has been the identification of photographs. The novelty value of aircraft dictated that people would pose in front of aircraft, incidentally revealing much about the aerodrome in the background. For access to private albums and collections I would like to thank Cecile Benjamin, Peter Bowers, Ken Cross, John Higginson, John Hopton, Rita Jackson, David Molesworth, Ray Spring and Ray White.

Since expressing my interest in the topic I have been assisted by many other people generous with their time and documents. A good background to the physical construction of early airports was found in the files of Dick Sanders, an avid collector who even sought out particular titles to add to his extensive library if he thought they might be of assistance.

Richard Hitchins allowed open use of his and the Queensland branch of the Aviation Historical Society of Australia's (AHSA) collection, also assisting in making reproduction-quality copies of original photographs with his photographic equipment. Through his contacts and the generosity of Rita Jackson I was able to access the unpublished manuscript of Trevan V. Jackson. AHSA member Roger Marks assisted with access to the research material he collected for his book on Second World War Queensland airfields.

John Hopton in Melbourne, as well as permitting access to a collection amassed over many years, advised on the intricacies of NAA (Vic.) files related to early civil aviation administration. A meeting with Trevor Boughton was helpful too in this area.

Allan Hodge freely gave of his time recollecting the Archerfield of his wartime youth, then introduced me to other local residents whose memories gave variety and depth to the oral history component of the research. These included Ruby Eaton, Keith and Helen Fedrick, Neville Mussic, Jeannetta Harvey and Ray Spring.

Beryl Roberts and the members of the Coopers Plains Local History Group offered use of their files in the Coopers Plains Library and introduced me to A. R. (Ray) White. His role as a radio technician allowed me entrée to a group of former DCA technicians which included Ken Cross in Brisbane and Roger Meyer in Melbourne. I am indebted to the latter for subsequently allowing access to the files of the Civil Aviation Historical Society (CAHS) at Essendon in Melbourne.

Former US serviceman Bill Bentson was generous in providing access to his files concerning the American presence in Brisbane during the Second World War. Time spent in his company was always informative.

Those who at some time had a close contact with Archerfield gladly recollected their experiences. Alex Freeleagus contributed his memories of postwar military involvement on the airfield, as did Barry Arentz. The latter introduced me to the irascible instructor who had taught him, Harold Kenny. His volumes of unpublished manuscripts were both amusing and invaluable.

Others helpful in providing information regarding their specialist areas included Dr K. N. E. (Bill) Bradfield, Marie Delisle, Ray Denning, Doug Fawcett, Neil Gates, Dr Brian Grenier, Gordon Jenkinson, Jean Jenkinson, Jean Haughton-James, Andy Houselander, Murray Moore, Dr Howard Quinlan, George Redding, Les Robinson, Mike Seymour, Bob Tait, Harry Wilcox, and Bruce Winley.

The staff at the offices of the National Archives in Melbourne, Sydney, Canberra and Brisbane made their workplace feel like a second home. In particular I would like to thank Margaret Daly, Cheryl McNamara, Margaret Stonell and Eleanor Wolf of the Queensland office.

The staff at the Brisbane City Council Heritage Unit were positive in their support of the project and considerate in allowing access to their amassed files on Archerfield,

particularly those buildings now heritage listed. On Archerfield Airport the current RQAC executive officer, Gerard Campbell, has never hesitated in allowing me to view at periodic times the documents held in the club's archives.

Dr Rod Fisher was responsible for rekindling my interest in history through a diploma in applied history in 1997. I thank him for his advice and written comments over the three years he acted as my supervisor. Dr Geoff Ginn and Dr Ross Johnston must also be thanked for the academic advice and support they have provided.

Constant in his life of aviation and caring for all things aeronautical, Allan Dunbar has provided support and advice throughout.

Without the financial support provided by the University of Queensland through the Australian Postgraduate Award scheme this thesis could not have been written. It is hoped that the following pages will repay their investment.

Chapter 1

In 1983, Thomas P. Hughes published a history of electrification in Western society between 1880 and 1930.[1] Through this study of United States and European electric power networks Hughes outlined his belief that, far from being dry and lacking in drama, technological affairs contain a rich texture of technical matters, scientific laws, economic principles, political forces and social concerns. He believed that although studies of technical subjects required historians to come to terms with the complexity of technology, such studies could also reveal the 'seamless web' of patterns of development, broad perspectives and the dynamics of change.

This thesis considers the suitability of the technological system model, as set out by Hughes, to the development of Australia's aerodromes. Other historians of technology have suggested it requires modification. Through a case study of Brisbane's aerodrome requirements between 1920 and 1988, including a closer examination of Archerfield Aerodrome between 1931 and 1949, the appropriateness of Hughes' model is explored.

It was to the electric power system pioneered by Thomas Edison that Hughes applied his theories of development. He concluded that the electrification system we know today developed from related parts or components connected by a network or structure. Controls were exercised in order to optimise the system's performance and to direct the system toward the achievement of its goals of growth and reduction of cost.[2]

Hughes' work on the electric power system proved to be seminal. Since its publication, many studying the history and sociology of technology have acknowledged the usefulness of the system approach (sometimes referred to as metaphor or model). Although not all historians of technology agree with the finer points of Hughes' theories, most acknowledge his system approach is a suitable means of imposing some order on complex issues.

At the time Hughes was not the only historian interested in technology. As a consequence of the annual convention of the American Society of Engineering Education in 1957, a group including Hughes formed the Society for the History of Technology (SHOT), with its accompanying journal *Technology and Culture*. In 1990 the editor, John M. Staudenmaier, identified nine key areas of interest for SHOT

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[1] Thomas P. Hughes, *Networks of power: Electrification in western society, 1880–1930* (Baltimore and London: The Johns Hopkins University Press, 1983).
[2] Hughes, *Networks of power*, p. 5.

historians. These included technological creativity, the military history of technology, the science-technology relationship, gender, electricity and technology from a capitalist perspective.[3] Since 1957, *Technology and Culture* has provided a platform for debate on the methods and interpretation possible for historians of technology, as well as a point of publication for technology-based studies.

Another opportunity for ensuing theoretical discussion occurred in 1987 with the publication of *The social construction of technological systems: New directions in the sociology and history of technology.*[4] This text identified the dominance of three approaches being explored at the time—the social constructivist approach, the system approach and the actor-network approach.[5] Two of the book's three editors, Wieba Bijker and Trevor J. Pinch, supported the social constructivist approach. This was later referred to as the social construction of technology (SCOT).[6] The other editor, Hughes, advocated his system approach in what has been referred to by some science historians as a landmark essay.[7] Many historians interested in technology since have appropriated and modified Hughes' approach. Others have pursued the SCOT path.

In essay comment since 1987, *The social construction of technological systems* has been referred to as the 'bible of the SCOT school' and continues to stimulate theoretical debate over how historians might structure the exploration of a particular field of technology.[8] Some have promoted case studies of technological communities as a valid means. These studies investigate the inventors of technology, the engineers and the groups they form, as well as how they share their knowledge. Other historians, notably Edward W. Constant, have attempted to impose order by studying the organisational groups which exist because they are technology based, such as the corporations,

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[3] John M. Staudenmaier, 'Recent trends in the history of technology', *American Historical Review*, 95 (1990), p. 717.
[4] Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology* (Cambridge, Mass.: MIT Press, 1987).
[5] Wieba E. Bijker and Trevor J. Pinch, 'SCOT answers, other questions: A reply to Nick Clayton', *Technology and Culture*, 43 (2002), p. 362.
[6] Trevor J. Pinch and Wieba E. Bijker, 'The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), pp. 17-50. Michael Callon presented a chapter on the actor-network approach.
[7] Michael D. Gordin and Sam Schweber, 'Thinking systematically', *Technology and Culture*, 43 (2002), p. 392.
[8] Nick Clayton, 'SCOT: Does it answer?' *Technology and Culture*, 43 (2002), p. 351.

companies and the administrative groups whose reason for existence is a particular technology.[9]

Even given this variety of approaches, the most logical basis for the wider investigation of Australia's aerodromes remains the system approach used by Hughes. His model explains change by considering the technical, scientific, economic, political and organisational matters that influence a modern system. Considering the role of each of these influences in the changes which occurred on the case study aerodrome allowed this thesis to explore the evolution of the Australian airport system, providing an analysis of the growth of air transport systems, both national and international.

Air transport is a socio-technical network consisting of heterogenous or dissimilar components such as aircraft, pilots, engineers, regulators and aerodromes. Hughes noted, and others have agreed, that it is the place of the system builder, one he referred to as the heterogenous engineer, 'to construct or force unity from diversity, centralization in the face of pluralism and coherence from chaos' by marshalling the components into a working whole.[10] Aerodromes throughout last century were the one place where air transport components interacted. Here the work of system builders is evident in organisational structures, such as companies or government bodies, and in the built fabric for which they were responsible.

As well as believing that the system approach could be used to bring order to change, Hughes concluded that systems embodied the physical, intellectual and symbolic resources of the society that constructed them. If this is true, then the Australian airport system should embody some of those components of Australian society which make it distinctly Australian.

Though the model introduced by Hughes will not always explain the development of Archerfield Aerodrome, it does in the main explain the development of Australia's airport system. In his work on electrification, Hughes noted that in the evolution of a system there occurred phases dominated by a particular activity. The five phases were:

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[9] Edward W. Constant, 'Communities and hierarchies: Structure in the practice of science and technology', in Rachel Landan, ed., *The nature of technological knowledge: Are models of scientific change relevant?* (Dordrecht, Holland: D. Reidel Publishing Co., 1984), pp. 27-46; Edward W. Constant, 'The social locus of technological practice: Community systems or organisation', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), pp. 223-42; Staudenmaier, 'Recent trends', pp. 715-25.

[10] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in*

invention, development, technological transfer, innovation and system growth, competition and consolidation. The phases are not necessarily sequential and may overlap and backtrack. Within the wider history of the Australian airport system, the five stages are clearly present.

Aerodromes needed to be 'invented'. Barnstorming pilots landing on racecourses or beaches in two- or three-seat aircraft to attract paying joy riders could not create a sustained transport industry. That would be achieved through passenger-carrying aircraft operating regular flights. These however needed dedicated, well-maintained, flat landing surfaces near cities or towns. Any ground infrastructure for this new system also had to protect the fragile fabric and wire aircraft. In the early 1920s the Commonwealth purchased land for aerodromes. Allotments for hangars were leased to commercial operators. Such was the uncertainty of the period that hangar construction was an architectural compromise between strength, economy and portability. To ensure its assets were protected, a caretaker was appointed to look after each capital-city aerodrome. According to the requirements of time and place, the economic, political and social characteristics that aerodromes would need for their operation were invented and developed in these first two phases.

Hughes expected another phase, technology transfer, to occur as the system evolved. As Daniel R. Headrick explained, the transfer of technology is not one process but two.[11] The first is the relocation from one area to another of equipment and methods. The second is the diffusion of the knowledge, skills and attitudes related to a particular device or process. Following the 1918 Armistice, Australian military pilots, engineers and ground personnel returned with knowledge of the most advanced and up-to-date methods of aircraft operation. Aircraft purchased in England were shipped to, assembled and flown in Australia. Regular exchange of technological advances continued as communication improved and more of the system's 'actors' travelled to places where aircraft technology differed.

Identifying technology transfer in the development of the airport system is somewhat harder. There is even a case to consider that 'home-grown' solutions to the problems of aerodromes, might have reduced the impact of technology transfer with regard to aerodromes. This response of innovation, another phase identified by Hughes, is discussed at a later stage. Hughes himself noted in 1987 that the adaptation of

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the sociology and history of technology, (Cambridge, Mass.: MIT Press, 1987), p. 52; Gordin and Schweber, 'Thinking systematically', p. 390.

[11] Daniel R. Headrick, *The tentacles of progress: Technology transfer in the Age of Imperialism* (New York & Oxford: OUP, 1988), p. 9.

technological style is a response to different environments.[12] The Australian environment may be as much different from that of Britain and the United States as Archerfield, the case study airfield, is different from inland aerodromes at Cootamundra in New South Wales or Longreach in Queensland.

Hughes believed increased load factor is the major explanation for the growth of capital-intensive technological systems, especially as they evolved into the final phase where competition and consolidation occurred. Whereas he wrote of load factor in the sense of electrification, the term is equally applicable to aviation. Hughes defined load factor as the ratio of average output to maximum output during a specified period. Load factor in aviation is the ratio of average seating occupancy to maximum seating occupancy on a specified flight or number of flights.[13] In either industry a high load factor was an indication of profitability.

Throughout the 1930s Australia's airlines sought to consolidate their positions at the same time as aircraft technology provided them with the faster, safer, more economical aircraft needed to allow it to happen. It is no coincidence that the demise of Archerfield as Brisbane's primary aerodrome in 1949 coincided with the establishment of Australia's Two Airline policy, a Commonwealth legislative move which provided the commercial stability necessary for the air transport system to advance competitively into the jet age.

Yet when designed, the generous acreage of 1930s Archerfield was regarded as capable of meeting Brisbane's aerodrome requirements well into the foreseeable future. Although Brisbane was not the nation's premier capital city, its Archerfield Aerodrome was designed to allow for commercial growth and improvements. Significantly, it was often the site where system improvements were first instigated and, above all, it provided its administrators with few problems.

That Eagle Farm, not Archerfield, was chosen as Brisbane's postwar aerodrome was due to what Hughes referred to as a reverse salient. A salient is a protrusion in a geometric figure, a line of battle or an exposed weather front. Hughes saw reverse salients as components of the system that have fallen behind or are out of phase. A reverse salient may become a critical problem which can retard the growth of the system. Such critical problems usually are capable of being resolved.

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[12] Hughes, 'The evolution of large technological systems', p. 68.
[13] Hughes, *Networks of power*, pp. 72-3.

Despite its wartime growth, Archerfield Aerodrome became a reverse salient in the airport system because it lacked formed runways and had little room for expansion which could be achieve without considerable cost. The runways built from 1942 at Brisbane's other aerodrome, Eagle Farm, favoured this reconstructed site as the city's chosen postwar aerodrome. After 1949 Archerfield was relegated to the role of secondary airfield while Eagle Farm was further developed as Brisbane's primary airport, avoiding the possible formation of a critical problem which would have reduced Brisbane's postwar access to air transport.

Ironically, in the early 1930s Brisbane's first aerodrome at Eagle Farm had been closed and operations moved to Archerfield because wet weather had exposed the site as a reverse salient. Excessive falls of rain in the late 1920s at times saturated the landing area, making it boggy and unusable. What looked like becoming a critical problem, for safety as well as financially, was remedied by shifting to another, better-drained aerodrome site in a corner of the Rocklea/Coopers Plains district which was renamed Archerfield.[14]

A reverse salient can be responsible for a loss of momentum. Hughes believed that systems acquire momentum because those involved with the success of the system have a vested interest in its future. Participants, operators and system builders have a tendency to push the system forward, to give it momentum. Hughes described Henry Ford's system of production as a high momentum system.[15] With improvements in aircraft technology, the Australian air transport system exhibited a steady momentum until sufficient aerodromes were constructed for a network capable of servicing the capital cities and major regional towns. The momentum for growth then was continued through individual site expansion and improvements.

While Hughes' system model can be applied to the Australian airport situation, other means of interpreting technological development may serve to enrich the analysis. With an interest in the sociology of technology, Edward W. Constant explored the usefulness of Hughes' system approach by comparing it with studies of technology as a community and studies of technology through organisational structure such as

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[14] In early Australian airport engineering the use of motor-driven machinery was gradual. The maintenance regime used by Eagle Farm's caretaker involved dragging heavy objects such as railway sleepers across the landing area behind his horse. When the trees were cleared from Archerfield in 1929, bullock teams were used to stack the fallen trees prior to burning.

[15] Hughes, 'The evolution of large technological systems', pp. 76-9.

corporations.[16] The Australian air transport system was in the beginning such a small one that there was indeed a sense of community for those involved and this assisted in the transfer of technology. Early airline companies and the system regulator, initially the Civil Aviation Branch within the Department of Defence, developed organisational structures which played a part in the success or otherwise of their activities.[17]

Since 1983, Hughes' system model has provided a theoretical framework which others have modified and adapted as a means of analysing the evidence within their case studies. These analyses should in turn assist in a study of Australia's airport system.

In the late 1980s, historian John Law related Hughes' approach to the idea of technological stability. Law defined stability as that particular form which an artefact has reached when it is seen as successful. Through his case study of Portuguese expansion Law concluded that to be understood, technological stability must be interrelated with a wide range of non-technological and specifically social factors.[18]

In the 1930s and 1940s, aircraft and airports evolved into a recognisable and successful form. The accepted idea of a transport aircraft became the all-metal, multi-engine monoplane. Aerodromes in Australia began as grass fields. Runways were established; aerodromes became airports. At some, control towers were erected, sometimes in conjunction with a terminal facility. Though the physical size of airports changed, the now-accepted form stabilised because it was successful in meeting the requirements for air travel between capital-city sites.

While Hughes does not emphasise the role of social forces other than through system builders or experts in the technology, others taking a sociological approach towards technology have analysed artefacts in the context of society. In their studies the relevant social groups linked to an artefact are considered, along with the process involved in achieving a particular stabilised form.[19] This, according to SCOT historians Wiebe E.

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[16] Constant, 'The social locus of technological practice', pp. 223-42; Edward W. Constant, 'Cause or consequence: Science, technology and regulatory change in the oil business in Texas, 1930–75', *Technology and Culture*, 30 (1989), pp. 426-55.

[17] Much of the prewar success of Qantas can be attributed to the organisational skills of Hudson Fysh and the calibre of the staff employed by Qantas.

[18] John Law, 'Technology and heterogeneous engineering: The case of Portuguese expansion', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), pp. 111-34.

[19] Pinch and Bijker, 'The social construction of facts and artifacts', pp. 17-50.

Bijker and Thomas J. Pinch, avoids presenting a 'standard empiricist view of the history of technology.'[20]

Also serving to add dimension to this analysis of the Australian airport system is the work produced by Douglas MacKenzie. He believed that no matter what the approach, systems still were constructs and would hold together only as long as the right conditions prevailed. Taking the concept one step further, MacKenzie recognised the importance of the actors who create and maintain systems. Stability, he concluded, was frequently a precarious achievement in the face of potentially hostile forces, both social and natural.[21]

In 1996 Deborah Douglas completed her thesis on the US airport system between 1919 and 1939. Writing a decade after *The social construction of technological systems* she acknowledged the deep influence of the intellectual currents of those predecessors who expressed theories on the social construction or social shaping of technology, or of technical determinism in aviation history.[22] Because of its similarities in time and its benefits for structural comparison, the framework of analysis chosen by Douglas has here been adapted. To her detailed analysis of political and economic factors and of the technology behind airport design this thesis will also consider the role of the flying machines and the groups of people involved, this last an approach similar to that of the social constructionists.

Structurally, this study of the Australian system is divided into four parts. The central two parts covering the core years between 1931 and 1949 predominantly concern Archerfield Aerodrome. The preliminary and concluding parts consider, though not to the same level of inquiry, activity on other Brisbane aerodrome sites before 1931 and until 1988. These dates have been chosen specifically as they mark a discontinuation of site usage or a major change in aerodrome activity.

Within each part the framework of ordered consideration of the political and economic, as chosen by Douglas, has been followed. Additional to each part are chapters on the influence of social factors, developments in aircraft technology and the resultant changes in built fabric or airport design. The structure within each chapter applies the concentric

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[20] Bijker and Pinch, 'SCOT answers, other questions', p. 366.
[21] Donald MacKenzie, 'Missile accuracy: A case study in the social processes of technological change', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987).
[22] Deborah G. Douglas, The invention of airports: A political, economic and technological history of airports in the United States, 1919–39, PhD thesis, University of Pennsylvania, 1996, pp. 15-19.

approach adopted by Mark Dierikx for his 1997 history of Holland's Schipol Airport.[23] In each part the international and national are considered before a deeper analysis of the evidence available from the local case study. This thesis is an effective blend of all these structural inputs.

The key primary sources used for this case study have been the pertinent files related to Brisbane's aerodromes which are lodged in the National Australian Archives (NAA). These documents have a wide distribution geographically. Located in Victoria are the majority of NAA files concerning the administration of the flying aspects of aviation prior to the formation of civil aviation regions in the late 1940s. Most construction files relative to buildings on aerodromes in each State are situated in the NAA facility for that particular State. Files pertaining to civil aviation aerodromes on which were situated Royal Australian Air Force (RAAF) stations or squadrons are located in Canberra. Understanding the administrative structure of organisations such as the Civil Aviation Branch is essential, as is a lateral appreciation of terminology no longer in use.

Other helpful archival sources have included the photographic collection of the John Oxley Library, the Hudson Fysh files lodged in the Mitchell Library in Sydney, the Civil Aviation Historical Society archives at Essendon, Victoria, the historical archives of the Royal Queensland Aero Club and private collections belonging to, amongst others, individual members of the Aviation Historical Society of Australia (AHSA).[24]

While secondary sources on the technical aspects of aviation are plentiful, most are only useful as background. Part of the problem is that aviation historians traditionally consider that it is the flying machine which makes history. Only infrequently do their publications consider or analyse related social and cultural matters.[25] One notable Australian exception is Leigh Edmonds, whose numerous articles have explored many of the recognised themes of Australian aviation; none though as a system study.[26]

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[23] Marc L. J. Dierikx and Bram Bouwens, *Building castles of the air: Schipol Amsterdam and the development of airport infrastructure in Europe, 1916–96* (The Hague: Sdu Publishers, 1997).
[24] Hudson Fysh, Qantas Ltd – 1927 to 8 September 1930, Brisbane Branch, Qantas Ltd – Queensland Aero Club, K21809, Newspaper clipping book 1, K21863, ML; Newspaper clipping books, RQAC. Richard Hitchins, John Hopton and Dick Sanders generously provided access to their collections.
[25] James R. Hansen, 'Aviation history in the wider view', *Technology and Culture*, 30 (1989), pp. 643-6.
[26] Leigh Edmonds, 'Western Australia's failed airline companies 1929–33', *Man and Aerial Machines*, May–June 1994, pp. 30-3; Leigh Edmonds, 'Value for money? Civil aviation and defence between the wars 1920–39', *Journal of the Australian War Memorial*, 15 (1989), pp. 26-33; Leigh Edmonds, 'How Australians were made airminded', *Australian Journal of Media & Culture*, 7 (1993), pp. 183-206; Leigh Edmonds, 'Capital: The cause of Australia's first airline accident', *Journal of Transport History*, 15 (1994), pp. 165-78; Leigh Edmonds, 'Edgar Johnston and the Empire men: Commonwealth government control of Australia's civil aviation in the 1930s', in William F. Trimble, ed., *From airships to Airbus: The history of civil and commercial aviation*, (Washington & London: Smithsonian

Oral histories were invaluable in providing local knowledge of events. Though memory can at times be unreliable, the oral recordings made in the course of this research provided a means of confirming what was written in the NAA files, as well as indicating how individuals interacted with the built fabric, especially during the Second World War.

Though Archerfield and Eagle Farm airports are part of the system which developed in Australia from the early 1920s, they are also part of an even larger Australian air transport system, components of which include aircraft, airlines, maintenance facilities, air traffic control, passengers and of course airports. The Australian airport system resides within this larger air transport system. Neither has been studied historically using a system approach.

The Australian airport system during the period under discussion consisted of locally owned landing grounds and federally funded aerodromes. A public service structure was charged with ensuring the travelling public would be delivered to a landing place which met an acceptably safe standard. This body was referred to chronologically as the Civil Aviation Branch of the Defence of Defence (DOD), the Civil Aviation Board or the Department of Civil Aviation (DCA). To achieve its ends the regulator established a scheme of aerodrome licensing.

General aerodrome policy was often translated into decisions made on a case-by-case situation. Individual files concerning decisions made at particular aerodromes are not always easy to find. Archerfield is neither Mascot nor Essendon, nor is it Eagle Farm. The more difficult the topography of an aerodrome, the more critical its problems, the greater attention that aerodrome would receive, the more likely policy was to be established.

Evidence of the attention given to any particular aerodrome lies in its built fabric. A study of what remains of the built fabric of today's Archerfield Airport makes possible this extended history of the airport system overall.

While Archerfield was not one of the forty-eight new government aerodromes established during 1922, its existence was due to Eagle Farm, the Government aerodrome established in Brisbane from early in 1922, becoming less and less suited to

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Institute Press, 1995), pp. 261-80; Leigh Edmonds, 'Australia, Britain and the Empire Air Mail Scheme, 1934–38', *Journal of Transport History*, 20 (1999), pp. 91-106; Leigh Edmonds, 'The policy of profit: The creation of the Two Airline Policy', *AHSA Aviation Heritage*, 32 (2001), pp. 143-52.

the requirements of heavier, technically more advanced aircraft.[27] Part one considers the establishment and failure of the early Eagle Farm because that story is essential to an understanding of both the establishment of Archerfield and the development of the early airport system.

Whereas geography played its role in the early development of inland aerodromes, Brisbane's geographical position as a relatively populous capital city contributed to its further expansion during the 1930s. Archerfield expanded gradually to meet the relaxed requirements of prewar airways and private flying. Part two deals with Archerfield in this civil aviation phase when, between 1934 and 1938, it was one terminus for the England to Australia airmail and passenger route. As the home base for QANTAS, then the only scheduled international carrier in Australian airspace, Archerfield's role was of primary importance to communication.

Archerfield's importance during the Second World War lies in it being a prepared landing facility at a secure distance from scenes of battle. Its existing civil aviation buildings and companies made it useful as a joint civil-military aerodrome. Squadrons from the RAAF, the United States Army Air Forces (USAAF) and the Netherlands East Indies Military Air Force were stationed there. The infrastructure requirements of these military forces revealed Archerfield's shortcomings however. The construction project which would expand the tiny and usually deserted Eagle Farm relief landing ground, equip it with runways and set it on the road to becoming Brisbane's primary postwar aerodrome, commenced in January 1942. Indications are that Archerfield's role in the postwar airport system was reassessed that same year. Part three deals with the changes made on both aerodromes by and during the Second World War.

Part four provides the denouement. It concludes the thesis by explaining the impact of postwar expansion of the air transport system on both aerodromes. Despite ongoing maintenance difficulties, the original Eagle Farm site became Brisbane's aerial gateway from 1949. Not until 1988 was a new airport constructed. By then the outmoded wartime igloos represented a critical problem within the Australian airport system. The once-busy Archerfield slipped into quiet stagnation as Brisbane's secondary airport, a position unchanged in 2003.

Whilst Archerfield is not typical of the aerodromes in the Australian airport system, no aerodrome really is. Archerfield's value as a case study is that the interplay between most of the forces which formed the airport system can be seen at work in primary

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[27] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia*

documents and in the existing built fabric. Those who made decisions concerning Archerfield were the system builders who translated government policy into distant regional reality. This created a momentum for aerodromes such as Archerfield, a momentum which might have remained on its gradual upward trajectory but for the intervention of the Second World War.

Brisbane's geographic position in relation to the Pacific theatre of operations during the war exposed Archerfield unexpectedly as a reverse salient. Increased numbers of military aircraft which required greater takeoff and landing distances made Archerfield such an operationally busy and sometimes dangerous aerodrome that the old deserted landing ground at Eagle Farm became first an auxiliary landing ground and later the home of much of the USAAF activity. The old, once-critical problem of its boggy nature was dealt with by the application of modern technology and a great deal of land fill. Archerfield's future as a leading aerodrome became a casualty of war.

But its built fabric serves as a time capsule for the historian. All of Archerfield's seven prewar hangars remain in use today, able to be studied. All that remains of the postwar Eagle Farm Airport, replaced since by the new Brisbane International Airport, is crumbling concrete hardstand, wartime engine testing stands, former workshop buildings and a heritage-listed igloo hangar, the future of which is still under discussion.

Any technology develops its own terminology. That related to places where aircraft land is important enough to require clarification for the purposes of this study. Australians in the 1920s spoke of meeting incoming aircraft at a landing ground or airfield. A landing ground was really only a flat paddock or even a racecourse enclosure set aside temporarily for the use of aircraft.

In Europe during the 1930s a number of terms—aerodrome, 'drome, airdrome, airport—some with an association to sports and racing, were in common usage. Aerodromes were generally grassed airfields, possibly also used by military aircraft. The European usage of the term airport, which was associated with passenger arrivals and departures, hearkened back to the concept of a customs port. Sydney's Mascot Aerodrome was referred to in correspondence in 1929 as 'likely to become a very important airport in the future'.[28] Not until after the Second World War was the term more widely used to describe the invention which catered for the arrival of aircraft at a particular town or city. Eagle Farm became Brisbane's airport in 1949. Department of

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(Sydney: Edwards & Shaw, 1971), p. 19.

[28] Acting Sec. Dept of Works to Sec. PM's Dept, memo dated 6 May 1929, Mascot Aerodrome Part 1, M314/1/6 Part 1, A461/7, NAA (ACT).

Civil Aviation correspondence did not begin to refer to Archerfield as an airport with any regularity until the early 1960s, even though plans as early as 1950 refer to it as such.[29]

Aerodromes were constructed prewar with the facilities required for aircraft maintenance and by passengers. This infrastructure might only have consisted of a hangar and a small airline office but it was a statement about a town's position within the developing air transport system. For the purposes of this thesis, prewar Archerfield and Eagle Farm will be referred as they were at the time, as aerodromes.

Technology system studies being a reasonably recent concept, the term 'airport system' will apply at all times. There may have been a system of aerodromes but in terms of historiography, there was never any 'aerodrome system'.

The term airline was not used with any regularity in Australia prior to the Second World War. Companies regarded themselves as airways or air-service operators. For many of the early years there was no aviation industry to speak of. Companies flew scheduled, passenger-carrying flights or they flew air-taxi services, what today is called charter. While regular flights needed to operate between licensed aerodromes, the air-taxi services could use landing grounds which did not meet the same exacting standards of size and maintained condition. The overall operations undertaken by a combination of all types and sizes of companies did not make an aviation industry until after the Second World War.

In general the word aircraft will be used to describe all forms of flying machines mentioned, except where directly referred to in contemporary quotations as 'aeroplane' and "'plane", or as the 'airplane' favoured by Americans.

Though its meaning differs, one term now appears both in aviation and technology history–the black box. In aeronautics this bright orange box records flight data and statistics on an endless loop so that accident investigators might find clues to an aircraft crash. Alternately, since the 1980s, those concerned with the history and sociology of technology have lifted the lid on what they referred to as the 'black box' of technology–a dark, mysterious place usually belonging to engineers and those acquainted with the terminology of technology. To do this historians have used a

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[29] Wolfgang Voight, 'From the hippodrome to the aerodrome, from the air station to the terminal: European airports 1909–45', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: Art Institute of Chicago and Prestel-Vertag, 1996), pp. 27-9; Memo for file 27 August 1962, Archerfield buildings – general, 1959/384 Part 6, J23/11, NAA (Qld); Archerfield Airport – Proposed Development of building areas – 14 February 1950, Acquisition of site for off-station married quarters, 171/16/333, A705/1, NAA (Vic.).

number of approaches.[30] Those studying large-scale technologies welcomed the model promulgated by Hughes because it acknowledged that a technological enterprise is simultaneously a social, an economic and a political enterprise and more than just the invention and application of technological knowledge.[31]

Indications are that this key system approach, adapted to allow for a greater consideration of the social construction of technology, will provide a suitable model to explain the history of the technological system of Australian air transport.

[30] Staudenmaier, 'Recent trends', p. 717; Edward W. Constant, 'Reliable knowledge and unreliable stuff: On the practical role of rational belief', *Technology and Culture*, 40 (1999), p. 324; Rachel Laudan, *The nature of technological knowledge: Are models of scientific change relevant?* (Dordrecht, Holland: D. Reidel Publishing Co., 1984), p. 1.
[31] MacKenzie, 'Missile accuracy', p. 198.

Chapter 2

'Prewar aviation was a sport; during the war it was a military weapon; after the war it became one of the transport industries.'[1]

Between 1920 and 1930 Australia's air transport system developed into a small, determined field of transport held together more by enthusiasm than economic stability. The dynamic interplay between political requirements of the Commonwealth and the States, the economic background which drove many political decisions, the gradual refinements in aircraft design and the gathering positive attitude of people towards aviation—airmindedness—meant that by 1930 a steady momentum for growth of air transportation existed. Improvements in technological efficiency, particularly in the area of aero engines, produced some financial gains for air-service operators. Though its ultimate direction was not known precisely, the Australian air transport system, with all its component parts, was at least on its way.

For most countries including Australia, air services from the end of the First World War to the Depression were in their infancy. In Europe a combination of scarred railway systems, national prestige and a surfeit of aircraft meant a number of air transport companies were established quickly. By 1924 small airlines operated in seventeen European companies.[2] Passengers were carried regularly, though it was the subsidies provided by respective governments for the carriage of mail which kept the airline companies in business. Aerodromes such as Schipol (Amsterdam) and Le Bourget (Paris) were constructed by municipal authorities to cater for airline traffic and to meet customs requirements.[3]

An initial hesitancy to develop commercial air services occurred in the United States. With their surface transport intact, no need to seek the prestige of a national airline and weather which did not favour the basic aircraft then available, only a system of delivery of mail using specifically designed aircraft had developed by 1927. Though a network of route lighting allowed aeroplanes carrying US Mail to fly at night, early transcontinental air passengers spent the hours of darkness in the forty-eight hour journey between New York and Los Angeles aboard Pullman railway coaches.[4] For

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[1] John Myerscough, 'Airport provision in the inter-war years', *Journal of Contemporary History*, 20 (1985), p. 41. The statement was made by M. d'Aubigny circa 1919.
[2] Ronald E. G. Davies, *A history of the world's airlines* (London: OUP, 1964), p. 38.
[3] Stedman S. Hanks, *International airports* (New York: The Ronald Press Company, 1929), pp. 13-18.
[4] O. E. Allen, *The airline builders* (Alexandria, VA: Time-Life Books, 1981), pp. 72-9.

those involved in the planning of aviation in the USA, the emerging consensus was that providing aerodromes was the responsibility of local government.

In Canada the situation differed yet again. After the First World War civil aeronautics was controlled by the Department of National Defence (DND) and had been developed in conjunction with military aviation. Predominantly, aircraft were used to exploit the economic resources of the north of the country. The early focus by both civilian and military authorities therefore was away from urban areas. As the major population centres were provided with little encouragement to develop ground facilities, Canadian aerodrome development lagged behind that of the nearby United States.[5]

First World War airmen returned to Australia keen to build air services which could take advantage of this country's low topography and its weather generally conducive to flying. Regulation of air navigation commenced in 1921. From that time the Commonwealth, through the Civil Aviation Branch, played a direct role in funding the development of some areas of aviation as a means of bringing order to what otherwise would have evolved in an uncontrolled manner.

To begin, subsidies were granted to a small number of air-service operations to establish services in remote areas not well served by regular means of communication. The Commonwealth funded the construction of aerodromes and emergency landing grounds (ELGs) on these subsidised routes. Local government bodies and private companies built others. With a topographical situation and political exigencies which differed from those in any of the European or North American countries, air transport in Australia developed initially to reflect the physical nature of the country. Long-distance flights highlighted the national advantages to a sparsely occupied continent; that same lack of population drew attention to the financial difficulties of establishing and supporting aerial services and the ground facilities they required.

Yet aviation development brought added excitement to the postwar 1920s. At first the challenge of flying from other parts of the world to Australia caught public interest. For the first successful flight of a plane constructed within the confines of the British Empire, and flown to Australia by a crew all of Australian nationality, the Commonwealth offered a prize of £10 000. The Smith brothers, pilots of the first aircraft to fly to Australia over a period of twenty-seven days in 1919, were knighted.[6]

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[5] Elliot J. Feldman and Jerome Milch, *The politics of Canadian airport development: Lessons for federalism* (Durham, N. C.: Duke University Press, 1983), p. 30.

[6] Ross Smith, *14 000 miles through the air* (London: Macmillan & Co., 1922). Travelling with the Smith brothers were engineers Wally Shiers and Jim Bennett.

Other flyers arrived, bringing their own varieties of excitement. In August 1926 Englishman Alan Cobham and his engineer arrived at Darwin after thirty-seven days of travel in a DH50 on floats.[7] Bill Lancaster and Mrs Keith (Chubbie) Miller took nearly half of 1928 to complete the same distance. That same year Bert Hinkler completed the trip solo over fifteen days. From across the Pacific Ocean, Charles Kingsford Smith and Charles Ulm with a crew of two others arrived at Brisbane's Eagle Farm aerodrome early in June 1928.[8] By the end of 1930, a boom year for record flights, the route from England to Australia had been reduced to ten and a half days.

Two themes run parallel in the early twentieth century history of Australian aviation. The first is bound up in the adventure of flight. Largely because of this country's geographic separation from Europe and North America, Australia is well represented in the history of long-distance flight. The second involves the desire to establish a durable and safe system of transportation of goods and people by air. While in this early period the adventurous received the greater public acclaim, those with vested interests in the stable future of aviation worked with less publicity towards their goal. Long-distance flights may have contributed to the general acceptance of air travel in the minds of the people but they could not sustain the system. Within aviation history these record flights often disguised the steady persistent re-ordering of the world going on as the system developed. The simultaneous running out of these two themes is a distinct feature of Australian aviation in the 1920s and 1930s.

Though long-distance and record flights heightened enthusiasm for aviation, the development of Australia's air transport system was largely a political and economic achievement. This responsibility lay with a number of key individuals whose system-building attributes will be discussed in later chapters.

Politically, the need for development was grounded in two ideas. The first was the desire to resolve some of the country's problems of distance and communication: the second was the need to defend the country. The subsidised air-service route flown by West Australian Airways (WAA) in 1922 reduced mail delivery time from one month to less than a week.[9] With no permanent Royal Australian Air Force (RAAF) presence in Western Australia, WAA pilots, all members of the RAAF reserve, also provided a visible if token aerial surveillance operation.

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[7] Alan Cobham, *Australia and back* (London: A. & C. Black, 1927). Cobham's first engineer was killed by a sniper en route.
[8] Charles Kingsford Smith and Charles Ulm, *The story of the 'Southern Cross' trans-Pacific flight* (Sydney: Penlington & Somerville, 1928).
[9] Leigh Edmonds, 'Capital: The cause of Australia's first airline accident', *Journal of Transport History*, 15 (1994), pp. 166-7.

The civil-military link, a consequence of the First World War, would remain strong well into the 1930s and re-emerge even more influentially after the Second World War.[10] In 1919 nearly all of the country's early pilots, engineers and civil aviation administrators were returned military personnel. Air policy rulings, budgetary decisions, the formation of key administrative bodies and the granting of subsidies for the delivery of mail by air have their basis in the Commonwealth's intention to foster the development of aviation for the purposes of national defence.[11] The style of air transport system which developed in the 1920s thus reflected contemporary political attitudes towards the nature and necessity of defence.

In the period between the First World War and the Depression, the material exploitation and economic development of the nation received greater attention. The emerging air transport system was well placed to exploit this trend. From the end of the War to the late 1920s was also a period of considerable prosperity in Australia. Business was brisk and unemployment at a minimum. With constantly rising revenue, public works projects were extended. The air transport system benefited, as did road construction and State railways. Transit over the continent became easier. Air transport made it even faster.

During the 1920s people became more aware of the potential of aircraft to transport goods of high value, or people in a hurry. Aircraft served as the tool of legitimate surveyors and fortune seekers alike. A cheque transported by air meant less time when the investor's money was not 'working'. This doctrine of inevitable material progress was tempered by an expectation that the power of the state would be used where necessary to arrange those conditions necessary to bring it about. [12] The essential Commonwealth support given so early in the genesis of the system created an expectation that the Government always would provide. This expectation lived on in aviation until economic rationalisation and the associated regimes of cost recovery were introduced in the late 1980s.

As the 1920s commenced, many of Australia's returned airmen believed they might continue flying within newly created, profit-making air services. Most operations, however, were unsuccessful. Just as the long-distant flyer differs from the airline pilot, so too does the wartime fighter pilot differ from the air transport operator. The pilot who

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[10] Canada's aviation was controlled by the Department of National Defence until 1927, when a Civil Aviation Branch was formed.

[11] Some air-service operations later carried mail without a subsidy of this first type. A postal surcharge was then applied to pay for transportation costs higher than usual railway rates.

[12] Gordon Greenwood, *Australia: A social and political history* (Sydney: Angus & Robertson, 1974), pp. 294-7.

learned to deal with company structure, political motives and economic reality during this period was better equipped to move forward with the system.

Eventual success had a great deal to do with understanding the power of the Commonwealth and its desires to establish a safe, well-regulated industry. Neither could plain good luck be discounted as a factor in a company's ultimate success. In Brisbane the damage caused to an Australian National Airways Ltd (ANA[1]) Avro Ten by the saturated condition of the Eagle Farm aerodrome meant additional and unexpected costs for Charles Kingsford Smith and Charles Ulm's unsubsidised company, then the largest aerial operation in the country with the most experienced pilots.[13] The changeover from Eagle Farm Aerodrome to Archerfield Aerodrome in 1931 reduced the tendency for aircraft to become bogged, but it could not save this airline from the greater problems brought on by the loss without trace of the *Southern Cloud* later that year, followed by the Depression.

Australia's first air services began in the 1920s using aircraft developed for wartime uses. Though some aircraft manufacturing existed locally, the majority of new aircraft were imported from England. By 1930 the most up-to-date passenger service was being operated by Avro Ten aircraft belonging to ANA(1). Originally a 1923 design by Dutch engineer Anthony Fokker, these eight-seat aircraft, made under licence by the Avro company in England, were noisy and uncomfortable.[14] Avro Ten wings were constructed from timber, while their fuselage was a mixture of metal and fabric. Even equipped with three power plants they could not fly over the weather, nor did they have radios. In any case, aerial navigation facilities between their landing points in Australia at this time did not exist. Destination aerodromes, large all-over grass fields like those in Europe, were easily sufficient for this level of technology.

Though suitable for flight in visual conditions, 1920s airliners such as the high-wing Avro Ten could fail when confronted with extremes of weather. The loss of the ANA(1) *Southern Cloud* with two crew and six passengers between Sydney and Melbourne on 21 March 1931 proved that.[15] Safe scheduled flights, and people's belief in that outcome when passengers, were conditions which had to prevail for the system to develop. Until aircraft technology exhibited the necessary improvements in design and instrumentation, and these were implemented, the future progress in other parts of the

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[13] ANA(1) is used to differentiate the Sydney-based Kingsford Smith and Ulm airways company from the Australian National Airways Pty Ltd (ANA[2]) formed in Melbourne on 13 May 1936.
[14] Davies, *A history of the world's airlines*, p. 62.
[15] The *Southern Cloud* was found in the Tooma River area of the Snowy Mountains in 1957.

system, such as in the development of an airline company or the continued maintenance of a local aerodrome, could not be guaranteed.

A town with an aerodrome was able to share in the excitement of flight, as Brisbane residents in the 1920s knew. Up to 15 000 people waited at Eagle Farm aerodrome on 9 June 1928 for the arrival of the delayed *Southern Cross* at the end of its trans-Pacific flight. Ipswich resident George Roberts recalled arriving at the aerodrome at 3:00 a.m., then having to wait seven hours squashed against a fence.[16]

Brisbane's first proper aerodrome had been established in 1922 as one terminus of the subsidised Sydney-to-Brisbane route granted to Frank Roberts. Though Roberts never took up his contract, a hangar was erected by the Commonwealth in 1924 and a caretaker's cottage constructed in 1925. QANTAS built a hangar there early in 1927; Queensland Air Navigation (QAN) constructed a smaller maintenance hangar in 1930. The aerodrome's buildings were basic but quite suited to the requirements of the time. In terms of the descriptions used by Reyner Banham, Eagle Farm was an aerodrome of the 'pastoral phase', one which was flat, grassy, omnidirectional, and had been laid out for civil rather than military traffic.[17]

By 1930 all the essential early components of the Australian air transport system had been 'invented' and were developing tentatively. Initial support in the form of ongoing Commonwealth subsidies had allowed two of the four initial air-service contractors delivering mail to survive. Because payload was limited by engine capacity and airframe design, passenger services such as ANA(1) carried no more than eight or ten passengers. In the area of aircraft technology, critical design problems needed to be resolved before the air transport system could gain greater momentum. By the late 1920s some of the aerodromes chosen earlier in the decade were revealing problems inherent to their particular sites. A series of wet summers foretold of more difficulties with Brisbane's Eagle Farm as aircraft size and demand for air travel increased.

As the 1920s drew to a close the cost of an extended journey by air still was beyond the reach of ordinary Australians. Travelling by air would remain for most a state of mind because, despite the development of the system, most people could not afford any more

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[16] Paul Byrnes, *Qantas by George! The remarkable story of George Roberts* (Sydney: Watermark Press, 2000), p. 52.
[17] Reyner Banham, 'The obsolescent airport', *Architectural Review*, 132 (1962), p. 252.

than the brief thrill of a joy flight in a DH60, such as the one flown by pilot Lester Brain, QANTAS' first Brisbane representative.[18] Still, it was a beginning.

[18] For the sake of continuity the uppercase QANTAS will be used to identify this company, formed as Queensland & Northern Territory Aerial Services on 16 November 1920.

Chapter 3

'If Australia...was to have commercial aviation and military aviation...then there must be laws to govern air traffic. There was nothing to prevent a man going up in any sort of machine. On the other hand there was nothing to prevent him coming down again. (Laughter)'[1]

The period between 1920 and 1930 encompassed not only the beginning of air transport in Australia, it also saw the establishment and initial growth of the system which would both administer and foster air transport. The Minister for Defence, Senator Pearce, introduced this somewhat ambiguous Civil Aviation Branch role of both regulator and financial supporter late in 1920. It marked the beginning of the political development of the air transport system. Likewise it created an expectation in aviation that the Commonwealth would provide the system's ground facilities, if not additional financial support to commercial operations. By the end of this preparatory period, regulatory policy would be set in place and the necessary infrastructure established to ensure comparatively safe, though not necessarily momentous growth, on a small number of routes. For Brisbane, this would mean considerable Commonwealth investment in one aerodrome site which by 1930 was being replaced by another.

Following the First World War, initial political debate on the future for Australian aviation centred not on whether aeronautical regulation was needed for Australia, rather on whether it should be controlled by the Commonwealth or the individual States. The Commonwealth claimed responsibility under its obligation to ensure regulation as required by the Convention for the Regulation of Aerial Navigation, which representatives had signed in Paris in 1919.[2]

Levels of Commonwealth control of intrastate and interstate aviation were discussed at a May 1920 Premiers' Conference. Two decades after Federation a means of transport not invented when the Constitution was written presented new issues to be resolved between the Commonwealth and the States. Australia's first Commonwealth statute in air navigation, the *Air Navigation Act (1920)*, was assented to on 2 December 1920.[3] Thereafter flights over the skies of the nation would be regulated in the majority by a

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[1] *Age*, 24 May 1920, p. 6. Report on comments made by Prime Minister W. M. Hughes at the 1920 Premiers' Conference.

[2] 'Aerial navigation – Convention for the regulation of', *CPP*, 4 (1920–21), pp. 479-524.

single Commonwealth body, though the legislative means by which regulation was achieved would cause problems in the future.[4]

Even before the passing of the *Air Navigation Act (1920)* an advertisement for the position of controller of civil aviation appeared in the *Commonwealth Government Gazette (CGG).*[5] From a short list of three, the position went to Lieutenant Colonel Horace Clowes Brinsmead OBE MC, the first system builder of Australian air transport. From 16 December 1920, Brinsmead set out to create an entirely new administrative organisation, the Civil Aviation Branch of the Department of Defence. According to the directions given by Senator Pearce, the Minister for Defence:

> It will be the duty of the controller to administer the traffic regulations. Amongst other things will be required machinery for the inspection, registration, and certification of airmen, aircraft and aerodromes. The controller will also advise on matters affecting the organisation of air lines and schemes for the encouragement of the growth of civil aviation.[6]

Brinsmead's was an unprecedented task, though he was not without guidelines on such as how to establish aviation regulatory framework. In his choosing to adapt the British aviation regulations for use in Australia, Brinsmead provided evidence of transfer of the intellectual resources behind the administration of aviation in the UK to the new and developing Australian system. Brinsmead's action constituted the diffusion of knowledge, skills and attitudes noted by Headrick as one of the processes of technology transfer.[7]

Many sections of the 1919 British regulations are produced word for word in the Australian Air Navigation Regulations, first published in 1921. The preliminary British regulation regarding aerodromes reads: 'No place in the British Islands shall be used as an aerodrome or as a regular place of landing or departure by passenger aircraft carrying passengers, unless it has been licensed for the purpose by the Secretary of State, and any considerations of such licence are complied with.'[8] For the Australian regulations

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[3] *Age*, 24 May 1920, p. 8; Commonwealth of Australia, *The acts of the Parliament of the Commonwealth of Australia passed during the year 1920: Commonwealth acts vol. 18* (Melbourne: Govt Printer, 1920), p. 159.
[4] State legislation applies to intrastate aviation. This topic will be discussed at greater length in Part 2.
[5] *CGG*, 4 November 1920, p, 2,037; *CGG*, 11 November 1920, p. 2,067; *CGG*, 18 November 1920, p. 2,179.
[6] *CPD*, 17 September 1920, p. 4,717-8.
[7] Daniel R. Headrick, *The tentacles of progress: Technology transfer in the Age of Imperialism* (New York & Oxford: OUP, 1988), p. 9.
[8] 'Air Navigation Regulations, 1919', *London Gazette*, 29 April 1919, Fourth Supplement p. 5,450.

this has been amended to the almost identical, 'No place shall be used as an aerodrome or as a regular place of landing or departure by passenger aircraft carrying passengers, unless it has been licensed for the purpose by the Minister and the conditions of the licence are complied with.'[9] Other sections have been adapted similarly. This particular example of transfer of technology in the form of regulations also is indicative of the strong links between the British and Australian aviation during the 1920s.

Subject to these new regulations were the up to 600 pilots from various services who had returned from the First World War.[10] How many of them wanted to 'make a go of it' in aviation was unknown. Senator Pearce recommended a preliminary annual vote of £100 000 towards the Civil Aviation Branch and the development of Civil Aviation. This was approved.[11]

In the beginning Controller Brinsmead identified three key areas pertaining to the regulation of aviation: aerodromes, flying and aircraft, and engineering. Superintendents were appointed to each area. Captain Edgar C. Johnston was appointed superintendent of aerodromes. He in turn would become a key builder of the system. A number of inspectors reported to each superintendent. The first three aerodrome inspectors were H. A. Mann, A. R. (Roley) McComb and J. O. Neill.[12] McComb's role as a system builder can be traced through to his retirement in 1957. By the end of 1921 however, these three had overseen the establishment of nine government aerodromes and five emergency landing grounds (ELGs). An additional ten aerodromes controlled by other authorities had been checked and were licensed. Based in Brisbane until 1929, Roley McComb inspected aerodromes in the Queensland regional area. Like the majority of aviation administrators he came from a military background.[13]

Construction of licence-standard landing grounds and aerodromes steadily increased after the First World War. In preparation for the England to Australia Air Race, Cloncurry's aerodrome was constructed in 1919 under the authority of and using money from the Department of Defence. The townspeople of Charleville were so keen

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[9] Commonwealth of Australia, *Commonwealth statutory rules 1921* (Sydney: Butterworth & Co., 1921), p. 352.
[10] G. A. (Don) Shearer, The foundation of the Department of Civil Aviation 1919–39, MA thesis, University of Melbourne, 1970, p. 17.
[11] *CPD*, 17 September 1920, p. 4,717. By comparison the RAAF received over £500 000 per annum.
[12] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 13.
[13] First World War airmen came from the Australian Flying Corps (AFC), the Royal Flying Corps (RFC) or the Royal Naval Air Service (RNAS). After 1921 airmen might also have been trained by the newly formed Royal Australian Air Force (RAAF). McComb, a surveyor, joined the Australian Imperial Forces (AIF) in 1915. He served at Gallipoli and in Egypt and France before transferring to the AFC in 1917.

to encourage aviation they built their own.[14] According to *Aircraft*, the Queensland Section of the Australian Aero Club (AAC Qld) in 1921 was corresponding with the Queensland Department of Public Lands regarding sites for aerodromes in some sixty-one Queensland towns and districts outside Brisbane. In the Queensland capital, aircraft were landing at various times on open land in the suburbs of Albion, Bulimba, Bowen Hills, Kedron Park, Lytton, St Lucia, Windsor Park and on the Graceville recreation reserve. According to their correspondence, the AAC Qld favoured a site for a permanent aerodrome near Northgate Junction and Banyo, just over ten kilometres from the centre of Brisbane.[15]

Like those employed by the Civil Aviation Branch, many of the leaders of the influential Aero Club movement were former military aviators. The first list of registered pilots was published in June 1921. It comprised forty-two commercial pilots and two private pilots, most of whom were First World War pilots. The emerging technological community involved in aviation was based on the continuity of shared military experience. Here among the first group of licensed pilots were most of the owners of air transport services founded in the 1920s and 1930s.[16] These men and their companies, along with the Civil Aviation Branch and its officers, constituted the skill and intellectual resources available in Australia in this first period of system building.

With Ministerial approval, Controller Brinsmead set about using part of the civil aviation vote of £100 000 to provide subsidies to companies for the delivery of mail.[17] A system of Commonwealth subsidies was favoured in the belief that, with government-guaranteed revenue, air-service companies could order suitable aircraft from Britain, construct hangars and purchase the other capital equipment necessary to meet the requirements stipulated by the Civil Aviation Branch in its contracts. The use of specific contract conditions allowed the Branch to influence how the companies spent their subsidy money, in the case of aircraft ensuring they were of British manufacture. State fears that the new aerial transport 'industry' would reduce passenger numbers on their monopoly

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[14] Hudson Fysh, *Qantas rising* (Adelaide: Rigby, 1965), p. 72, p. 103.
[15] *Aircraft*, 10 March 1921, pp. 150-2; *BC*, 10 July 1920, p. 5.
[16] This list included: Hudson Fysh, formerly 1 Squadron AFC, and Paul McGinness, formerly RFC, who founded QANTAS; Jack Treacy, former AFC pilot who founded Queensland Air Navigation; Norman Brearley, former RFC pilot who founded West Australian Airways; Horrie Miller, former AFC pilot who co-founded MacRobertson Miller Airlines Ltd; Les Holden, former AFC pilot who founded Holden's Air Transport; Herbert. J. (Jimmy) Larkin, former RFC pilot who founded the Larkin Aircraft Supply Co. (LASCO) and Charles Kingsford Smith, formerly RFC and RAF, co-founder of the first Australian National Airways.
[17] In the first six months, only £4 733 0s 1d of this vote was expended by the Civil Aviation Branch.

railway systems were allayed by the Commonwealth initially subsidising only routes which did not conflict directly with railways.[18]

The first subsidised Australian air route, for which ten aerodromes and seven emergency landing grounds eventually were built, commenced between Geraldton and Derby in Western Australia on 4 December 1921. A double fatality on the first flight caused a temporary delay but the momentum was regained in February 1922, when services recommenced. Controller Brinsmead wanted the second subsidised service to operate between Melbourne and Launceston but the Minister for Defence favoured an east-coast route, with a subsidy of £8 000.[19] This second subsidised route, between Sydney and Brisbane, was advertised in August 1921.[20]

Yet another route between Cloncurry and Charleville was advertised for tender on 8 December 1921 and subsequently awarded to the Queensland and Northern Territory Aerial Service (QANTAS), a company formed in November 1920. Seven aerodromes and two emergency landing grounds were established in conjunction with this western Queensland route.[21] QANTAS commenced their route services on 2 November 1922. At the time the company had a full two years of joy ride and air-taxi service experience in the west .[22] The expansion of QANTAS from this small inland route between rail services is well documented.

At a time when it was still not known who would be granted the Sydney–Brisbane subsidy, Inspector McComb opened discussion with Elizabeth A. Beatty of Rocklea on the south side of Brisbane for the purchase of 120 acres (48.5 ha) of her 228 acre (92 ha) property. Beatty asked £25 per acre (£62 per ha). Whereas in August 1921 the purchase of the land was regarded as urgent, by late the following month the proposal to purchase the Rocklea land was abandoned after the Commonwealth surveyor-general

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[18] At this time, the interstate rail link between Sydney and Brisbane crossed the border at Wallangarra, inland from the coast. North of the border trains stopped at Toowoomba before proceeding to Brisbane. A direct coastal air route ostensibly for the transport of mail was not regarded as a threat, especially as passenger numbers were limited by aircraft size.

[19] According to Stanley Brogden the subsidy for the Sydney-to-Brisbane route was £11 500 per annum.

[20] *CGG*, 18 August 1921, p. 1,217; *CGG*, 1 September 1921, p. 1,267; *CGG*, 15 September 1921, p. 1,324; *CGG*, 29 September 1921, p. 1,388.

[21] *Aircraft*, 30 June 1924 p. 378. QANTAS management lobbied Prime Minister Hughes for this particular route so that they might submit a tender.

[22] *CGG*, 8 December 1921, p. 2,276; *CGG*, 15 December 1921, p. 2,301; *CGG*, 22 December 1921, p. 2,325; *CGG*, 29 December 1921, pp. 2,408-9; *CGG*, 21 September 1922, p. 1,599.

(CSG) informed McComb that an aerodrome would not now be needed. Seaplanes instead were to be used on the Sydney–Brisbane route.[23]

At this point it would appear that the Mascot company Australian Aircraft and Engineering Company (AA & E Co.), which had tendered using seaplanes, was being favoured to win the contract. With a paid-up capital of £50 000, twenty-two aircraft and five pilots, the AA & E Co. was well placed to operate the service from Sydney to Brisbane. Yet between September 1921 and February 1922 the Civil Aviation Branch appears to have reassessed the matter and AA & E Co. was not granted the contract. It went instead to one of the company's employees, Frank Roberts, who had tendered separately on the basis of using land planes. [24]

By 1924 AA & E Co. had collapsed, one of the many corporate victims of this first phase of development of the air transport system. Whether the contract might have restored the ailing finances of the AA & E Co. is impossible to determine.

In Brisbane for two days in February 1922, Edgar Johnston, Frank Roberts and Roley McComb inspected what were considered the best aerodrome site options. The area of just over 228 acres (92 ha) belonging to Elizabeth Beatty at Rocklea was viewed again, as was an area at Northgate. So too was a site at Eagle Farm, consisting of 84 acres 2 roods 2.26 perches (34 ha) and made up of allotments from two separate owners, David Wilson and William Lynn.[25] On 20 February 1922 Edgar Johnston chose the Eagle Farm site. (See Figure 1.) The Department of Home and Territories commenced its acquisition.

Johnston's diary does not note what influenced his decision. Proximity to Brisbane city would have been in Eagle Farm's favour. Rocklea's lack of existing services and a moderate coverage of trees would have been against that site. Following on from his previous joy flight visits when an AA & E Co. employee, Roberts would have been aware of the difficulties of operating either too close or too far from the city. The decision in favour of Eagle Farm made, Johnston departed by train.

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[23] Sec. Air Council to Sec. Dept of Home & Territories, memo dated August 1921, A. R. McComb to CSG, memo dated 16 September 1921, CSG to A. R. McComb memo dated 23 September 1921, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).

[24] Jennifer Gall, *From bullocks to Boeings: An illustrated history of Sydney Airport* (Canberra: AGPS, 1986), p. 15.

[25] Menu – Archerfield Golden Jubilee Dinner, 23 May 1981, Author's collection; CSG to A. R. McComb, 10 May 1922, Eagle Farm Aerodrome – Original acquisition, QL805 Part 1B, J56/11, NAA (Qld).

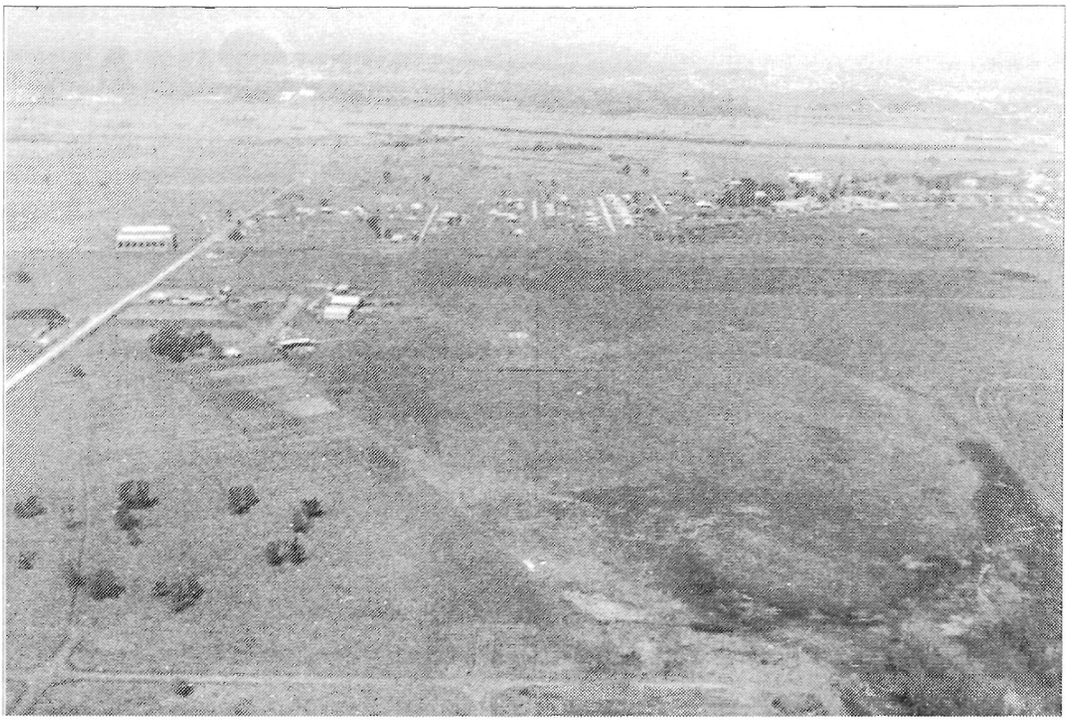

Figure 1: Aerial view of Eagle Farm Aerodrome circa 1930. The land falls away towards the right-hand bottom of the photograph (north-east) into a hyacinth swamp. By this time three hangars had been built on the aerodrome proper. In the left rear distance is the Ford Motor Company's works building in Schneider Road.
Source: AHSA (Qld) via Richard Hitchins

David Wilson was paid £3 252 for his portion of the Eagle Farm site. William Lynn received £2 000 for his segment.[26] Brisbane gained its first Government aerodrome at a completed acquisition cost of £5 421 13s 10d, or £146 per hectare.[27] By comparison, Melbourne's 86 acre (35 ha) Essendon (Broadmeadows) site had been gazetted for purchase on 11 August 1921 for £5 160. This equates to a comparable £147 per hectare. In October 1921 the 163 acre (66 ha) Mascot Aerodrome site had been acquired by the Commonwealth for £15 500, a more substantial £234 per hectare for a site closer to that city's centre.[28]

Early aviation activity was balanced against revenue generated by renting the grazing rights for Commonwealth aerodromes. Eagle Farm resident Charles Kenyon ran his

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[26] CSG to William Lynn, letter dated 13 November 1922, Solicitors for David Wilson to CSG, letter dated 26 June 1923, Eagle Farm Aerodrome – Original acquisition, QL805 Part 1B, J56/11, NAA (Qld).
[27] Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.). Delays in payment generally accrued interest which additionally was paid to the vendor.
[28] *CGG*, 11 August 1921, p. 1,188; Sec. Dept. of Home and Territories to Sec. Dept. of Defence, memo dated 1 March 1923, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA, (Vic.).

cattle on the aerodrome for an initial annual rent of £85. The figure provided small compensation, however, the cattle and horses kept the grass down. At the time similar rights on an annually reviewed basis were allocated at most government aerodromes, including Mascot, Cootamundra and Toowoomba.[29]

Between Sydney and Brisbane a string of aerodromes and ELGs, each a component of the new system, were constructed late in 1921. Limited range and uncertain engine reliability meant such landing areas needed to be established in reasonably close proximity. The closest ELG to Eagle Farm was located at Runcorn, fifteen kilometres south of the centre of Brisbane. Further along the route, others were established at Beenleigh and Pimpama, rural areas respectively thirty and fifty kilometres to the city's south.[30] At the Sydney end of the route lay the Government aerodrome at Mascot.

In retrospect it may have been better for AA & E Co. to have been granted the contract for the Sydney–Brisbane air service rather than it being granted to Frank Roberts.[31] For all his knowledge of the route gained from time spent in the area, Roberts as an individual lacked the corporate structure and financial backing available to companies such as QANTAS or AA & E Co. Even with his contract, Roberts was unable to raise the financial backing necessary to run the Sydney-to-Brisbane route. Subsequently he formed an alliance with Herbert J. Larkin of the Larkin Aircraft Supply Co. (LASCO), the holder of the contract for the air service between Adelaide and Sydney. In January 1923 Roberts approached the Civil Aviation Branch, asking to assign his Sydney–Brisbane contract to LASCO.[32] Any momentum the partnership might have gained was lost as the delayed arrival of aircraft from England forced the starting date for the new combined Adelaide-to-Brisbane service further and further into the future.

Trading under the new name of Australian Aerial Mail Services Ltd (later Australian Aerial Services Ltd), the combined Roberts/LASCO operation finally commenced services in April 1924 but from Adelaide to Sydney only. Weather troubles on the route further reduced the chances of the company ever commencing the Sydney–Brisbane sector. In slow decline, Australian Aerial Mail Services Ltd relinquished the difficult

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[29] *CGG*, 29 May 1924, p. 1,179; Sec. Dept. of Home and Territories to Sec. Dept. of Defence, memo dated 1 March 1923, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA, (Vic.).
[30] Civil Aviation, Sydney–Brisbane, 7/52, A2408/0, NAA, (Vic.).
[31] Both aviation historian Leigh Edmonds and journalist Stanley Brogden have stated their belief that the AA & E Co. would have been more successful with the route. Nigel Love, former AFC pilot and managing director of AA & E Co., later founded the successful N. B. Love food processing company.
[32] *CGG*, 1 November 1923, p. 2,111; Frank S. Briggs, *Joysticks and fiddlesticks (the unofficial history of a flying kangaroo), or The flying kangaroo* (London: Hutchinson, 1936), p. 175; Subsidised routes, Sydney – Brisbane, 192/14, A2408/0, NAA, (Vic.).

east-coast sectors of the route before concluding all operations early in 1930, shortly after subsidies were withdrawn.

That only one of the four companies operating subsidised routes survived beyond the mid-1930s is indicative of the indeterminate nature of this first phase of development of the air transport system. With its separate components influenced by at this stage by political, economic, social and technological forces, few groups or individuals could predict accurately the direction the system might take. Pilot and business manager, Hudson Fysh of QANTAS maintained close communication with the Civil Aviation Branch, informing them regularly of the company's actions and aspirations. By comparison, in 1929 Herbert Larkin of Australian Aerial Mail Services Ltd alleged improper conduct in the distribution of air mail contracts against the Secretary of the Department of Defence, M. L. Shepherd. A Board of Inquiry found the charges not proved.[33] The former's company prospered, the latter's did not. The rise and fall of companies, aircraft accidents, whether aircraft arrived from England on time and performed as well as advertised, all these factors and more influenced the slow steady growth of the system and its aerodromes.

The lack of a subsidised Sydney-to-Brisbane service did not mean the new aerodrome at Eagle Farm was under-utilised. The Government hangar was erected in 1924, a caretaker's cottage the year after.[34] The Brisbane Aircraft Company, financed by plywood manufacturers D. G. Brims and Sons, commenced an Eagle Farm-to-Toowoomba route late in 1926, essentially for the delivery of newspapers. Courier Aircrafts Ltd followed when Brims withdrew, using the same aircraft G–AUEW and G–AUFB. As a route operator Courier Aircrafts survived until a paying passenger was killed in an accident at Ripley near Ipswich on 9 February 1927.[35]

QANTAS, the air-service company with a subsidised western Queensland route, made its tentative move into the state capital-city aerodrome early in 1927 by setting up a flying school in a hangar they had built on a leased allotment. Pilot Lester Brain and engineer T. R. (Tom) Young opened the Brisbane Flying School for QANTAS on 26 March 1927 with an aerial pageant.[36] For nine months the company took on the well-tried Brisbane-to-Toowoomba route but withdrew when it proved unfinancial. Hudson Fysh, co-founder of QANTAS, later described the company's gradual move into

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[33] Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 87.
[34] Edgar Johnston to Horace Brinsmead, minute paper dated 25 March 1924, Completion return dated 2 August 1925, Eagle Farm Aerodrome – Caretaker's residence, 7/16/349, A705/0, NAA (Vic.).
[35] *Daily Mail*, 10 January 1926, p. 7.
[36] *BC*, 9 March 1927, p. 17; *BC*, 28 March 1927, p. 16.

Brisbane as a 'natural event'.[37] Steady work, an easy momentum and the excitement of a number of minor accidents characterised the early years of joy flights, flying training and air-service operations on the aerodrome.

Other companies which operated from Eagle Farm were formed by military-trained pilots with faith in the future. Former 1 Squadron AFC pilot Ron Adair, who had flown for both Brims and Courier Aircrafts Ltd, formed Aircrafts Proprietary Limited (APL) in August 1927. His more successful attempt at operations on the Toowoomba route commenced later that year. In April 1928 Jack Treacy formed Queensland Air Navigation (QAN) to operate a coastal air service north to Rockhampton and Townsville which commenced in March 1930. As from 1 January 1930, Avro Ten aircraft belonging to the first Australian National Airways (ANA[1]) formed by Charles Kingsford Smith and Charles Ulm operated into and out of Eagle Farm Aerodrome. This company erected a small building on site to cater for passenger comfort. Ascot Aerial Services avoided hangar rental charges in the Government hangar by operating from a former cowshed outside the aerodrome fence line. Here owners E. W. Beckman and E. R. Videan with pilot/engineer Horrie Miller (later of MacRobertson Miller Airlines Ltd) conducted as many at twenty joy flights a day on weekends.[38]

In 1927 and 1928, greater than average rainfall proved Johnston's decision to choose the Eagle Farm over the Rocklea site had been ill advised. On estuarine land, the former's northern contours fell gradually into a thick hyacinth swamp with water one metre deep, geographical features clearly evident on a preliminary plan from 1922.[39] Table 1 indicates an annual average of 1 148.8 mm of rainfall for Brisbane between 1918 and 1931. Even though Johnston had viewed the site after a comparatively wet year, the airfield's problems with excess subsoil moisture were not fully revealed until 1927. As the table reveals, below average rainfall was recorded in most of the intervening years between 1922 and 1927.

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[37] *Qantas News*, August 1953, p. 3; File on Lester Brain, Qantas Historical Collection, Mascot, NSW.
[38] H. C. (Horrie) Miller, *Early birds: Magnificent men of Australian aviation between the wars* (Adelaide: Rigby, 1968), p. 109; Charles Kenyon to CSG, letter dated 26 July 1924, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).
[39] Plan of Eagle Farm Aerodrome, neg. 4964, Eagle Farm Aerodrome – Original acquisition, QL805 Part 1B, J56/11, NAA (Qld).

Table 1: Annual rainfall for Brisbane between 1918 and 1931.[40]

YEAR	RAINFALL IN MM	YEAR	RAINFALL IN MM	YEAR	RAINFALL IN MM
1918	634.6	1923	592.7	1928	1 338.4
1919	491.3	1924	1 046.8	1929	1 010.2
1920	1 009.0	1925	1 350.0	1930	1 048.4
1921	1 381.7	1926	783.7	1931	1 695.4
1922	910.7	1927	1 577.6		

Both Civil Aviation Branch and QANTAS company correspondence reveal an awareness and growing concern about the problem. In February 1927 the caretaker, Andy Lauchland, advised the Controller that he had watched one aircraft taking off and 'could not see the fuselage of the machine at all on account of the muddy spray that was being thrown back.'[41] In April 1928 Lester Brain informed Hudson Fysh that in under three days rainfall amounted to over twelve inches (300 mm) and flying would have to be suspended for a few days.[42] Engineer George Roberts even recalled king tides coming across the field. After two years of steady complaints, the Civil Aviation Branch began to reconsider its options.[43] Until the problem of excessive surface wetness at the Eagle Farm site was resolved, the growth of aerial services to and from Brisbane was held back. In effect, what Hughes referred to as a reverse salient, one component in the system which had fallen behind the others, had developed.

Planned action to resolve the problem was evident when a Civil Aviation Branch representative revisited Elizabeth Beatty's Rocklea farm and re-opened negotiations in November 1928. Though a Sunnybank site was also considered, the final decision was to acquire the full 228 acres 2 roods 17.9 perches (92 ha) owned by Beatty. It was envisaged that further acquisition of nearby grazing land could in due course enlarge the aerodrome to approximately 300 acres (121 ha).[44] The results of soil tests were satisfactory and supported the purchase. As the first impacts of the Depression were felt on the nearby communities of Coopers Plains and Rocklea, the blue gum and Moreton Bay ash trees on what had been Elizabeth Beatty's farm were cleared, stacked and burned. Eagle Farm's aerial companies planned their relocation to the new aerodrome in the outer Brisbane suburb now referred to as Archerfield.

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[40] Australian Data Archives of Meteorology, Bureau of Meteorology.
[41] Andy Lauchland to CCA, memo dated 7 February 1927, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).
[42] Lester Brain to Hudson Fysh, letter dated 20 April 1928, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.
[43] George Roberts, interview with author, 10 May 2000.
[44] Sec. DOD to Sec. Dept of Works, memo dated 22 July 1929, Eagle Farm Aerodrome – Original acquisition, Folder four, QL805 Part 1B, J56/11, NAA (Qld).

The Australian air transport system by 1930 had been invented and was developing at a pace similar to that of overseas countries. The companies which survived this period possessed the piloting skill, business and political acumen and basic good luck which were needed to counter the influences of environmental and other factors not always within their control. These included the need for capital-intensive equipment, a political and regulatory framework steeped in the concept of air navigation as an adjunct to defence, poorly maintained landing grounds and aerodromes and the weather. Whether a company survived could be measured by a fixed, permanent address at the Government aerodrome.

Commonwealth investment in Eagle Farm Aerodrome during the 1920s included initial acquisition, clearing, connection of services, erection of a hangar, earth closets and a caretaker's cottage, full-time employment of a caretaker and supply of his horse. The cost of running and repairs to this Commonwealth property extended over an eight-year period. When aircraft on scheduled flights were damaged merely in the process of taxying on wet days, or chose to land at Lytton landing ground instead, the momentum of all this investment in Eagle Farm faltered. Unfortunately for the Commonwealth, the solution to what would become a critical problem, if not addressed, was to write off much of the investment in Eagle Farm. For the overall advancement of the air transport system, the relocation to Archerfield was a necessity.

Chapter 4

'My government is satisfied that the element of time saved by the aerial method has a large economic importance to this country...'[1]

The Australian air transportation system emerged in the twentieth century as a means of transferring people and goods, items usually of minimum weight or high value, to areas either not serviced or not serviced well by other forms of transportation. What it also offered, above rail, sea and road transport, was speed. This inherent virtue of air transport was recognised and exploited by both air-service operators and the Commonwealth. Though many companies were unsuccessful commercially, the few which survived established a steady record for reliable transportation services. This reliability fostered an expectation that in the long term, when technology improved, the air transport system could deliver all that it promised.

To Australian Hector Sleeman, speaking to the Institute of Aeronautical Engineers in London on 15 December 1920, the establishment of air transport in his home country promised to hasten the manner in which all companies conducted business. Such, he indicated, would not be difficult.[2] The once-a-day train journey between Sydney and Brisbane took twenty-seven and a half hours and involved a change of trains at the border between Queensland and New South Wales. Aircraft that year could fly between the same cities in less than eight hours, as proved by Lt J. Butler in a BE2E biplane on 9 July 1920.[3]

A small number of Australian businessmen already were convinced of the advantages of air transportation. For nearly two years former First World War pilot Frank Briggs flew Clement J. de Garis, an independent land agent and the publicity director of the Australian Dried Fruits Association, on numerous business flights between Perth and Brisbane. Briggs' diary entry for 26 June 1920 records his initial meeting with de Garis, whose stated intentions of starting to travel by air he had read of in an Adelaide newspaper:

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[1] *Aircraft*, 31 July 1927, p. 147. Prime Minister Stanley M. Bruce was commenting on the future of Australian air transport.
[2] *Aircraft*, 10 March 1921, p. 138. Hector Sleeman formed Australasian Aerial Transport Ltd in 1919. Like many others formed at this time, the company never operated an aerial service.
[3] *BC*, 10 July 1920, p. 5.

> Here is the man who is presenting the opportunity I have been looking for, I think, to prove aviation as a commercial proposition; something that every businessman will in time appreciate as helping to eliminate time and distance in a more concrete manner than the telegram or telephone.[4]

As the adventurous flying recorded by Briggs in his autobiography reveals, during the period from the early 1920s to the Depression the Australian air transportation system was in its infancy. So too were two of its key industry components, the air-service companies established to profit from the new mode of transportation and the Civil Aviation Branch set up to both promote and regulate it. Within each component were the system builders or, as Douglas Mackenzie has named them, the 'actors' who guided the directions taken by the respective bodies.[5] Whether company or Commonwealth employees, these decision-makers could learn only by trial and error just how effectively or otherwise the rules relating to surface transportation enterprises transferred to this new means of conveying people and goods. Mistakes not only were costly but also slowed the momentum of system development.

Between 1920 and the end of 1930 a total of seventeen aviation businesses were formed in, or regularly operated into, the Brisbane area alone. Only QANTAS and Aircrafts Proprietary Ltd were successful in the long term. Nationally the rate of attrition was similar. Responsibility for such a high failure rate for aviation companies can be attributed to a combination of any of six related factors. Because the system being developed was one Hughes would describe as being open, some of those influences were beyond the control of the participants, the actors responsible for the decisions which influenced what form the system would take.[6]

The six factors that caused the failure of most early aviation businesses were the need to invest heavily in capital equipment, unreliable aircraft technology, varying levels of government involvement, lack of clientele, lack of business expertise and luck. Even the few successful companies acknowledged the contribution of 'Dame Fortune'.

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[4] Frank S. Briggs, *Joysticks and fiddlesticks (the unofficial history of a flying kangaroo), or The flying kangaroo* (London: Hutchinson, 1936), p. 90.
[5] Donald MacKenzie, 'Missile accuracy: A case study in the social processes of technological change', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 197.
[6] Thomas P. Hughes, *Networks of power: Electrification in western society, 1880–1930* (Baltimore and London: The Johns Hopkins University Press, 1983), p. 6.

According to Deborah Douglas the economic value attributable to speed was acquired during the later nineteenth century and the period of modern enterprise.[7] In Australia the Commonwealth translated its understanding of the economic value of speed into improved communication by the allocation of subsidies for the delivery of mail. Such subsidies, although renewed annually, allowed the companies fortunate enough to be in receipt of them to raise, through share issue, the heavy capital expenses needed. Without the finances to invest in the necessary capital equipment, an aviation company most certainly would fail.

Western Australian Airways Ltd needed to raise a start-up capital of £16 000—£12 000 for aircraft, £2 000 for spare parts and £2 000 for hangars—to commence its Geraldton-to-Derby run. Their subsidy for the first year amounted to £25 000, paid in allocations of £2 083 per month.[8] In the eastern States, QANTAS commenced its first subsidised route on 22 November 1922. Their Commonwealth subsidy was valued at £12 000 per annum. To equip itself for those operations, QANTAS had had to raise its capital from a recorded £6 850 in May 1921 to £31 947 14s 0d in June 1923.[9] Capital expansion involved selling shares to the public. Accounts of successful long-distance flights could work to the company's advantage; reports of aircraft accidents generally did not. The conditions which held together individual companies, and by consequence the developing system, were fragile indeed.[10]

Such heavy capital expenditure is one of the reasons British transport historian Peter Lyth believed that air transport in Europe during the same period was not cost effective.[11] The situation was no easier in Australia where even war surplus aircraft were expensive. QANTAS purchased its first aircraft, an Avro Dyak, for £1 500 early in 1921. The repair bill after an engine failure and crash into an Ingham cane field dissipated most of the company's early accumulated profits.[12] An Avro Triplane that cost the company £2 798 eventually had to be condemned and written off. This caused further heavy losses.[13]

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[7] Deborah Douglas, 'Airports as systems and systems of airports: Airports and urban development in America before World War Two', in William M. Leary, ed., *From airships to Airbus: The history of civil and commercial aviation*, (Washington & London: Smithsonian Institute Press, 1995), p. 70.
[8] Leigh Edmonds, 'Capital: The cause of Australia's first airline accident', *Journal of Transport History*, 15 (1994), p. 169.
[9] Hudson Fysh, *Qantas rising* (Adelaide: Rigby, 1965), p. 98.
[10] In the financial year 1924–25 German civil aviation was subsidised to the value of £245 000. Britain spent £131 000 on subsidies to its industry and France directed £521 000 in direct subsidies to civil aviation.
[11] Peter J. Lyth, 'The history of commercial air transport: A progress report 1953–93', *Journal of Transport History*, 14 (1993), p. 166.
[12] Fysh, *Qantas rising*, p. 110.
[13] Fysh, *Qantas rising*, pp. 120-1.

Setbacks were not uncommon. The Brisbane timber company D. G. Brims & Sons announced a Brisbane-to-Sydney service in September 1926 using two Avro 504K biplanes, G–AUEW and G–AUFB. By December 1926, as a consequence of an accident at Mascot and little patronage of their service, the aircraft were sold for a combined figure of £2 375 and the Brims company withdrew from air transportation.[14]

Another reason Lyth believed European air transport was not cost effective is that it was subject to an abnormal degree of government control, regulation and general interference.[15] This may be truer of the British situation than of the Australian at this time. While government control and interference might not have been the reason for company failure, a government subsidy was more likely the reason for its success. The Commonwealth chose in the early 1920s to provide material encouragement to air transportation by directly subsidising a small number of air-route operators and providing the aerodrome infrastructure needed for their operation. In 1926 Controller Brinsmead reported that approximately 55% of the total amount received to fund civil aviation was expended on subsidies while the remaining 45% was spent on aerodromes and air routes.[16] In the 1924–25 financial year funding for the development of civil aviation, towards the acquisition of aerodromes and for the construction of hangars, amounted to a total of £59 413.[17] This direct expenditure on the development of infrastructure, though not without its errors of judgement as to where and how the money was spent, established the physical resources of the system.

Irrespective of the mode of transportation used, geographer Howard Quinlan has noted there are only three fundamental ways in which any transport task can be performed. The passenger or freight consignor can undertake the movement privately in their own vehicle, charter a transport operator to perform the task required or pay the fare or freight charge required by a scheduled operator.[18] Air transport companies of the 1920s made their profits by providing either charter or charged scheduled services, or a combination of both. The more astute company managers recognised that the future lay in development of the latter.

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[14] Valerie R. Dennis, Circuits and bumps: The development of commercial aviation in Queensland between 1920 and 1940, PostgradDip thesis, University of Queensland, 1997, p. 30.
[15] Lyth, 'The history of commercial air transport', p. 166.
[16] *Aircraft*, 1 May 1926, p. 157.
[17] 'Treasurer's statement of receipts and expenditure accompanied by the report of the auditor general and expenditure in 1924–25', *CPP*, 4 (1926–27–28), pp. 2,703-2,817.
[18] Howard G. Quinlan, 'Some geographic perspectives on Western Australian air transport', in J. A. Kesby, et al., ed., *Geodiversity: Readings in Australian geography at the close of the Twentieth Century, Special Publication Series* (Canberra, ACT: Australian Institute of Geographers Inc., 1999), p. 335.

Charter, known then as air-taxi flights or services, provided an unpredictable income for the air-service operator, partly because of the limitations of aircraft technology. Though costly for the client, the advantage of charter lay in the saving of time taken for the journey. When a large fire in the Melbourne factory of J. C. Hutton Pty Ltd severely depleted the stock of hams available for Christmas 1929, QANTAS delivered the Hutton's Brisbane manager to Melbourne in two days, despite adverse weather conditions.[19] While working as both an engineer and pilot for Videan and Beckman of Ascot Aerial Services, Horrie Miller flew those who could afford the fee on charter flights from Eagle Farm to country centres situated, perilously as far as he was concerned, in the Great Dividing Range.[20] Much of the peril lay in the poor performance of the 100 hp engine in his Avro Dyak aircraft, especially as the weather he faced was unknown.

Regular operation of scheduled flights carrying paying passengers or charged freight was the ultimate goal of air transportation towards which both the Civil Aviation Branch and air-service operators worked. Likewise hindered by the limitations of aircraft technology, this goal was approached slowly. Until 1926 the hours flown by air services in Australia per annum were no greater than 6 500. It took another four years for the figure to double.[21]

An additional reason for such slow progress was the lack of clientele. Not until there was an increase in what was termed 'airmindedness' did more people travel or choose to make use of air transport in the moving of their goods. According to historian Leigh Edmonds, 'An airminded society would be one which supported aviation, could appreciate its advantages and understood that prosperity and development lay in using the air.'[22] Safe, scheduled operations improved airmindedness, as did the running of aerial pageants, the successful completion of long distance flights and a steady publicising of the industry. Greater airmindedness could be translated into more passengers and therefore greater economic efficiency.

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[19] QANTAS Brisbane manager to Hudson Fysh, letter dated 24 December 1929, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.
[20] H. C. (Horrie) Miller, *Early birds: Magnificent men of Australian aviation between the wars* (Adelaide: Rigby, 1968), p. 111.
[21] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 178.
[22] Leigh Edmonds, 'How Australians were made airminded', *Australian Journal of Media & Culture*, 7 (1993), p. 184.

In his wonderfully florid style the then editor of *Aircraft*, Edward J. Hart, identified overall improvements he had observed in the industry by 1925 and duly advised his readers:

> It may truly be said that for the first time since the Armistice a number of ex-Service flying men who have stoically devoted time, money and skill to the advancement of aeronautics in this country are ceasing to lament their enterprise in championing what must have seemed a lost cause. The transition from despair to contentment has come like a flash of lightning, converging from half a dozen directions at once and illuminating many fields of aerial activity which for many years had been dark and cheerless.[23]

Though subsidies eased the finances of new companies, it was the ability to operate a company along proper business lines which was the key to success. Engineer and pilot Horrie Miller later acknowledged that he did not succeed financially until he partnered with chocolate manufacturer MacPherson Robertson in the 1930s, thereafter leaving the MacRobertson-Miller company's paperwork to the accountants of his partner's firm.[24] Reflecting on the role of pilot-as-businessman he wrote, 'Few of the ex-Flying Corps pilots who started about the same time had any more business experience than I.'[25]

QANTAS' Hudson Fysh tackled the problem of his business inexperience by studying to improve his management skills. He read voraciously, studied economics, and undertook a course in Pelmanism, a style of business management, on which he worked in the evenings.[26] The establishment of a QANTAS branch office on Eagle Farm in 1927, as the first step towards expanded operations, was a goal set by Fysh the businessman, rather than Fysh the pilot. For those who achieved aviation business success, skills beyond piloting aircraft were needed. Controller Brinsmead recognised those additional skills in WAA's Norman Brearley, whom he described as 'not only one of the best pilots in the world, but also an outstanding figure as organiser and managing director.'[27]

The final factor influencing the failure of air-service operators was luck. In Western Australia WAA suffered a fatality on its first flight but found further financial backing and remained in business. With the momentum that came in part from being the first air-

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[23] *Aircraft*, 28 February 1925, p. 97.
[24] Miller, *Early birds*, p. 128.
[25] Miller, *Early birds*, p. 90.
[26] Fysh, *Qantas rising*, p. 178.
[27] *Aircraft*, 1 May 1926, p. 156. Long-term success could never be guaranteed. Brearley's WAA was wound up in June 1936.

service operation in that part of the country, WAA regrouped. For the next decade it flew accident-free.

Aircraft crashes were very visible bad luck. Courier Aircrafts ceased its Brisbane to Toowoomba run after the February 1927 fatality at Ripley near Ipswich that caused its financial backer, the Brisbane Newspaper Company, to reassess its participation in aviation. A crash in Maryborough on 30 December 1930 effectively ended the operations of Jack Treacy's QAN, though indications are that this unsubsidised company already was losing up to £11 000 per month from a lack of clientele and the early effects of the Depression.[28]

Hudson Fysh of the ultimately successful QANTAS accounted for luck in this manner:

> A last but most important feature of success was just plain good fortune, the lucky spin of the coin, and no success is possible without this in any true pioneering undertaking. There are times of crisis and decision in the lives of us all, times of opportunity which lead on either to success or failure. What actions will be taken? It is then that the gods must smile.[29]

The desire of former wartime pilots to make a living in aviation in the 1920s saw the rushed formation of companies which sought to use the speed of the aircraft to improve communications across what seemed an under-serviced continent. That most did not succeed was a function of key and related economic and other factors, some beyond the control of the individuals. Given that this period is one where the system was being invented, trial-and-error methods contributed much to solving problems or achieving goals. The durability of the system is evident in that it did develop. As for those actors whose early companies failed but who wished to remain in aviation, places in other aviation organisations usually were to be found. Ultimately their skills were too valuable a resource for the system to lose.

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[28] John Gunn, *The defeat of distance: Qantas 1919–39* (St Lucia, Qld: UQP, 1985), p. 131.
[29] Fysh, *Qantas rising*, p. 268.

Chapter 5

'But great as are the improvements in the art of flying, the construction of planes, engine efficiency and quality of fuel and lubricating oils, these advances cannot be fully demonstrated if the ground side of the problem does not receive similar close and detailed attention.'[1]

For just under a decade from 1922, former dairying land once owned by David Wilson and William Lunn was the aerial gateway to Brisbane. That these paddocks reverted to leased grazing land after 1931 can be attributed to deficiencies in the Eagle Farm site becoming apparent as the aerodrome was used more frequently, especially by heavier aircraft. In effect, the overseas advances in aircraft technology that produced these larger aircraft determined the provision for aerodromes in Brisbane, as well as the future of the Australian airport system. Local consideration of overseas solutions to aerodrome problems consequent to these advances in aircraft technology reveals a very broad process of technology transfer at work. The 1931 closure of the Eagle Farm component of the system is, more than all else, a matter of technology.

In the early 1920s, Australian administrators could refer to two established models of aerodrome development for guidance. The first model, later labelled the 'pastoral' type, developed in Europe.[2] Architect Wolfgang Voight subdivided the pastoral type into two 'generations'.[3] First generation aerodromes were those such as Holland's Schipol, military aerodromes which tolerated the presence of civil companies.[4] Second generation aerodromes were flat, omnidirectional fields of grass specifically laid out for civil, rather than military air traffic. In Europe, Berlin's Tempelhoff (1924) and Copenhagen's Kastrup (1925) were built as second generation aerodromes; in Australia virtually all pre-Second World War airfields, including Eagle Farm and Essendon, fell into this category. Australian's military aerodromes such as Point Cook and Laverton in Victoria

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[1] W. R. Baldwin-Wiseman, 'Some ground aspects of aviation', *Society of Engineers*, (1 December 1930), p. 251.
[2] Reyner Banham, 'The obsolescent airport', *Architectural Review*, 132 (1962), p. 252.
[3] Wolfgang Voight, 'From the hippodrome to the aerodrome, from the air station to the terminal: European airports 1909–45', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: Art Institute of Chicago and Prestel-Vertag, 1996), pp. 32-4.
[4] Marc L. J. Dierikx and Bram Bouwens, *Building castles of the air: Schipol Amsterdam and the development of airport infrastructure in Europe, 1916–96* (The Hague: Sdu Publishers, 1997), pp. 46-9.

and Richmond in NSW remained separate entities used by civil aircraft only in special circumstances.[5]

The second model from which Australian aerodrome designers could choose was that which developed in the United States. Deborah Douglas traced the origins of US aerodrome designs to standard specifications, produced by the US Army in 1919, which became the paradigm of the early municipal airport.[6] With the United States lacking a federal body to fund and promote aerodrome development, this Army model became the de facto set of guidelines. Aerodromes constructed according to these Army guidelines were generally square, though an L-shaped airfield served some situations. Aerodromes were divided into four classes. All required a take off and landing distance of 1 800 feet (548 metres) in every direction with no obstacles.[7]

In 1910 the dimensional requirement of the round or elliptical pastoral type of airfield was a take-off and landing distance of 1 500 feet (457 metres). Aircraft were hardly economical, being cloth, timber and wire machines which only carried one or two people over short distances. For costs to reduce, the profit-making weight of passengers and freight which could be carried by any particular aircraft, referred to as the payload, had to increase.

First World War improvements in aerodynamics, propulsion and structural efficiency went part of the way towards enabling aircraft to carry heavier loads. By the late 1920s an eight-seat passenger aircraft of the Avro Ten type had better aerodynamics, with one wing placed high rather than two wings, and improved propulsion from three engines. Hardly streamlined and lacking improved structural efficiency, it had a maximum take-off weight of approximately 4 000 kgs, a weight which made it more difficult to stop than the more common and smaller aircraft such as the DH60 training biplane, hence its need for a longer landing run.[8]

The Avro Ten was chosen by ANA(1) for its east-coast services commencing from 1 January 1930. When fully loaded these aircraft could leave the ground after a take-off roll of 1 350 feet (411 metres), but pilots deliberately kept the machines on the ground

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[5] Laverton was used as the Melbourne landing ground for the 1934 Centenary Air Race. When Essendon became boggy, airline aircraft of the early 1940s also diverted there. The heavily laden *Southern Cross* departed for the first Australia-to-New Zealand flight in September 1928 from the RAAF base at Richmond outside Sydney.

[6] Deborah G. Douglas, The invention of airports: A political, economic and technological history of airports in the United States, 1919–39, PhD thesis, University of Pennsylvania, 1996, pp. 428-31.

[7] Douglas, The invention of airports, pp. 604-6.

[8] Charles Ulm reported ANA(1) Avro Tens when fully loaded weighed 10 225 lbs (4 624 kgs).

for 1 500 to 1 800 feet (457 to 549 metres).[9] For night operations they preferred a distance of 3 000 feet (914 metres) to be available.

Aircraft taking off or landing at Eagle Farm had a maximum of approximately 2 000 feet (609 metres) in a NNW/SSE direction and 1 848 feet (563 metres) in an E/W direction.[10] With winds predominantly from the south-east during the summer months, the former was the preferred direction. Operations into and out of Eagle Farm were not considered marginal for the Avro Tens used by ANA(1) and QAN, but in certain wind conditions greater caution had to be applied. For that reason and due to the lack of night flying facilities, scheduled night flights into Eagle Farm were not possible.

How influenced Australian administrators were by either of these early aerodrome models is not easy to assess. Given the strong imperial bonds evident in Australian support of British manufactured aircraft, the British/European model would be expected to exert greater influence; yet Australian aerodrome markings were similar to those of the US.[11] Whatever the level of influence, technology transfer can explain how specification and guidelines spread geographically and culturally, and how they were adapted to new environments. Indeed, the improved communication brought about by air transport meant engineering, design and innovation related to aircraft and to aerodromes were shared even more rapidly between the technological communities they influenced.

Nor was the Australian air transport system the only one to benefit from this transfer of technology. Stedman Hanks, who travelled to Europe in 1928, explained in *International airports* exactly why he considered European aerodromes were superior to his American examples at the time.[12] All Europe's major aerodromes, except Holland's Schipol, had landing distances greater than 914 metres in any one direction by 1928.[13] While the three representative American aerodromes chosen by Stedman Hanks in *International airports* also had runway lengths over 914 metres, few others were of that standard at the time and needed to be improved. The notable exception was the runway

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[9] Parliamentary Standing Committee on Public Works, 'Report together with minutes of evidence and plan relating to the proposed development of the civil aerodrome at Mascot, NSW', *CPP*, 3 (1929–30–31), p. 891. The figures are for still-air conditions.
[10] Plan of relief landing ground, Archerfield RAAF – Extension of relief landing ground at Eagle Farm, K353, BP243/1, NAA (Qld).
[11] The US aerodrome of the period was marked by a white circle in chalk or concrete of 100 feet (30.4 metres) diameter. The Australian aerodrome was marked by a white circle with a diameter of 50 feet (15.2 metres).
[12] Stedman S. Hanks, *International airports* (New York: The Ronald Press Company, 1929).
[13] Hanks, *International airports*, pp. 13-30.

at Oakland (California) Municipal Airport used by trans-Pacific aircraft invariably overloaded with flight fuel. It was 7 000 feet (2 133 metres) in length.[14]

Australian civil aviation officials were aware of the latest trends. Publications sent and subscriptions arranged by a Liaison officer in London between 1923 and 1933 were recorded in an Air Service Branch letter book. These reference publications were available for perusal by Civil Aviation Branch personnel in the Melbourne head office. They included *Aeronautical Journal*, *Airways Bulletin*, *Aircraft*, *Aviation*, *Airways and Airports*, *Construction and rating of airports* and *Airport design and construction.*[15]

Technology transfer also occurred by more direct means. WAA's Norman Brearley, at the time one of the country's leading aviation company managers, returned to Perth late in 1924 after a five-month absence overseas. Part of the reason for his trip was to visit the Fokker aircraft factory in Holland. During a visit abroad in the late 1920s, Thomas Hill, the chief engineer for the Commonwealth Department of Works, 'took advantage of every opportunity that presented itself to visit aerodromes in America and England', despite the inspection of aerodrome sites not being included in his instructions. [16] Though not as common in the 1920s as in the following decade, pilots, engineers, airline officials and aviation administrators all gained by the experience of visiting overseas aviation facilities.[17]

Both the US and British/European aerodrome models acknowledged the importance of a number of aerodrome basics. These included location, site, dimensions, surface, drainage, obstructions, gradient and markings. Factors affecting the flight aspect of site selection included the direction of prevailing winds and the prevalence of fogs and mist. Where it was significant, the drift of factory smoke and dust needed to be taken into account. The particular uses of the aerodrome, be they for regular passenger services, taxi services, pilot training or as a recreational facility as sometimes was the case in Europe, influenced the need for communication and services such as water and electricity. All factors ultimately became part of the financial considerations of aerodrome construction.

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[14] Hanks, *International airports*, p. 42. The *Southern Cross* departed on its trans-Pacific flight from Oakland.
[15] Publications – Civil Aviation, 172/4, A2408/0, NAA, (Vic.).
[16] Parliamentary Standing Committee on Public Works, 'Mascot Aerodrome report', p. 832.
[17] *BC*, 12 November 1924, p. 8. Prior to the First World War one Queenslander, Charles Lindsay-Campbell, travelled to England to gain a Royal Aero Club licence. In the interwar period Queenslanders who travelled overseas on aviation business included Lester Brain (pilot), Hudson Fysh (administrator), Geoff Wickner (aircraft designer), Percy Moody (pilot and administrator). Controller Brinsmead was en

Because the establishment of an aerodrome involved considerable capital expenditure, aviation administrators worldwide made guidelines for site selection available to municipal authorities and private individuals. In 1929 the Department of Defence published *Notes on the selection and establishment of landing grounds for aircraft,* attributed to Controller Brinsmead.[18] Both layout and language are yet again very similar, in places almost word for word, to notes produced by the British Air Ministry. Brinsmead's notes, adapted to the Australian situation, provide another example of the Civil Aviation Branch's transfer for Australian usage of overseas technology-related material.

In the 1920s most authors of guidelines, including Brinsmead, noted that obstructions such as hills near an aerodrome site were to be avoided, as were high buildings, wires of any sort, or trees near the proposed boundary. Though the dimensions deemed desirable tended to increase over the years, generally 3 000 feet (914 metres) in any one direction was considered adequate for the multi-engine aircraft operating between major Australian aerodromes in the 1920s. Brinsmead's *Notes on the selection and establishment of landing grounds for aircraft* recommended just 1 980 feet (603 metres) for aerodromes used only by the more common single-engine aircraft such as the DH60. Whatever the aircraft, at any landing ground an obstruction near the boundary of the airfield reduced the available space for landing and take-off by a distance equal to ten times its own height measured from the foot of the obstruction.

The surface of the aerodrome needed to be smooth and able to be driven across, without inconvenience, by a light car doing 20 mph (32 km/h). As aircraft increased in weight, so too did this requirement—to 30 mph (48 km/h).[19] An average gradient of 1:50 was considered acceptable. A light, porous soil created a firm, resilient, well-drained surface. Clay was generally to be avoided, as was loose sand. Australia's aerodrome builders were warned to remove tussocks, bushes, suckers, mounds and anthills as well as to watch out for rabbit burrows and gilgai and melon holes. In a 1975 biography, pilot Keith Virtue recalled the melon holes he had had to avoid on the Lismore (NSW) aerodrome in the early 1930s.[20]

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route to England for a survey of the state of aviation and discussions on airmail when he was injured in Thailand in November 1931.

[18] H. Brinsmead, *Notes on the selection and establishment of landing grounds for aircraft* (Melbourne: Department of Defence, 1929).

[19] After the Second World War this recommendation would be increased to 40 mph (64 km/h).

Landing and take-off distances and surface requirements of these early aerodromes were adequate for the aircraft technology of the 1920s. The tricycle undercarriage had yet to be invented. Aircraft had a tail skid rather than a tail wheel at the rear. To allow aircraft to slow down by landing into the wind from any direction, omnidirectional airfields were essential. The dragging tail skid assisted in the process. That it removed divets and left channels in aerodrome turf was not considered too great a problem in an all-over field. At worst, surface repairs sometimes were necessary in frequently used areas near hangars and on a waterlogged airfield.

Like overseas guidelines, Brinsmead's Australian notes suggested an aerodrome should be close to a town because 'the advantages of rapid journeys by air are reduced if time is wasted in transit to and from the aerodrome.'[21] In Europe close proximity to an efficient ground transport system was considered a necessity. The British Air Ministry advised that water and power services and a telephone were necessities for a fully equipped aerodrome.[22] In the US, aerodromes meeting the US Army specifications were provided with 'communication by telephone, transportation facilities, gasoline, oil and sundry supplies.'[23] Australia's guidelines only considered it desirable to 'have telephonic communication and a small supply of water (such as a tank) available within reasonable distance.'[24]

In various ways each set of guidelines warned against the choice of a bad aerodrome. The US Army specifications for municipal landing fields warned that when selecting a site, 'it is imperative that future expansion be considered.'[25] In Britain, where municipalities were being encouraged to invest in aerodromes, H. Angley Lewis-Dale, assistant director of works in the Air Ministry, warned that without adequate investigation an authority could be 'saddled permanently with an expensive and bad aerodrome by reason of the money which has been sunk into buying the land and erecting the buildings thereon.'[26] Limited capacity for expansion was only one of the problems he foresaw could eventuate. Another was car parks, the need for which

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[20] Joan Priest, *Virtue in flying: A biography of pioneer aviator Keith Virtue* (Sydney: Angus & Robertson, 1975), p. 6.
[21] Brinsmead, *Notes on the selection and establishment of landing grounds for aircraft*, p. 1.
[22] H. Angley Lewis-Dale, *Aviation and the aerodrome* (London: Charles Griffin and Co., 1932), p. 163.
[23] Douglas, The invention of airports, p. 605.
[24] Brinsmead, *Notes on the selection and establishment of landing grounds for aircraft*, p. 4.
[25] 'Municipal landing fields for air services: A statement of the War Department's policy', *The American City*, July 1919.
[26] Lewis-Dale, *Aviation and the aerodrome*, p. 12.

furnished 'an object lesson which should be taken to heart in connection with the reservation of aerodrome sites.'[27]

Though subdivision of residential land had commenced near Eagle Farm Aerodrome by the late 1920s, lack of ability to expand was not the reason it eventually was deemed an inadequate aerodrome. Eagle Farm's chief problem, the one feature which slowed its momentum and led to the site becoming a reverse salient within the developing system, was the poor quality of the land upon which it had been constructed. Quite simply, without adequate drainage Eagle Farm became too boggy for aircraft to operate from when it rained. The associated bad publicity was likewise harmful to system growth.

Sites for government aerodromes were chosen in all Australian capital cities except Hobart and Perth during 1921.[28] Few choices were perfect. Mascot's range of problems resulted in a Parliamentary Standing Committee on Public Works conducted between May 1929 and March 1930. The committee accepted witnesses' claims that, with increased use for commercial purposes, Mascot Aerodrome should be in a condition 'to admit of machines taking off and landing in all weathers.'[29] At the time it was not.

Edgar Johnston, then superintendent of aerodromes, admitted when a committee witness that experience in other parts of the world had shown that no turfed surface would indefinitely withstand the use involved in the frequent landing and departure of heavy aircraft. He added:

> Runways are expensive to construct. Consequently it is not proposed to provide them until experience has proved they are necessary. In the meantime all possible information is being obtained from America, where such runways are being almost universally provided, and experiments are being conducted by the Department of Works with a view to finding a cheap and efficient form of construction.[30]

Construction of gravelled runways at Mascot was deferred until the early 1930s.

Another capital-city aerodrome revealing operational problems in the late 1920s was Perth's Maylands, which was severely limited in its ability to expand, as well as having

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[27] Lewis-Dale, *Aviation and the aerodrome*, p. 11.
[28] Roger Meyer, *The creation of the Civil Aviation Branch and its early years of operation* (Melbourne: Civil Aviation Historical Society, 1996), p. 7.
[29] Parliamentary Standing Committee on Public Works, 'Mascot Aerodrome report', p. 819.
[30] Parliamentary Standing Committee on Public Works, 'Mascot Aerodrome report', p. 834.

problems with drainage.[31] In August 1928 the *Southern Cross* was delayed there while pumps moved the excess water from the main drain. A newspaper report claimed the site had been inspected in the dry season when the problem was not apparent. The same report regarded the fact that during the rainy winter months WAA's passengers were forced to undertake the first leg of their journey to the north-west by train as an 'embarrassment'.[32]

Apart from some trees too close to the boundary about which pilot Horrie Miller was sometimes concerned, Eagle Farm's primary problem lay in its wetness, a surface problem not improved by the running of stock over the field since 1923.[33] In 1924 a contractor with horse and dray was employed for £6 10s 0d per week to fill the airfield's holes and depressions.[34] The problem increased in the wet season at the beginning of 1927. Andy Lauchland, the caretaker living on site reported:

> The 'drome is absolutely sodden and the water is lying all over the place, in spots there is a depth of as much as six inches. The weather has been so bad that the Courier Aircraft machine has been unable to leave for the last two mornings and there doesn't seem to be any prospect of a change for some time ... The rainfall up to this evening, so I am informed by the Weather Bureau, is 18.23 inches (46.3 cm).[35]

Lauchland's next report indicated possible danger for users of the aerodrome. Of the Courier aircraft he again noted, 'it took machine AUFB all it knew to stagger over the western boundary fence.'[36] When the rain ceased, more difficulties ensued. The ground needed time to be dry enough to allow Kenyon's stock to graze; however, as Lauchland reported, 'the grass here is growing like the dickens and the next thing that will be

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[31] David Webb, ed., *Perth Airport 1944–94: Fifty years of civil aviation* (Mascot, NSW: FAC, 1994), p. 3; Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW* (Canberra: Govt Printer, 1938), p. 7.
[32] *BC*, 21 August 1928, p. 13.
[33] H. C. (Horrie) Miller, *Early birds: Magnificent men of Australian aviation between the wars* (Adelaide: Rigby, 1968), p. 110. Flying in an underpowered Avro, Miller later claimed he sometimes had to fly for miles dodging trees before he could gain enough height to clear them.
[34] DW&R (Qld) to CCA, letter dated 12 June 1926, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).
[35] Andy Lauchland to CCA, memo dated 19 January 1927, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).
[36] Andy Lauchland to CCA, memo dated 7 February 1927, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).

taking place is that the people with machines here will be complaining about the grass cutting their [wooden] propellers about.'[37]

The damage which livestock caused to wet ground ceased when Kenyon's grazing rights were withdrawn permanently in February 1927. Complaints to the Controller about surface conditions continued, more so after the opening of the QANTAS Brisbane Flying School because flight instruction meant more take-offs and landings. The next wet season (1927–28) forced the Civil Aviation Branch to consider providing a tarmac area near the hangars and 500 feet (152 metres) of drainage, at a cost of £625.[38] Instead, expenditure of £250 was approved for enough gravel to be laid down to enable the aerodrome to be used during the following wet season (1928–29). Lauchland spent time rolling the sections most often used.

Though Civil Aviation Branch employees would not have used the term 'critical problem' in the sense established by Hughes—where one component slowed the system's momentum to the point where its cause needed to be identified and a solution found—their correspondence and actions show an awareness that something needed to be done or more damage and possibly loss of life would occur.

The search for a solution to Eagle Farm's growing critical problem commenced around March 1928. Preliminary and unsuccessful investigations were made into the cost of additional land nearby.[39] Soon after, contact was re-established with Elizabeth Beatty at Rocklea through her agent, Isles Love and Co.[40] Complaints about Eagle Farm continued throughout the summer months of 1928–29. Flights were postponed. Finally in August 1929 the Civil Aviation Branch invested in a larger, better-drained site where another omnidirectional aerodrome could be established.[41]

Had the Civil Aviation Branch favoured the evolving American model of aerodrome they might have developed a system of runways in the direction of prevailing winds. Though not a feature of the US Army guidelines of 1919, the construction of new runways at aerodromes began in Boston in 1923. Because the new airfield there was built on filled

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[37] Andy Lauchland to CCA, memo dated 7 February 1927, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).
[38] WD (Qld) to CCA, letters dated 17 April 1928 and 18 June 1928, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.). It has not been ascertained whether this did occur.
[39] DW&R (Qld) to CCA, memo dated 23 March 1928, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).
[40] Isles Love & Co to A. R. McComb, letter dated 6 March 1928, Isles Love & Co to DW&R (Qld), letter dated 15 March 1928, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).
[41] *CGG*, 26 September 1929, p. 2,010.

land, preparation of the entire field for omnidirectional operations was considered too expensive. Two cinder-surfaced landing strips, 1 500 feet (457 metres) by 200 feet (61 metres) and laid out in the shape of a letter T became the first model for all of today's runways.[42]

Hard surfaced runways did not appear in Europe until 1936, at Stockholm's Bromma Airport. By then most airline aircraft were fitted with brakes making redundant the necessity to land directly into wind. Runways of the ideal length of between 2 400 feet and 3 000 feet (732 and 912 metre) were not adopted on civil aerodromes in Australia until the 1930s because of what Edgar Johnston referred to as their 'prohibitive cost'.[43]

Eagle Farm remained Brisbane's aerodrome for two years after its problems were recognised as critical. During that time further damage to ANA(1) Avro Ten aircraft forced them to move their operations to Lytton during rainy periods.[44] After Archerfield was opened as Brisbane's airport, Eagle Farm reverted to a grassy paddock, one leased for grazing to Wilson Campbell & Co and used by local gliding clubs on the weekends.[45] By that time the Depression had altered dramatically the economics of running an air service.

As it improved in design and technology, the aircraft component of the air transport system forced a number of changes on the aerodrome system. This was clearly evident on some capital-city aerodromes. In Sydney an extensive search failed to discover any equally suitable area within a reasonable distance of the city so, along with the purchase of nearby land, drainage and improvements worth £6 540 were recommended in April 1930 for Mascot Aerodrome.[46] In Brisbane a smaller search uncovered a new site within an acceptable distance of the city, one which allowed the Queensland capital to keep pace with the aerodrome system until the Second World War. Though the technologically superior concept of runways was considered at this stage, its application was not yet effected on the grounds of expense. The relationship between technology and the financial restraint which the Commonwealth applied to civil aviation is here well exemplified.

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[42] Wood Lockhart, 'A pilot's perspective on airport design', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Art Institute of Chicago and Prestel-Verlag, 1996), p. 215.
[43] Parliamentary Standing Committee on Public Works, 'Mascot Aerodrome report', p. 890.
[44] *Week*, 31 January 1930, p. 32.
[45] Though some of the aerodrome land in 1922 was owned by David Wilson, in the 1930s dairying was conducted by a Wilson family group which included his son-in-law, whose surname was Campbell.
[46] Parliamentary Standing Committee on Public Works, 'Mascot Aerodrome report', p. 832.

Chapter 6

'Tenants may erect any size or type of hangar desired, provided that such building shall not be unduly unsightly or of such a construction as to be dangerous or obnoxious to other tenants.'[1]

As the Australian air transport system expanded during the 1920s, the country's aerodromes developed to meet the requirements of the key stakeholders—the air-service operators and the Civil Aviation Branch. With little money available to either, and a determination by Controller Brinsmead to have the system develop according to Civil Aviation Branch guidelines, Australian aerodromes generally evolved to meet current, rather than future needs. In design and in the manner of their buildings, Australian capital-city aerodromes even began to look the same.

In this pastoral period of aerodrome development, simplicity was the key. Architectural historian Wolfgang Voight traced the origin of aerodrome buildings to structures erected at air meetings held at Rheims (France) and Brescia (Italy) prior to the First World War. These were 'simple lightweight buildings erected on the periphery: wide viewing stands, along with hangars placed some distance away, in unpretentious order and without a precise plan.'[2] Only later would consideration be given to placing buildings so that they were not a height obstruction for what were the most commonly used approach and takeoff zones.

American historian Reyner Banham concluded that the 'rule of thumb logic of immediate expediency' dictated where the hangar and the fuel pump, the two permanent structures on an airfield, would be placed.[3] He saw the way they were usually placed together on one side of the airfield as being similar to the design of a marina, alluding to it therefore as a 'yacht-basin approach'. Buildings on Australian aerodromes of the 1920s were generally set out in such a fashion. Hangars and other auxiliary structures were grouped together in one part of the aerodrome, often spaced out along a single line which ran parallel to an external road.

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[1] CCA Brinsmead to Jack Treacy, letter dated 20 February 1924, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).
[2] Wolfgang Voight, 'From the hippodrome to the aerodrome, from the air station to the terminal: European airports 1909–45', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: Art Institute of Chicago and Prestel-Vertag, 1996), p. 28.
[3] Reyner Banham, 'The obsolescent airport', *Architectural Review*, 132 (1962), p. 252.

In the 1920s only the Commonwealth, those companies it subsidised and a very few well-financed companies or individuals could afford to build on aerodromes. Sydney's Mascot Aerodrome evolved from land initially leased near Botany Bay by Nigel Love and Harold Broadsmith of the AA & E Co. Not being able to afford expensive structures and only leasing the land, their aircraft were housed at first in canvas hangars.[4] The first permanent hangar on Mascot, a Government hangar of similar design to those erected at Essendon and Eagle Farm, was not constructed until after the Commonwealth purchased the land for the stated purpose of an aerodrome in 1922.

Aircraft owners needed hangars to protect their frail aircraft from damage by extreme weather, vandals and animals. These provided storage spaces for spares and shaded areas in which to repair aircraft. Hangars also reduced aircraft depreciation due to exposure to the elements. An office with facilities could be built in a lean-to on the side of a hangar, though as Banham noted, the two needed to be kept separate due to the 'noise, bad language, pools of oil, smells and dangerous equipment' associated with the workshop.[5] Pilot Horrie Miller's expressed satisfaction is understandable after he had constructed a hangar for his DH9 at Adelaide in 1927, 'instead of leaving it to the mercy of rain and wind, vandals, and particularly of wandering stock.'[6]

While Northern Hemisphere winter weather made housing early fabric and timber aircraft a virtual necessity, in Australia strong wind, either from thermal convection (willy-willies) or storm, was a greater, less-able-to-be-predicted danger than ice and snow. Hudson Fysh issued standing instructions to QANTAS pilots of the 1920s:

> A set of tying-down gear should always be carried in the machine. You should not leave the machine even for five minutes without first having securely pegged down. In gusty weather, pegs should be driven immediately you stop your engine.[7]

Even possessed of his Adelaide hangar, Miller's aircraft became a casualty of Australia's weather. After he was forced to land near Port Pirie (SA) because of an approaching dust storm he was faced with a dire situation:

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[4] The AA & E Co. erected two canvas-on-rigid-frame structures for protecting their aircraft. The first was made by Smith, Copeland and Co. The second, a Richards Patent Hangar which housed four aircraft, served its purpose until blown away in the early 1920s.
[5] Banham, 'The obsolescent airport', p. 252.
[6] H. C. (Horrie) Miller, *Early birds: Magnificent men of Australian aviation between the wars* (Adelaide: Rigby, 1968), p. 123.
[7] *Aircraft*, January 1928, p. 358.

> Before I could tether the machine it was caught in the gale and hurled across the ground. When the storm subsided I found that wings and propeller had been damaged beyond repair and I was forced to suspend my service while I ordered new parts and put the machine together once more.[8]

Aircraft needed to be protected in capital cities and in regional areas. Cootamundra, NSW, developed as an inland, regional aerodrome in the 1920s after the Australian Aerial Services (formerly Australian Aerial Mail Services Ltd) constructed a large hangar there in 1926 when operating the Adelaide-to-Sydney subsidised route. The hangar was built on land leased by Australian Aerial Services on the Government-owned aerodrome, formerly a 75 acre (30 ha) area of land known as Quinlan's paddock.[9]

At regular intervals following the establishment of Eagle Farm Aerodrome in 1922, the Civil Aviation Branch received requests for the erection of a Government hangar. Authority to proceed with its construction was not given until October 1923. The Commonwealth body responsible for this, the Department of Works and Railways in Brisbane, estimated the hangar would cost £2 820. Concrete flooring would cost an extra £200. Tenders with a closing date of 18 July 1924 were called.[10]

Supply of the steelwork, amounting to £300, was awarded to Edward Campbell and Sons of Carlton, Victoria. The contract for the erection of the hangar, along with one for the erection of the caretaker's cottage advertised at the same time, was awarded to G. F. Carlson of the nearby Brisbane suburb of Clayfield. The estimated cost of erection of the hangar was £1 909. Building the weatherboard cottage was estimated at £786. Both structures were expected to be completed towards the end of 1924.[11]

The caretaker's cottage was not completed until around April 1925, at which time it was occupied by Andy Lauchland and his family. This delay of nearly six months can be attributed to the contractor, G. F. Carlson, becoming bankrupt during the construction period. As a result of the termination of both contracts, Department of Works and Railways completed the work.[12] By mid-1925, with the Government hangar also completed, aircraft belonging to owners willing to pay the hangarage fees could be

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[8] Miller, *Early birds*, p. 125.
[9] Ben Dannecker, *Cootamundra aerodrome* (Essendon, Vic.: B. Dannecker, 1976), p. 810.
[10] *CGG*, 10 April 1924, p. 985; *CGG*, 3 July 1924, p. 1,419; Jack Treacy to CCA, letters dated 15 October 1923 and 8 January 1924, Sec. Dept of Works & Railways to CCA, memo dated 15 October 1923, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).
[11] *CGG*, 7 August 1924, p. 1,642; *CGG*, 14 August 1924, p. 1,657.
[12] DWR (J. Orwin) to CCA, letter dated 26 March 1925, Eagle Farm Aerodrome – Caretaker's residence, 7/16/349, A705/0, NAA (Vic.).

protected against the vagaries of weather, vandalism and the stock belonging to grazing-lease holder Charles Kenyon.[13]

From early in 1924, Jack Treacy was interested in leasing an aerodrome allotment on which to construct 'the smallest type of hangar permissible on the aerodrome.'[14] At any given time during the 1920s, only three surveyed lots were available for lease. The ground rental for each lot was £10 per annum. The ever-optimistic Treacy interested Brisbane three-ply manufacturer J. M. Williams in funding the construction of a hangar on one of the lots. Though plans were prepared and submitted by a Rockhampton architect, Williams seems to have lost interest soon after. All correspondence to the Civil Aviation Branch on the matter stopped after March 1924.[15]

That steel was chosen as the construction material for the Government hangar indicated a high level of commitment to the permanence of the structure and the site. According to Archibald Black, a leading contemporary aerodrome engineer, hangar construction could be divided into five classes. Arranged in the order of cost these were tent, canvas on rigid frame usually of wood, all-wood, all-steel, and the factory type of brick or other walls with steel sash and timber or other roofing. The all-steel and factory types were preferred because they had the advantages of longer life, better appearance and lower fire risk.[16] The preference in Australia was for an all-steel frame clad with galvanised corrugated iron. Steel was comparatively inexpensive and certainly less attractive to termites than an all-wood structure.

The 1924 Eagle Farm Government hangar and the hangar constructed by QANTAS in 1927 were of the all-steel variety. The converted cowshed occupied by Horrie Miller when he worked for Ascot Aerial Services in the mid-1920s did not meet Civil Aviation Branch building requirements. Being outside the aerodrome boundary it did not have to. Movement of Ascot Aerial Services' aircraft and joy flight passengers was conducted through a removed section of aerodrome fencing, a situation which caused aggravation at times to grazing-lease holder Kenyon.[17]

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[13] Kenyon reported having to construct a temporary fence around one of Jack Treacy's aircraft before the Government hangar was completed.

[14] Jack Treacy to CCA, letter dated 6 February 1924, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).

[15] CCA to Jack Treacy, letter dated 20 February 1924, Geo B. Hutton to CCA, letter dated 20 March 1924, Sketch of aeroplane hangar for Capt. Treacy prepared by Roy Chipps, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).

[16] Archibald Black, *Civil airports and airways* (New York: Simmons-Boardman Publishing Co., 1929), p. 76.

QANTAS concluded early in 1927 that construction of their own hangar would be better than placing their aircraft in the Government one, where at least three aeroplanes were more or less permanently housed and a 'good deal of activity' was already going on.[18] The company obtained a quotation from Stewarts and Lloyds (Australia) Ltd, the firm which had supplied and erected their hangar at Charleville. Eventually QANTAS agreed to their quotation of £1 505 for a 60 feet (18.2 metres) by 72 feet (22 metres) hangar with a 15 feet (4.5 metres) lean-to which ran the length of the southern side of the hangar.[19] The doors on the air-side (the side which faced the landing area), like those of the Government hangar, were what Archibald Black described as the straight (side) rolling or sliding type.[20]

The Civil Aviation Branch accepted that the QANTAS Eagle Farm hangar would be structurally sound largely on the basis that it was a product of the reputable Stewarts and Lloyds company.[21] For the lease of the site, the second lot on the aerodrome to be taken up, QANTAS paid an annual rental of £10 on a three-year contract. The allotment was re-pegged to allow for more space between the buildings because QANTAS Brisbane manager (and pilot) Lester Brain was concerned about the spread of fire between hangars situated too close together.[22]

Utility services were provided at Eagle Farm gradually. Electric power was not connected to the Government hangar and the caretaker's cottage until August 1926, over a year after construction was completed. This service was supplied initially by the Hamilton Council.[23] Electric power was connected to the QANTAS hangar some time after June 1927. From March 1930 a temporary hangar constructed by Queensland Air Navigation also was supplied with power.[24]

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[17] Sec. Dept of Home and Territories to Sec. DOD, memo dated 11 September 1924, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).
[18] Hudson Fysh to CCA, letter dated 8 January 1927, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).
[19] Stewarts & Lloyds to Hudson Fysh, letter dated 17 February 1927, Stewarts & Lloyds hangars 1929–30, K21809, ML.
[20] Black, *Civil airports and airways*, pp. 80-1.
[21] Edgar Johnston to CCA, minute paper dated 13 May 1927, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).
[22] Plan of hangar allotments at Brisbane Aerodrome, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).
[23] Andy Lauchland to CCA, memo dated 6 September 1926, DWR (Melbourne) to Dir. of Works, Dept. of Defence, memo dated 5 June 1923, Electricity supply – Eagle Farm Aerodrome, 7/16/452, A705/0, NAA (Vic.).
[24] Sec. Works & Railways, Melbourne to Sec. DOD, memo dated 22 June 1927, CCA to NAVAIR Brisbane, telegram dated 6 March 1930, Electricity supply – Eagle Farm Aerodrome, 7/16/452, A705/0, NAA (Vic.).

Having a guaranteed supply of water was of great concern to those who worked or lived on Eagle Farm Aerodrome, especially against the risk of fire. The rainfall catchment into tanks was deemed insufficient for fire-fighting purposes. Halfway through 1926, a year when Brisbane received only 60% of its average rainfall (See Table 1), Andy Lauchland had to make arrangements to have water delivered. It was the fourth time since moving into the cottage that he had done so, even though 1925 had been a year of above-average rainfall.[25] A contract for £316 for two mains and two pillar hydrants was let to Sheridans Ltd of Newstead in October 1926. Fortunately no fires occurred in the interval to test the aerodrome's fire-fighting resources.

Sanitation for aerodrome users was provided by two dual earth closets between the caretaker's fence and the Government hangar.[26] These facilities must surely have been tested on days when thousands arrived at the aerodrome to watch aerial pageants.

Even though the Government hangar was available, a number of local aircraft owners wished to construct small, private hangars to protect their aircraft. Wyndham Pike, of the Brisbane clothing retailer Pike Brothers, applied to do so late in 1928. A year later Jules Moxon of Moxon Motors applied for a lease of land on which to build a light, temporary structure to house his Moth.[27] Pike was advised to house his Moth in the Government hangar at 7s 6d per week, even though it was already crowded with aircraft. Moxon was advised that ample hangarage would be available at the new aerodrome at Archerfield—even though this would not be available for at least a year.[28]

That more hangars were not constructed on Eagle Farm was largely due to its increasing unsuitability for heavier air traffic. In October 1928, QANTAS was in the process of obtaining a quote from Stewarts and Lloyds for a second, larger Eagle Farm hangar when first indications of a proposed move to the Rocklea (Archerfield) site were made public.[29] Kingsford Smith and Ulm's ANA(1) had begun preliminary negotiations to erect a £3 000 Comet steel hangar with an air-side opening of 75 feet (22.8 metres) on

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[25] CCA to Sec. DOD, minute paper dated 15 December 1925, Andy Lauchland to CCA, letter dated 26 July 1926, Eagle Farm Aerodrome – Water and water for fire services, 7/16/776, A705/0, NAA (Vic.).
[26] WD (Qld) to CCA, memo 26/960 dated 28 October 1926, One chain to one inch plan circa May 1927, Eagle Farm Aerodrome – Water and water for fire services, 7/16/776, A705/0, NAA (Vic.).
[27] Wyndham Pike to Sec. Air Council, letter dated 21 December 1928, Wyndham Pike to CCA, letter dated 4 February 1929, Jules Moxon to CCA, letter dated 18 October 1929, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.).
[28] Acting CCA to Wyndham Pike, letter dated 14 January 1929, CCA to Sec. Moxon Motors, letter dated 28 October 1929, Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.). A 1929 aerial photograph of Mascot shows three commercial hangars, two Government hangars, two aero club hangars and at least four private hangars either constructed or under construction.

Eagle Farm when indications of the move became public knowledge. Heavily committed as well to the construction of their Mascot hangar, ANA(1) chose to amend their Eagle Farm presence to a small office which could be moved across to Archerfield in 1931 after the company had established itself there.[30]

Also inconvenienced by the changeover between aerodromes was Jack Treacy's Queensland Air Navigation (QAN), which began a twice-weekly coastal Queensland service to Townsville in March 1930. From October 1929, QAN had been attempting to gain Civil Aviation Branch approval of plans for a hangar in which their primary maintenance could be conducted.[31] Eventually the company erected a temporary covering for the wings and main portions of their Avro Ten and Avro Five aircraft so that they could at least be worked on under cover.[32]

The Queensland Section of the Australian Aero Club was still corresponding with the Civil Aviation Branch about design proposals for their clubhouse when rumours about relocation to Archerfield first circulated.[33] Though they objected initially to the move, the club eventually agreed to a semicircular allotment on the northern boundary of the new aerodrome as the site for their first club house.[34]

The 1920s was a formative period in the development of the air transport system. For Eagle Farm Aerodrome, the problems consequent to its initial siting in a water-logged area made operations more difficult for the major companies then using the aerodrome—ANA(1), Aircrafts Pty Ltd (APL), QAN and QANTAS. The last two years of the early history of Eagle Farm Aerodrome were marked by developmental stalemate. Companies which wanted to invest in buildings were forced to wait as the new site at

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[29] Stewarts & Lloyds to QANTAS, letter dated 27 October 1928, Stewarts & Lloyds hangars 1929–30, K21809, ML; DW&R to CCA, memo dated 5 November 1928, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).

[30] C. T. P. Ulm to CCA, letter dated 9 January 1931, Drawing of National Airways office, no date, Atlantic Union Petrol Installation – Archerfield Aerodrome, 7/16/700, A705/0, NAA (Vic.); Specifications of an aeroplane hangar at Brisbane for ANA Ltd (4 pages), Eagle Farm Aerodrome – Lease of hangar allotments, 7/16/420, A705/0, NAA (Vic.); Jennifer Gall, *From bullocks to Boeings: An illustrated history of Sydney Airport* (Canberra: AGPS, 1986), p. 23; Parliamentary Standing Committee on Public Works, 'Report together with minutes of evidence and plan relating to the proposed development of the civil aerodrome at Mascot, NSW', *CPP*, 3 (1929–30–31), p. 880.

[31] QAN to CCA, letters dated 7 October 1929, 8 November 1929, 16 December 1929, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).

[32] *BC*, 2 April 1931, p. 15; Photograph of QAN hangar, Hopton Collection; QAN to CCA, letter dated 29 January 1930, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).

[33] WD (Qld) to CCA, memo dated 21 November 1927, Australian Aero Club (Qld) to CCA, letters dated 3 April 1928 and 26 November 1928, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).

Rocklea was cleared and prepared. Decisions had to be made as to how Eagle Farm's two main hangars would be relocated and who would pay the costs. Though not typical of all aerodromes in the system, the early history of Eagle Farm Aerodrome provides insight into the Civil Aviation Branch's necessity to restrict aerodrome system development to a pace the nation could afford, even if such was to the detriment of air-service operators. The wisest kept open as many options as possible.

[34] Minutes of meeting held 23 January 1929, General Meeting Minutes Book, Royal Queensland Aero Club; Australian Aero Club (Qld) to CCA, letter dated 14 December 1928, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).

Chapter 7

'We had a good picking from Kingsford Smith's arrival and things have been active since.'[1]

Rural landing grounds of the 1920s started, and often concluded as lonely paddocks visited periodically by 'rag and wire' aircraft. By contrast, Australian capital-city aerodromes expanded throughout the 1920s from isolated clusters of galvanised iron hangars inhabited by only a few permanent employees to busy gathering places for crowds of enthusiastic people. This was especially so at weekends. As air-service operations settled into regular, scheduled arrivals and departures, increased community interest in the new form of transport became apparent. The vital interaction involving people in this distinctly modern technology was perhaps the most dramatic change of the period, and the least since analysed.

In a 1998 article on the role of technology transfer in Australian aviation, Harry Irwin reached a similar conclusion. Studying the topic from the discipline of communication, Irwin noted that the transfer of aeronautical technology was highly influenced by key, confident, risk-taking individuals such as Ross and Keith Smith, Charles Kingsford Smith and Charles Ulm. Though they were influential, these individuals were not the complete picture, a point Irwin readily acknowledged. He concluded the shortage of evidence available for analysis was due to the industry itself being 'largely informal, unorganised, unplanned and random, so that records are sparse and discontinuous.'[2]

Irwin would have found considerable evidence had he looked more closely at the day-to-day interaction between pilot and engineer, as well as company and customer on the nation's aerodromes. At Eagle Farm and other well-visited aerodromes during the 1920s the development of the air transport system can be read in the activities of those who worked on or flew from the aerodrome, and by the numbers who visited the aerodrome for a joy flight or just to look around.

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[1] Lester Brain to Hudson Fysh, letter dated 21 May 1928, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.

[2] Harry Irwin, 'Showmen, stars, larrikins, and pioneers: Communication and innovation in Australian aviation and aerospace development 1900–70', *Australian Journal of Communication*, 25 (1998), p. 27.

At the conclusion of the First World War, up to 600 trained pilots and an unknown number of technicians, generally referred to as ground engineers, left the services.[3] The *Air Navigation Act (1920)* established the need for both pilots and engineers to be licensed. During these years the Australian system of aviation licensing was identical to the British system. Pilots could be licensed A (private) or B (commercial). Ground engineers could hold any combination of A, B, C and D licences. An A licence was for inspection of aircraft (airframe) undergoing complete overhaul; a B licence was for aircraft engines undergoing complete overhaul. With a C licence an engineer could inspect aircraft (airframe) before flight. Installation and inspection of aircraft engines before flight was allowed with a D licence.[4] To work on an airfield in a professional capacity, a licence of some variety was necessary.

Although pilots had a greater profile, more evidence of the transfer of technology is present in the actions of ground engineers. Some designed and manufactured new aircraft. Others solved the mechanical difficulties which arose when components of established designs failed. Most absorbed the intricacies of new designs as these were introduced, learning with experience. The chief engineer played a pivotal role in any successful air-service operation. Towards the end of the1920s, apprenticeship schemes helped transfer the accumulated knowledge of aeronautical technology to a new generation.

In 1924 there were ninety-four licensed ground engineers in Australia.[5] These few generally appreciated the advice offered by the experienced engineers employed by the Civil Aviation Branch. One notable early Civil Aviation Branch engineer was Robert H. (Jock) Buchanan, a Scot who had enlisted in the AIF in 1916 when working as a fitter and turner on the railways at Charleville (Qld). He joined the Civil Aviation Branch as its first inspector of aircraft on a salary of £450 per annum in 1922. [6]

Most ground engineers, though, had a fixed base. Mascot Aerodrome was established by AA & E Co. in 1919. One of the company's principals was the experienced engineer Harry Broadsmith. The AA & E Co. began manufacturing aircraft of their own design in a Mascot factory which employed twenty-five men. Unusual for the time, the designs used Australian timbers which Broadsmith had selected personally. After the company

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[3] A flight engineer's licence for engineers who were part of the aircrew was introduced in 1948. Prior to that no differentiation was made between the ground and flight engineering roles. Prior to 1948 an engineer might be necessary on a long flight and would travel accordingly.

[4] An X class of licence also was available to engineers in the 1930s. This class encompassed welding (aircraft), radio, electrics and instrumentation.

[5] Norman Ellison, *Flying Matilda: Early days in Australian aviation* (Sydney: Angus & Robertson, 1957), p. 61. By comparison, Arthur Butler in *Flying Start* recorded a total of ninety-five.

failed, Broadsmith returned to working with the Avro company in England.[7] According to journalist Norman Ellison, Broadsmith's belief that an Australian aircraft manufacturing industry was possible was always going to be beaten by the Australian Government's stronger belief that 'the British industry could supply all of Australia's prospective requirements for aircraft.'[8]

Where Australian aircraft manufacture was successful in the 1920s was in the construction, under licence, of British-designed aircraft. Arguably the best-documented success occurred on the aerodrome at Longreach (Qld) and would not have been possible without the technical expertise of QANTAS chief engineer, Arthur Baird. Leaving the military in June 1919, Baird joined QANTAS when it was founded in 1920.[9] In 1927, he was one of only eight ground engineers in Australia with A, B, C and D engineering licences. At the time there were only 137 in the country who held any kind of engineering licence.[10]

By 1924, chief engineer Baird had built up a skilled staff of aircraft specialists in Longreach. The QANTAS board decided the company would commence construction from blueprints of four-passenger DH50 cabin biplanes which could then be used on its air-service routes. Between 1926 and 1929, seven DH50s and one DH9 aircraft were constructed under licence by QANTAS at Longreach.

Also owned and maintained by the company at various times during this period were seventeen DH60 two-seat training biplanes.[11] Introduced in 1926, this light, reliable and forgiving aircraft made flying training accessible to almost anyone. Without it, expansion of the aero club movement would not have been possible. The impact the DH60 and the aero clubs had can be seen in pilot licence figures. In 1927 there were eighty-nine private pilots and sixty-seven commercial pilots in Australia. By 1930 the number of private pilots (A licence) had more than quadrupled to 331. The number of commercial pilots (B licence) had more than trebled to 190.[12]

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[6] Ellison, *Flying Matilda*, pp. 57-64; Hudson Fysh, *Qantas rising* (Adelaide: Rigby, 1965), pp. 186-7.
[7] Before his death in 1959, Harry Broadsmith returned to Australia on five occasions.
[8] Ellison, *Flying Matilda*, p. 35.
[9] Bruce Leonard, *A tradition of integrity: The story of QANTAS engineering and maintenance* (Sydney: UNSW Press, 1994), pp. 3-4.
[10] *Aircraft*, 30 June 1927, p. 136. Charles Kingsford Smith held C and D engineering licences. Frank Roberts held A and C engineering licences. Horrie Miller held A, B, C and D engineering licences.
[11] Fysh, *Qantas rising*, p. 281.
[12] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 178.

With more pilots came the need for more ground engineers. In July 1927 the QANTAS apprenticeship scheme commenced with the employment of Longreach boy Jack Avery. The company's third apprentice, Eric Kydd, commenced his apprenticeship at Eagle Farm in August 1929.[13] By 1930, the number of licensed ground engineers in Australia had increased to 232.[14]

Engineers and pilots were only a portion of the social fabric of an aerodrome in the 1920s. On Eagle Farm the interaction and communication between people who went there to work and those who arrived for a joy ride or just look around provides evidence of how the air transport system was developing a steady momentum. (See Figure 2.) Early in the decade, Eagle Farm Aerodrome was a quiet place, grazed upon during most days by Charles Kenyon's stock. Engineer and pilot Horrie Miller was based there temporarily while working for Ascot Aerial Services. Pilot Jack Treacy kept a plane there at times. To prevent stock damaging the machine, Kenyon built a protective fence around it.[15]

Visiting aircraft came and went. A contingent of five RAAF and three civil aircraft made it their base during Brisbane centenary celebrations in 1924.[16] The construction of the Government hangar and the caretaker's cottage gave the aerodrome a greater permanence. Confidence aplenty was expressed by Mayor W. A. Jolly in September 1926 when he launched the new venture by the Brisbane Aircraft Company at a 'large and representative gathering' at Eagle Farm. Owned by the plywood manufacturing company, D. G. Brims and Sons, and flown by Ron Adair, the *City of Brisbane* DH9 aircraft, the mayor announced that day, would 'go down as far south as Sydney, or as far north as one pleased.'[17]

Brisbane Aircraft Company operated only a few months before mounting costs caused the parent company to reconsider their involvement in aviation. From late 1926 their place was taken by a new venture, Courier Aircrafts Ltd, operated by chief pilot and managing director Ron Adair, with ground engineer George Boehm.[18] Loaded with

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[13] Leonard, *A tradition of integrity*, pp. 16-19.
[14] Butler, *Flying start*, p. 178.
[15] *CGG*, 1 February 1923, p. 182; *CGG*, 29 May 1924, p. 1,179.
[16] Charles Kenyon to CSG, letter dated 26 July 1924, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.).
[17] *BC*, 16 September 1926, p. 7.
[18] Memorandum & Articles of Association, 23 December 1926, Courier Aircrafts Pty Ltd, Register of Companies Office, Brisbane, A/33728, QSA. Knight, editor of the *Brisbane Courier*, was also chairman of directors of Courier Aircrafts Ltd.

newspapers and one or two passengers, Courier Aircrafts Ltd planes departed every day except Sunday for Toowoomba at 4:45 a.m., returning at 7:45 a.m.[19]

To counter the adverse effects of an accident in February 1927 in which a Courier Aircrafts Ltd passenger was killed, the *Brisbane Courier* throughout March 1927 heavily promoted the new aerial service. Photographs or stories about the company appeared in the newspaper every three or four days. Just over twenty passengers per week travelled to or from Toowoomba on the service during that particular month.[20] F. H. C. Sanders, manager of T and G Mutual Life Society in Brisbane, described his journey as having no more danger than a comparable trip in a motor car. For the doubters he added:

> As far as the element of danger is concerned, there is danger in everything that is worth having, and if people are not prepared to take a risk they cannot expect to achieve or experience anything beyond a humdrum experience.[21]

Figure 2: Spectators outside the QANTAS hangar at Eagle Farm, late 1920s
Source: Gus Grulke Collection via Richard Hitchins

[19] Andy Lauchland to CCA, memo dated 17 January 1927, Eagle Farm Aerodrome – Grazing rights, 7/16/534, A705/0, NAA (Vic.). The Courier DH9C registered G–AUFB had a small cabin behind the pilot's seat.
[20] *BC*, 12 March 1927, p. 16; *BC*, 19 March 1927, p. 16; *BC*, 26 March 1927, p. 18.
[21] *BC*, 12 March 1927, p. 17.

The pace of aerodrome activity quickened late in March 1927 when QANTAS came to Eagle Farm. Their Brisbane operations were in the hands of pilot Lester Brain and ground engineer T. R. (Tom) Young. At the opening celebrations aircraft belonging to both QANTAS and Courier Aircrafts Ltd went through 'all the evolutions of which the modern aeroplane is capable.'[22] Mayor Jolly shared his vision of a future where aeroplanes would be so perfected 'that it would be possible for citizens to house them in their back yards.'[23] Aldermen then would not have to worry about smoothing the air as they did the roads.

Though it trained pilots and conducted air-taxi operations, QANTAS also conducted joy flights in competition with Adair and Treacy. Hudson Fysh's son John recalled:

> Every weekend my father used to take me up to the airport, first at Eagle Farm and then later at Archerfield ... There were joy flights going on; even I was out in the car park trying to sell tickets.[24]

Competition for joy-flight passengers at Eagle Farm was perhaps not as fierce as at Sydney's Mascot aerodrome in the public enclosure known as the 'bull pen':

> A possible meal ticket was instantly surrounded, each seller loudly extolling the merits of the different aircraft and services available. Such virtues as their visibility or safety were the main features of such spiels.[25]

With financial survival at stake, rivalry was inevitable. In private correspondence with Hudson Fysh, then still in Longreach, Brisbane manager Lester Brain kept his managing director up-to-date on the activities of Ron Adair, Jack Treacy and, when they commenced operations into Eagle Farm from Sydney in 1930, the pilots of Kingsford Smith and Ulm's ANA(1). In an April 1928 letter he was particularly informative:

> I have heard since that he [Adair] had got about 60% of his capital in. It is a very easy matter to float any sort of aviation company in Brisbane at the present time, when the average mind is apt to get enthusiastic and run wild over the feats of Hinkler, Lancaster and others. Treacy also is floating another company and has got a certain amount of capital in... It is regrettable that such unreliable men as

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[22] *BC*, 28 March 1927, p. 16.
[23] *BC*, 28 March 1927, p. 16.
[24] Bill Bunbury, *Rags, sticks and wire: Australians taking to the air* (Sydney: ABC Books, 1993), p. 29.
[25] Doug Fawcett, *Pilots and propellers: A lifetime in aviation* (Bathurst, NSW: Crawford House Publishing, 1997), p. 68.

> these should be snatching the money available for investment in aviation projects at the present time.[26]

Due to a legal technicality in the involvement of the Brisbane Newspaper Company in Courier Aircrafts Ltd, the latter company ceased operations half way through 1927. The company which Brain reported being floated by Ron Adair was Aircrafts Pty Ltd (APL), registered on 5 August 1927 and destined to service the former Courier routes.[27] The company Jack Treacy was floating at the time was Queensland Air Navigation. In an unsubsidised operation, Treacy planned to pioneer the Brisbane-to-Townsville coastal route as soon as the necessary locally owned aerodromes at Maryborough, Rockhampton and Townsville were constructed and licensed.[28]

Aviation at either a national or local level had the informal nature referred to by Harry Irwin because so few were involved in the industry. Even if they had not served together during the First World War, the men concerned met later in what was a very mobile transport industry. Amongst those who were regulars on Eagle Farm during the 1920s the military connection is evident. Hudson Fysh, Arthur Baird and Ron Adair had all been in No. 1 Squadron AFC. Jack Treacy had flown in the AFC as well as for the AA & E Co. Former AA & E Co. pilot Frank Roberts, whose advice had been influential in the choice of the Eagle Farm site, had flown in No. 2 Squadron AFC. So too had Horrie Miller. Local pilot and retail executive Wyndham Pike had flown with the RFC. Courier Aircrafts Ltd pilot and instructor Charles Matheson, who taught Mrs Harry (Lores) Bonney to fly in the late 1920s, had served with No. 3 Squadron. Superintendent of aerodromes Edgar Johnston, a regular visitor concerned with the progress of Eagle Farm, had trained through the RFC. Local aerodrome inspector Roley McComb had been an RFC flight instructor. Even QANTAS' Lester Brain, who trained in 1924, had done so through the RAAF.

The man who knew most of them, and what they were attempting in aviation, was Edward J. Hart. From 1918 Hart co-published *Sea, Land and Air*, a periodical backed by Amalgamated Wireless (Australasia) Ltd. In March 1921 he purchased the Sydney publication, *Aircraft*, the first issue of which had appeared on 1 July 1919. Except for a ten-month hiatus in publication in 1924, Hart provided *Aircraft* readers with up-to-date

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[26] Lester Brain to Hudson Fysh, letter dated 19 April 1928, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.

[27] John Wilson, 'A brief history of Queensland Airlines Pty Ltd', *AHSA Aviation Heritage*, 30 (1999), p. 18; Memorandum & Articles of Association, 23 December 1926, Courier Aircrafts Pty Ltd, Register of Companies Office, Brisbane, A/33728, QSA.

[28] Memorandum & Articles of Association, 2 April 1928, Return of capital and shares, 25 September 1929, QAN, Register of Companies Office, Brisbane, A/33774, QSA.

information on the activities of Australian aviators and engineers until 1930, when he sold his publishing interests and returned to England.[29]

The initial issues of *Aircraft* usually contained reports on the activities of each of the State branches of the Australian Aero Club. These emerged after the First World War when former military pilots formed clubs which would own aircraft in which members could train or retrain. Initially committees had a strong military orientation. Until 1927 women were not accepted as flying members.

In Queensland, the genesis of the aero club movement had been a 1910 gathering of aircraft builders and enthusiasts under the name Queensland Aero Club.[30] A new club, comprising some of the members of the old, re-formed at an inaugural dinner held on 5 November 1919 at the Brisbane Club.[31] John J. Knight of the *Brisbane Courier* was elected provisional chairman. Though it lacked access to flyable aircraft, the new Queensland section of the AAC (AAC Qld) held together until the start of the QANTAS Brisbane Flying School. From March 1927 to 11 May 1929 QANTAS trained fifteen pilots. Some were aero club members. From then until the AAC Qld employed W. E. Gardner as its first instructor in 1930, QANTAS provided maintenance and instruction at fixed rates under contract to the AAC Qld.[32] Because of the aerodrome activities they helped organise, aero clubs provided a strong link between those who worked in aviation and the general public.

Though he did not attend the event, Hart described the 26 March 1927 opening of the Brisbane Flying School as being 'in the presence of a large number of enthusiastic visitors and under the happiest of auspices.'[33] Arriving late because the weather had forced him to travel by train, Hart still provided the aviation community with news of the Brisbane Aerial Pageant the following November:

> With ten minutes in hand I made a quick change and was rushed round to the National in time for a pre-prandial cocktail. Among the hundred diners were many faces long familiar in Australia's little flying community: Lukis, Treacy, Harman, George Mills, Brain, Maugham and other old stagers.[34]

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[29] *Aircraft*, 31 March 1924, pp. 321-2.
[30] Edward P. Wixted, *Queensland aviation: From the ground up 1910–12* (Brisbane: W. R. Smith and Paterson, 1972), pp. 11-20.
[31] Minutes of meeting held 5 November 1919, General Meeting Minutes Book, Royal Queensland Aero Club.
[32] History and Progress of the Company, 28 November 1930, Qantas Ltd – Queensland Aero Club, Flying schools, K21809, ML.
[33] *Aircraft*, 30 April 1937, p. 14.
[34] *Aircraft*, October–December 1927, p. 294.

Hart was less happy with missing the first two program items at the next Eagle Farm pageant, held on 25 August 1928. As well as being critical of the aerodrome's poor surface drainage, he explained at length to a national readership what the pageant had revealed about the approaches to the aerodrome:

> The main entrance to the 'drome is approached through a bottle-neck into which big streams of motor traffic from Hamilton Road, Eagle Farm Road and several other important thoroughfares empty themselves against the gates of a level crossing, which lies within the bottle-neck... On the day of the pageant several thousands of aviation enthusiasts were conveyed to this station [Eagle Farm] by special trains. Motor traffic was held up at the crossing for fifteen to twenty minutes at a time, while railway passengers filed out into a narrow lane. Whenever the gates were reopened the scene was a pandemonium of hundreds of impatient, honking motorists and thousands of terrified pedestrians, all pressing toward the modest gateway which marks the entrance to the aerodrome proper.[35]

Nonetheless, with fourteen competitors in the derby and some 15 000 interested spectators 'including a large proportion of what social editresses describe as "Brisbane's Two Hundred,"'[36] the day was considered a success.

Despite its surface and drainage shortcomings, Eagle Farm Aerodrome, like most Australian capital-city aerodromes of the 1920s, was a place where the business of aviation was conducted enthusiastically and where public curiosity about the new technology could be satisfied. The arrival of the high profile risk-takers, such as Kingsford Smith and Ulm on their 1928 trans-Pacific flight, certainly brought aviation interest to the fore. It was the persistent day-to-day aerodrome activity however, reported on periodically between such high-profile events, which formed the basis of the development of the Australian air transport system.

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The period between 1920 and 1930 was a formative period in the development of the Australian air transport system. In 1920 the legislative authority to regulate this new

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[35] *Aircraft*, 31 August 1928, pp. 47-8.

industry was passed by the Commonwealth. The Civil Aviation Branch of the Department of Defence was formed to administer the legislation. This body, headed by Controller Horace Brinsmead, established the physical and regulatory infrastructure which guided the industry in its early growth.

With as full a view as possible of what was happening overseas, especially in Britain, Brinsmead steered the members of the Civil Aviation Branch towards making the industry as safe as it could be. Allocation of one of the subsidies he controlled was no guarantee of economic success, but it did allow the air-service operator to purchase the best planes available and maintain them in purpose-built hangars on aerodromes owned by the Commonwealth.

By its regulatory actions, this administration invented the Australian air transport system. Through its construction of some, and licensing of all suitable aerodromes in specific locations, the Civil Aviation Branch forced order on the sites so that they became the aerodrome system. The Branch could not develop air transport and aerodrome systems alone, requiring a symbiotic relationship with commercial operators to pioneer the key routes between centres of population. Often the relationship was an uneasy one. Without the right combination of conditions—safe and reliable air technology patronised by an affluent, airminded public—the air transport system would not hold together, unless it was provided with continued Government assistance.

An efficient political and administrative framework was the necessary strong basis needed before Australian air transport could increase the public's confidence in flying. Passenger numbers would increase only when faith in air travel rested on the steady, daily timetable of air-service operations conducted without accidents or incidents. Air-service operators needed reliable engines and structurally sound airframes carrying enough passengers to make the journey economically feasible to achieve this goal. Technological advances in aircraft design made throughout the 1920s made such aircraft as the Avro Ten available to Australian operators. Soon it was apparent that the successful operators, the actors responsible for system development, treated flying as a transport business rather than a means by which they could continue to enjoy the experience of flight.

The one place where the all the components of the air transport system came together was the aerodrome. Within the Australian aerodrome system, no 'typical' aerodrome

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[36] *Aircraft*, 31 August 1928, p. 48.

existed, yet the history of the aerodrome at Eagle Farm between 1922 and 1930 provides evidence of the many influences on the system entire.

In this new field of technology where there were few precedents, mistakes were inevitable. The 1922 choice of Eagle Farm as Brisbane's aerodrome, over the Rocklea land belonging to Elizabeth Beatty, was one such error. By 1927 the first Brisbane aerodrome had become a reverse salient in the system. Like Perth's Maylands the following year and Sydney's Mascot in 1929, this site provided sound indications that drainage problems at sites close to the coast would need to be resolved for future system growth.

In 1929 Controller Brinsmead stated that although Mascot was not an ideal site for an aerodrome, it could be made good. He added that 'if the area were abandoned, the loss would be considerable because there are already many buildings there which would have to be removed or dismantled.'[37] Fortunately the level of investment in Eagle Farm was not so extensive that the problem could not be rectified by relocation. Despite the brevity of its pre-1930 existence, the history of Eagle Farm Aerodrome provides a most suitable introduction to that of the system overall.

[37] Parliamentary Standing Committee on Public Works, 'Report together with minutes of evidence and plan relating to the proposed development of the civil aerodrome at Mascot, NSW', *CPP*, 3 (1929–30–31), pp. 869-70.

Chapter 8

'In two states, at least, controversies raged and verbal brickbats flew regarding the provision of new main terminal aerodromes.'[1]

Australia commenced the decade of the 1930s with only the beginnings of an air transport system and concluded it with one that encompassed both an internal domestic and regional airline structure, and an international service linking the country to the rest of the world. This decade of consolidation and re-organisation encompassed progress in aerodrome engineering and architecture, plus the formalisation of aviation regulatory procedures. Perhaps, not surprisingly, such dramatic changes took place during years marked by technological advancement, economic turmoil and political confusion.

At the end of 1929, air-service companies flew intrastate operations only. A decade later one major airline, the second ANA, serviced aerodromes from Townsville to Adelaide while another, MacRobertson Miller Airways Ltd, was responsible for the western routes. The third major airline, QANTAS, kept open the links of aerial communication with the world. Development dominated this phase of system evolution. Transfer of aircraft and aerodrome technology from overseas into Australia continued throughout the decade. At times Australian engineers improved on the designs of others, evidence that in a country so far from the original source of aircraft technology, local innovation also played an important role. The level of development in both systems by 1939 reached a plateau of stability in form. There it might have remained, advancing only steadily had not the Second World War intervened.

Part two of this thesis considers just how the air transport and aerodrome systems developed between 1931 and 1939. They did not do so in isolation, rather in a complex manner linked to the political, economic, technological and social factors significant at the time. This part examines these in greater detail, as well as how appropriate Hughes' model is to these years of development. Running as connecting threads through the decade are five themes. One or two themes may dominate a particular chapter, but the influence of each is relevant to all and contributes to the development of the air transport and airport systems during the 1930s.

How the growth of air transport benefited communication is the first theme. Rather than miles, distance was now measured by the ever-decreasing time those miles took to be travelled. Air transport beyond our shores reduced the impact of the long-standing

tyranny of distance and, while having the potential to strengthen the old alliances with Britain and Empire, at the same time provided challenges to established commercial links. By end of the decade the economic efficiency and reduced operating costs of aircraft from countries other than Britain would place pressure on both patriotism and imperial financial ties.

The impact of technology is the second theme identified. Rapid advances in aircraft and auxiliary technologies, such as radio navigation, placed direct pressure on the Commonwealth to provide air-service operations with an adequate ground infrastructure.

The third theme, one closely aligned to the nation's defence needs, followed the changing role played by the influence of the military on a civil transport industry. Whereas military aviation previously held financial and diplomatic priority, civil aviation had now to be considered no less a national asset.

This theme introduces a fourth, the separation of operations by air-service companies into domestic and international. Even before local and regional aviation needs were met, Australian pilots looked beyond our coastal shores to the possibilities of international flights.

That more people became involved in air transport in many capacities—as pilots, engineers, ground radio operators, aerodrome caretakers, air-service company employees, freight handlers, and as passengers—is evidence of the fifth and final theme. New skills were fostered by the transfer of technology from country to country and generation to generation. In the wider population, this growing acceptance of air transport would lead to even greater expansion of air travel in the post-war years.

Because these key themes are so inter-related, it is exceedingly difficult to discuss each separately. For example, the commencement of that overseas airmail service from Archerfield on 10 December 1934 was achieved by political negotiations between Britain and Australia, acted upon in its resolution at a commercial level between Imperial Airways and QANTAS. How rapidly new technology was introduced onto this international airmail route, and to other parts of the Australian air transport system, was a function of overseas marketing, domestic commercial impetus and government regulation. The development of a positive attitude towards aviation, of people paying additional money to send their mail by air, or themselves travelling the same way, had much to do with safety. Perceptions about government regulation, reported company

[1] *Aircraft*, 1 June 1935, p. 34. The article concerned civil aviation progress during 1934.

insolvencies and intractable environmental factors beyond the control of the system all affected how much confidence and faith the public had in air travel. Behind much of the government support for services such as the overseas airmail route was a policy of co-development of military and civil aviation, one justified by a bipartisan belief that the civil aviation industry was a component of aerial defence and a major factor in Australia's relations with Britain.

This last factor is of key importance. Throughout the decade, the influence of Britain and the Empire on Australia's political, economic, technological and social life was strong. Most evident in Australia's defence policy, reflections of this influence can be seen also in the funding provided for aviation and how Australians, both privately and as air-service operators, were encouraged to buy British aircraft. The similarities between British and Australian regulatory structure and how each defended its commercial interests in the Asian air route into Australia also show how important this country believed were the links with the British Empire, in decline though they were.

The technological style of the Australian air transport system was dominated by close Commonwealth control. As such it was influenced by the budgetary complications of endeavouring to obtain the best from limited financial resources. For the larger airway companies especially, restrictions on the introduction of new technology made as a consequence of the Commonwealth's priorities ran counter to the laissez-faire attitude of commerce and profit. Despite industry warnings of the dangers, the restricted, slow introduction of new radio navigation technology cost the lives of travellers and aircrew.

Of the five themes which underlie this period, aviation technology's ability to reduce the time taken to travel between distant places was the most newsworthy. As a consequence the journeys of the early aviators, especially when undertaken against adverse conditions, form the basis of much popular aviation history.

Within days of the opening of Archerfield late in March 1931, C. W. A. (Charles) Scott, a British flying instructor who had worked for QANTAS on Eagle Farm, delivered a new de Havilland DH60 Moth from England for Brisbane Valley grazier R. S. (Scamp) White.[2] When Scott arrived at the very new Archerfield Aerodrome after creating a London to Darwin solo record of just over nine and a half days, he was fêted by thousands for having broken Kingsford Smith's October 1930 record of ten and a half days. Fifteen months later and with a flight of 8 days 20 hours 47 minutes, Scott broke

[2] *BC*, 14 April 1931, p. 11.

the record Arthur Butler had set in the interval. By October 1933 the record was again in the hands of Kingsford Smith.

The Melbourne Centenary Air Race highlighted this onslaught on time. Commencing on 20 October 1934 from Mildenhall, a RAF base outside London, entrants in the speed section raced to overhead Flemington Racecourse in Melbourne. Tom Campbell-Black and the same Charles Scott won the race in one of three Comet racing aircraft especially designed for the event.[3] Only hours behind was a KLM DC2, named *Uiver*, which throughout the flight carried three passengers and conducted what its captain described as a 'normal commercial flight'.[4] The British Comet flew day and night exhausting its pilots. The passengers and crew of the KLM aircraft, an American Douglas commercial airliner used on regular scheduled flights, kept up a similar pace but travelled in airliner comfort. The Comet made the journey in seventy-two hours elapsed time; the KLM DC2 took ninety.[5]

Though the laurels and prize money went to the winners in the wooden and fabric de Havilland Comet, many recognised the significance of a passenger aircraft coming a close second. As the *Sydney Morning Herald* reported, 'the sight of the Douglas and the Boeing here will open Australian eyes to advances in air transport in the United States.'[6] Such standard all-metal monoplanes of the DC2 and Boeing 247 types had just been introduced and were approaching a stability of design for airliners of the 1930s.[7] The results of the 1934 air race convinced knowledgable observers that the heavier and more technically advanced aircraft required longer take-off and landing distances and would place increased pressure on existing ground facilities. Even for the 1934 race, aerodrome upgrades had been necessary to ensure scheduled stops were at sites suitable for the fastest of the competing aircraft to land and take-off safely.

That renewed consideration emphasised the impact of technology, the second theme identified. The requirements of new aircraft technology had to be addressed through changes within the air transport system and aerodrome systems. Not only did the introduction of new metal monoplanes require a large capital investment on the part of the airline operator, considerable investment was needed also in ground support for the auxiliary navigation and communication devices now incorporated into these machines.

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[3] The race ended at Flemington Racecourse but the aircraft landed at Laverton RAAF Base. Charles Scott and Tom Campbell-Black were the winning pilots of the speed section. Though Scott had worked in Australia for QANTAS in the 1920s, he was born in the UK in 1903.
[4] *SMH*, 23 October 1933, p. 11.
[5] The KLM aircraft's elapsed time included an unscheduled night landing at Albury and consequent take-off from a boggy landing ground the following morning.
[6] *SMH*, 24 October 1934, p. 12.

Viewed as a complete airliner, this next generation of aircraft promised speed, safety, commercial reliability and passenger seats enough to cater for the increasing numbers of air travellers. Without the complementary ground facilities, in 1934 these advantages of safety and profitability glimpsed during an air race stayed just a tantalising hint of the future.

Australian air-service operators were keen to embrace this new, more advanced technology; however, they would be forced to wait until a year after the race before the Commonwealth Government allowed them to do so. Morally, Australians were encouraged to 'Buy British'. Technically, and more significantly, any aircraft not accompanied by a Certificate of Airworthiness, or validated by a State signatory to the International Convention for Air Navigation (ICAN) of 1919, could not be imported into Australia, as per Customs Proclamation no. 163 of 1928.[8] The United States had not signed the ICAN agreement. Until reversed by a Cabinet decision in November 1935, the customs proclamation effectively kept modern American aeroplanes off the Australian register of aircraft.

This legal technicality encouraged QEA and Holymans Airways Pty Ltd to purchase the slow and outmoded de Havilland DH86 airliners when both companies expanded their operations in 1934.[9] In October and November of that year, sixteen lives were lost in two separate crashes involving DH86s. Though proof was never established conclusively, some Australian engineers of the period believed that a design flaw related to the aircraft's rudder trim mechanism, though denied by its British designers, was the cause.[10] Politics, patriotism and the culture of technology all contributed to the style of air transport system developed in Australia during the 1930s.

Throughout the 1930s and especially after 1936, the level of aircraft technology available was in advance of ground facilities provided by the Federal Government. On a day-to-day basis this placed greater pressure on pilots and their flying skills. Three major aircraft accidents during this decade showed just how far ahead of the Australian ground facilities the technology of aircraft had moved.

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[7] Third place went to Roscoe Turner in a Boeing 247D.
[8] *CGG*, 24 September 1928, p. 2,719.
[9] On 13 May 1936 Holymans Airways Pty Ltd combined with Adelaide Airways Ltd and shipping interests to become Australian National Airways Pty Ltd, ANA(2).
[10] *Miss Hobart*, belonging to Holymans Airways Pty Ltd, was lost over Bass Strait on 19 October 1934. On one of the final legs of its delivery flight from England, QEA's VH–USG crashed south-east of Longreach on 15 November 1934.

The disappearance of the ANA(1) *Southern Cloud* (VH–UMF) between Sydney and Melbourne in March 1931 in particular revealed inadequacies in the availability of accurate and up-to-date weather forecasts for pilots. The loss of the AOA Stinson *Brisbane* (VH–UHH) after it departed from Archerfield on 19 February 1937 revealed the need for a network of aviation-specific, ground-to-air radio stations so that aircraft on scheduled services could maintain contact. The public and open inquiry into the crash of the ANA(2) DC2 *Kyeema* outside Melbourne on 25 October 1938 with a total loss of life revealed just how bureaucratic the operations of the Civil Aviation Board had become. On board the *Kyeema* were fourteen passengers and four crew. The passenger list included Charles A. Hawker MHR, wine industry executives and a group of legal professionals who had attended a Royal Commission on national health insurance in Perth.

The Air Accident Investigation Committee's report on the *Kyeema* crash, tabled in Federal Parliament on 8 December 1938, directed some of the blame towards the Board. At the time of the crash its members had reached an impasse on the cost of hire of a commercial aircraft fast enough to test installed ground facilities. More than any other, this last accident revealed the necessity of removing the administration of civil aviation from within the Department of Defence. The hasty creation of the Department of Civil Aviation was gazetted on 25 November 1938.[11] Given greater finances and a new director-general, the DCA had only really commenced its task of re-organising the system when war was declared less than a year later.

The growth of a system requires the resolution of problems. The problems created by the pressure of new technology on the aerodrome system were not resolved by the Civil Aviation Board until well after the need for change was evident. This reactive form of aviation administration was indicative of a greater misunderstanding at parliamentary level of the obligations that new technology placed on air travel as a transport industry. Added to this was a pecuniary reluctance to fund what was elsewhere in the world being realised as essential support equipment for passenger aircraft.

Contributing to the confusion, a legislative situation not resolved adequately in 1920 re-emerged to vex both politicians and civil aviation administrators. A 1936 High Court challenge by Sydney commercial pilot Goya Henry revealed that because of the failure of the States to follow through with enabling legislation after the passing of the *Air Navigation Act (1920)*, the Commonwealth did not have the legal right to regulate intra-state flying, that is flights made by aircraft flying within one state. Not until the first

[11] *CGG*, 25 November 1938, p. 2,751.

week in November 1938 was the matter resolved completely. This period of legal uncertainty further compounded growing concerns as to whether civil aviation was being administered wisely.

Political uncertainty about the direction Australian aviation should pursue reduced the likelihood for a separation to occur between aviation's civil and military branches, indicating the third underlying theme within the period. In general, the Commonwealth support of military aviation came at the expense of civil development. In the 1920s, appropriation for civil aviation was generally less than one-third of that provided to the RAAF.[12] Increasing confusion in the Federal political sphere as to the future role of civil aviation, and its place as a transport industry, led to greater difficulties for the administrators of the Civil Aviation Board, formed on 7 April 1936 to replace the Civil Aviation Branch.[13] Between February 1931 and November 1938 Controller (later Controller-General) Edgar Johnson reported, through departmental channels or directly after 1936, to six different ministers for defence.

Given this lack of political foresight about the role of civil aviation, the position of Johnston as system builder needs to be considered. A detailed study has yet to be made of this West Australian surveyor and pilot who became the nation's first superintendent of aerodromes and later the head of its civil aviation administration.[14] After receiving considerable criticism following the inquiry into the crash of the ANA(2) DC2 *Kyeema*, Johnson never again advanced above the lesser position of assistant director-general. An evaluation of his role at the head of civil aviation administration for much of the decade is as important as understanding the political influences on the system.

Staffed by former military pilots and physically situated in Melbourne's Victoria Barracks, the administrative body led by Controller Johnston in the 1930s inevitably possessed strong military links. As civil aviation grew in importance, this influence concerned the owners of civil aviation companies, the entrepreneurs within the system whose focus was profitable commerce. Even when Federal Government money was spent—on enlarging aerodromes, and on subsidising the training of pilots—justification usually was given on the grounds of defence of the nation rather than the encouragement of a new transport industry.

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[12] 'Expenditure in 1922–23 classified under the heads of expenditure', *CPP*, 3 (1923–24), p. 1,443; 'Expenditure in 1923–24 classified under the heads of expenditure', *CPP*, 3 (1923–24), pp. 1,804-5; 'Expenditure in 1924–25 classified under the heads of expenditure', *CPP*, 2 (1926–27–28), pp. 2,533.
[13] *CGG*, 7 April 1936, p. 621.
[14] A brief article by Ormond Grace was published in the *AOPA* magazine of June 2000, pp. 24-8.

By comparison, in the United States civil aviation was administered through the Department of Commerce and fostered primarily for what it could provide to the civilian population—fast, efficient and safe transport of people and goods. Upon their return, some Australian aviation executives who travelled to the United States publicly expressed their doubts as to the direction, or lack thereof, provided for civil aviation at home.

Though the aviation technology and commercial operations of the USA were attractive, 'overseas' in the Australia of the 1930s generally meant Great Britain. It was to this destination able to be reached by flight across an intervening land mass, that Australia's first international operations were planned. The separation of domestic and international aviation, the fourth identified theme, is closely linked with Archerfield. A comparatively brief four years after the aerodrome opened it was possible for wealthy passengers to make the journey in reasonable comfort directly from Brisbane to London in twelve days and a half days. The opportunities for unexpected adventures in exotic locations were, for these intrepid travellers, an added bonus.

Evidence of this point where international operations separated from domestic services exists in newspaper and archival reports and in the buildings of 1930s Archerfield. From its official opening early in April 1931, the aerodrome had catered for travellers and mail to and from western and northern Queensland as well as being an interchange for people, mail and goods arriving from southern capital cities. With considerable fanfare, on 10 December 1934 Archerfield became the terminus of the overseas airmail service.[15] When QANTAS added passenger services to the England–Australia route in 1935, patrons literally began or ended their international air journey on the concrete apron in front of hangar no. 5.

The fifth theme can be identified in the greater acceptance air transport found in the wider community as more people became directly involved in flying. Progress was initially hesitant, the Depression having a direct impact on passenger numbers, though less influence on system development. Air-service hours flown per annum had reached 29 268 by 1929. The following year they dropped to 14 260. By 1932 the figure had fallen to 9 573 hours per annum. Pre-Depression figures would not be achieved again until 1935, by which time people were accustomed to the idea of regular interstate

[15] Mail for Brisbane arrived at Archerfield. Mail for Sydney and Melbourne was flown from Charleville to Cootamundra. From there it travelled by train. Mail for Sydney would have arrived earlier had it been allowed to travel by air through Brisbane.

services.[16] At that same time in mid-decade, greater numbers of pilots and engineers were needed to operate the faster more technologically advanced aircraft which were the stimulus for the industry's expansion.

Many of the aviation companies that had survived the competitiveness of the 1920s did not make it through the lean Depression years. Kingsford Smith and Ulm's ANA(1) was an early casualty, collapsing as an operational company shortly after the loss of the *Southern Cloud* on 21 March 1931.[17] Only a few months earlier Queensland Air Navigation had succumbed to a lack of business and the bad publicity associated with a fatal accident outside Maryborough in December 1930. The opening left on the Archerfield-to-Mascot route by the departure of the ANA(1) was filled quickly by New England Airways (NEA). With funding from its parent organisation, the New England Motor Company, NEA purchased the aircraft and hangar assets of QAN and in mid-1931 commenced flying twice a week between Brisbane and Sydney.

During the Depression, even with its subsidised routes, QANTAS still had to look at ways of reducing operating expenditure. New routes which might prove profitable were considered. Until both routes were realised as uneconomical, QANTAS, now with its head office in Brisbane, tried the Queensland coastal route which had defeated QAN, as well as the route to Toowoomba. It did not stay very long with either. By the end of the decade QANTAS had moved its head office to Sydney. Following the separation of operation for air-service companies into domestic and international, the emerging Qantas Empire Airways (QEA) moved its base and key personnel south to Sydney and its international operations onto water with a home base at Rose Bay in Sydney Harbour.

On Archerfield, Ron Adair's Aircrafts Pty Ltd (APL) might not have survived the Depression had it not been for a special £3 000 allocation provided in 1933 by the Commonwealth to a fortunate few companies. Of the initial allocation, APL received £650 for a once-weekly service to the gold-mining town of Cracow in central Queensland, an otherwise isolated community.[18] With this assistance APL continued to operate.

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[16] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 178.

[17] The *Southern Cloud* disappeared less than a fortnight before the opening of Archerfield. It was found in the Snowy Mountains by a bushwalker in 1957.

[18] 'Treasurer's statement of receipts and expenditure', *CPP*, 4 (1933–34), pp. 2,433-4; Edgar Johnson, minute paper dated 11 December 1933, Aircrafts Pty Ltd, application form, Four minor services. Special £3,000 allocation for civil aviation, 192/102/45, MP113/1, NAA (Vic.).

Other changes became apparent during this decade. An evolution of design occurred on aerodromes in Europe and the United States in the 1930s, though little of this change was evident in the aerodrome layout and building construction on Australian aerodromes by 1939. Some Australians who travelled overseas appreciated the architectural responses to new aircraft technology which they were seeing. Hudson Fysh wrote of Berlin's Tempelhoff in a letter to Edgar Johnston as, 'The finest in Europe in I think all respects, and the busiest.'[19] Fysh was describing what architect Wolfgang Voight refers to as the second generation of aerodromes. Tempelhoff was upgraded in the mid-1930s by demolishing city buildings to provide space for a new terminal which featured the idea, then considered novel, of having passengers, luggage and freight dealt with on different terminal levels.[20]

In Europe, national aerodromes were treated as the country's chosen entry and exit points. Britain's Croydon Airport, one of the country's few nationally funded aerodromes and a customs entry point, was provided with a terminal facility in 1928 which featured a walk-through layout. At the time of its construction the building which became a template for so many others cost £267 000.[21] Holland's Schipol Airport retained its place as the nation's key aerodrome facility because its owners, the city of Amsterdam, fully realised its potential and invested in facilities such as paved runways, not common on European aerodromes in the 1930s.

Architectural interest in the design and layout of aerodromes grew worldwide throughout the 1930s. An early awareness of this interest can be seen in the Lehigh Airports Competition, sponsored by the Lehigh Portland Cement Company in the United States. Forty-four entries were received. These entries were analysed by engineer Archibald Black and published in the book *American airport designs*.[22] The book was distributed widely.[23]

Though there were no significant architectural changes on Australian aerodromes in the 1930s, other than in the construction of larger hangars which also housed passenger terminal facilities, like aerodromes worldwide they were more frequently visited by passengers and sightseers. Here was evidence of the phenomena referred to as

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[19] Hudson Fysh to Edgar Johnston, letter dated 21 August 1933, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.
[20] Marc L. J. Dierikx and Bram Bouwens, *Building castles of the air: Schipol Amsterdam and the development of airport infrastructure in Europe, 1916–96* (The Hague: Sdu Publishers, 1997), p. 45.
[21] *Aircraft Illustrated*, February 1983, p. 66.
[22] *American airport designs* (New York: Taylor, Rogers & Bliss Inc. for the Lehigh Portland Cement Co., 1930).
[23] According to the stamps on its covers, the copy held by the National Library of Australia was originally lodged in the library of the Department of Defence.

airmindedness—the positive attitude of people towards aircraft and all things flight-related. First coined in the 1920s, the term encompassed the ambiguous territory where aviation technology and society met. For readers of the *Brisbane Courier* in 1931, airmindedness was encouraged each week through 'Aviation Notes' by the columnist Propeller.[24] Still a new fad, aviation fascinated people. As a result, more took to the skies, or hoped to.

Passenger numbers increased as the Depression waned. Numbers of people training as pilot numbers also grew because government subsidises to aero clubs made flying cheaper and encouraged more to learn. That some of these were women who were perceived as having little value as pilots who could defend the country led to heated debate in Federal Parliament, but the subsidy remained.[25] In 1936–37, at the peak of the pilot training scheme, the aero club which instructed more students than all others nationwide was Archerfield-based Royal Queensland Aero Club (RQAC).[26]

Numbers of licensed ground engineers doubled during this decade. In 1930 there were 264. The number reached 565 by 1939.[27] Maintenance buildings on capital-city aerodromes had to expand to accommodate larger aircraft. While the Avro Ten only had a wingspan of 19.3 metres, the Douglas airliners (DC2s and DC3s) measured 29 metres. As well as wider, hangars also needed to be higher. During this decade the 'coat-hangar' design replaced the gable-ended design as a means of achieving the necessary width and height while yet maintaining structural integrity. Not surprisingly, all five of Archerfield's 1930s hangars are of the coat-hangar style.

The Archerfield Aerodrome of the 1930s provides material evidence as to the complexity of inter-relationships between all the key themes of this period. Early in the decade Archerfield was one in a loose network of aerodromes used by pilots. Within ten years it was one of the six major assets of an airport system that was in turn an integral part of the larger air transport system.

Aerodromes and landing grounds established across the country could be divided into three groups by the late 1920s. The first contained the capital-city aerodromes, as well as the landing grounds established on subsidised routes. The Commonwealth provided the

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[24] *BC*, 26 March 1931, p. 7; *BC*, 4 April 1931, p. 15; *BC*, 22 April 1931, p. 12; *BC*, 25 May 1931, p. 13.
[25] Valerie R. Dennis, An attitude about altitude: Women pilots and civil aviation in Australia between 1927 and 1979, MA thesis, University of Queensland, 2000, pp. 46-7.
[26] The Australian Aero Club (Queensland Section) became Queensland Aero Club (QAC) in 1931 then Royal Queensland Aero Club (RQAC) in 1936.
[27] Butler, *Flying start*, p. 178.

funding for all in this group. Because commercial aviation was expected to develop profitably and beyond the need for subsidies, it followed that any commercially viable future for aerodromes centred on where client population was most concentrated, in effect around the capital-city aerodromes. The Commonwealth, owning aerodromes in all capital cities, was well placed to undertake a lead role in system development.

Queensland in 1927 contained thirteen aerodromes and twenty-two emergency landing grounds (ELGs) established and maintained by the Commonwealth.[28] Most were on the outback routes flown by QANTAS. The state's capital-city aerodrome, then Eagle Farm, had operated since 1922.

The second group of landing places which would become part of the aerodrome system were those which the Civil Aviation Branch referred to as licensed 'public' aerodromes or landing grounds. These were owned either by a municipal body or by private individuals. As scheduled air-service operations could use only licensed aerodromes, these fields needed to be inspected and approved by the CAB as part of the licensing process. Because funding for their establishment and maintenance came from the private sector, licensed public aerodromes were generally fewer in number.

In 1930 Queensland had four licensed public aerodromes—at Dalby, Nanango, Townsville and Rockhampton.[29] The licensed landing ground at Dalby, owned by the Dalby Town and Wambo Shire Councils, was located south of Myall Creek, close to the racecourse reserve.[30] At Rockhampton, local volunteers constructed the Connor Park Aerodrome on privately owned land in 1929–30 so that Queensland Air Navigation could schedule flights there. This it did from early April 1930.[31]

The third group, those generally deemed the least important to the system, were the unlicensed landing grounds. These were used mainly by private pilots and air-taxi services and could be owned privately or by a municipal authority. The landing ground facilities at Gympie were both unlicensed. Pilots of aircraft arriving at this former gold-mining town could land at the showgrounds west of the town, or at the privately owned

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[28] *CPD*, 30 November 1927, p. 2,277.
[29] *CPD*, 9 July 1930, p. 387.
[30] Notice to Airmen (NOTAM), Civil Aviation Branch, no. 8 of 1930, pp. 1-2. Today's aerodrome is to the north-east of the town of Dalby, but has the same owners.
[31] Glenn S. Cousins, *Men of vision over Capricorn: A story of aviation history in Central Queensland* (Brisbane: Boolarong Press, 1994), pp. 63-5. Rockhampton's Aerodrome is still located at Connor Park.

Beattie's paddock at Lagoon Pocket, 10 miles (16 kms) south of the town. In 1930 neither was considered safe for anything other than light aircraft.[32]

Examples of landing places from each can be found in other states, though Victoria, not having any subsidised outback routes, likewise had fewer government aerodromes. In NSW, government aerodromes were established at towns such as Hay and Cootamundra to provide support for the subsidised Australian Aerial Services Ltd operation of the 1920s, and at Sydney's Mascot. Licensed public aerodromes in 1933 were at Grafton, Coffs Harbour and Lismore, the towns served by New England Airways.[33] A wealthy grazier named Perry purchased land at Dubbo for use by a company named Southern Air Lines. In 1935 Nancy Bird flew joy flights from this unlicensed landing ground. While passengers were scarce she erected a windsock and painted the posts white. Southern Air Lines failed to operate into Dubbo.[34]

The Archerfield of the 1930s was a modern aerodrome which developed in spite of the economic and political problems of the period. Six months after the land was purchased from Elizabeth Beatty, contractor William E. Brown & Co. of Coorparoo commenced clearing the site of the blue gum, Moreton Bay ash and ironbark.[35] The Government hangar was disassembled at Eagle Farm and re-erected on the most northerly allotment available, along a hangar alignment running parallel to Beatty Road. QANTAS built a new, larger hangar on the most southerly allotment then available, just north of the existing pioneer cemetery established by the Grenier family in October 1859. QANTAS' smaller Eagle Farm hangar was re-erected beside the large QANTAS no. 1 hangar. Staff referred to the older building as their no. 2 hangar. (See Figure 3.)

With their introduction of services between Archerfield and Mascot in mid-1931, New England Airways constructed their hangar, possibly using material from the small QAN Eagle Farm building, on the no. 2 allotment immediately to the south of the Government hangar. In 1935 Sidney Williams of West End constructed a hangar on the no. 3 allotment, just south of NEA. A company operated by ground engineer Frank Higginson occupied this building. APL aircraft were hangared there regularly.

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[32] Christopher de Vere, *The showgrounds: Gympie's first aerodrome* (Gympie: National Trust of Australia, Gympie Branch, 1999), pp. 14-6. Today Gympie's aerodrome is at Kybong, south of the town.
[33] *BC*, 25 August 1933, p. 2.
[34] Nancy Bird, *Born to fly* (Sydney: Angus & Robertson, 1961), pp. 84-5.
[35] *CGG*, 26 September 1929, p. 2,010; *CGG*, 13 March 1930, p. 438.

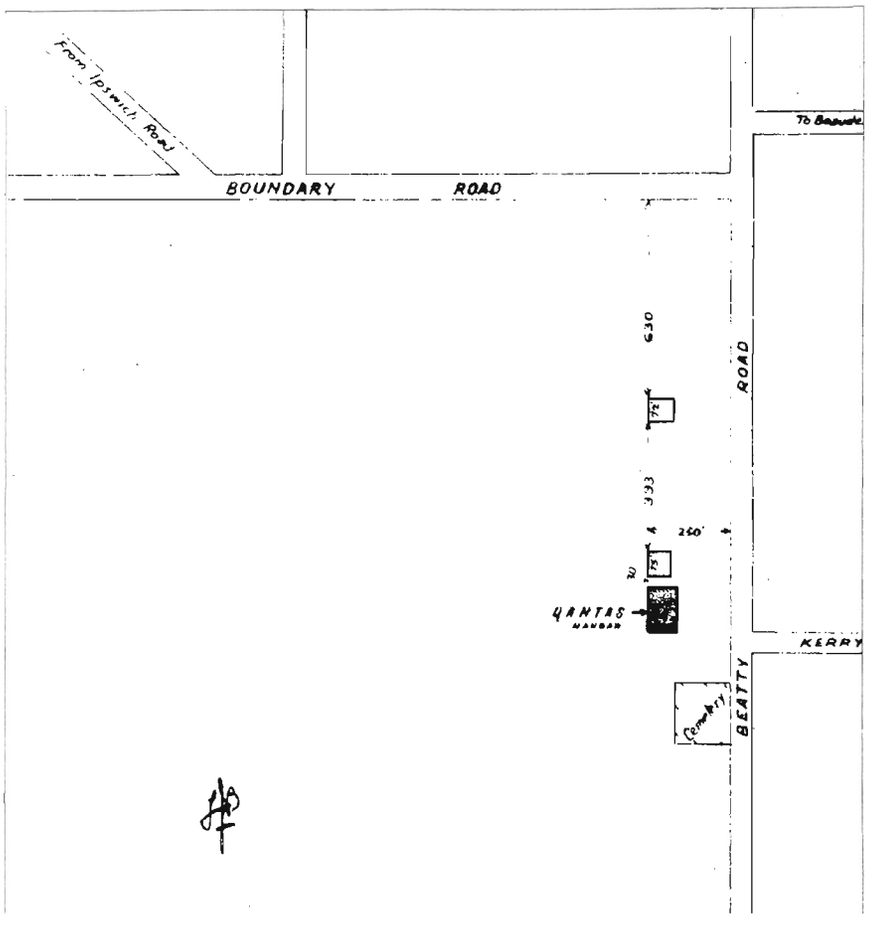

Figure 3: Section of plan of Archerfield Aerodrome circa 1931
Source: Archerfield Aerodrome – Survey, QL718/22, J56/11. NAA (Qld)

In October 1935 NEA was incorporated into a new company, Airlines of Australia (AOA). Control of AOA fell to ANA(2) in 1937.[36] Two years later this combined company constructed a larger hangar (no. 6) to the west of the QANTAS hangar. Placed alongside the brick and stucco building which the Shell Company had erected in 1935 to house its refuelling wagon, hangar no. 6 easily accommodated the larger DC2 and DC3 aircraft that ANA(2) operated. (See Figure 4.)

[36] Joan Priest, *Virtue in flying: A biography of pioneer aviator Keith Virtue* (Sydney: Angus & Robertson, 1975), p. 97; Howard G. Quinlan, 'Air services in Australia: Growth and corporate change, 1921–96', *Australian Geographical Studies*, 36 (1998), p. 162.

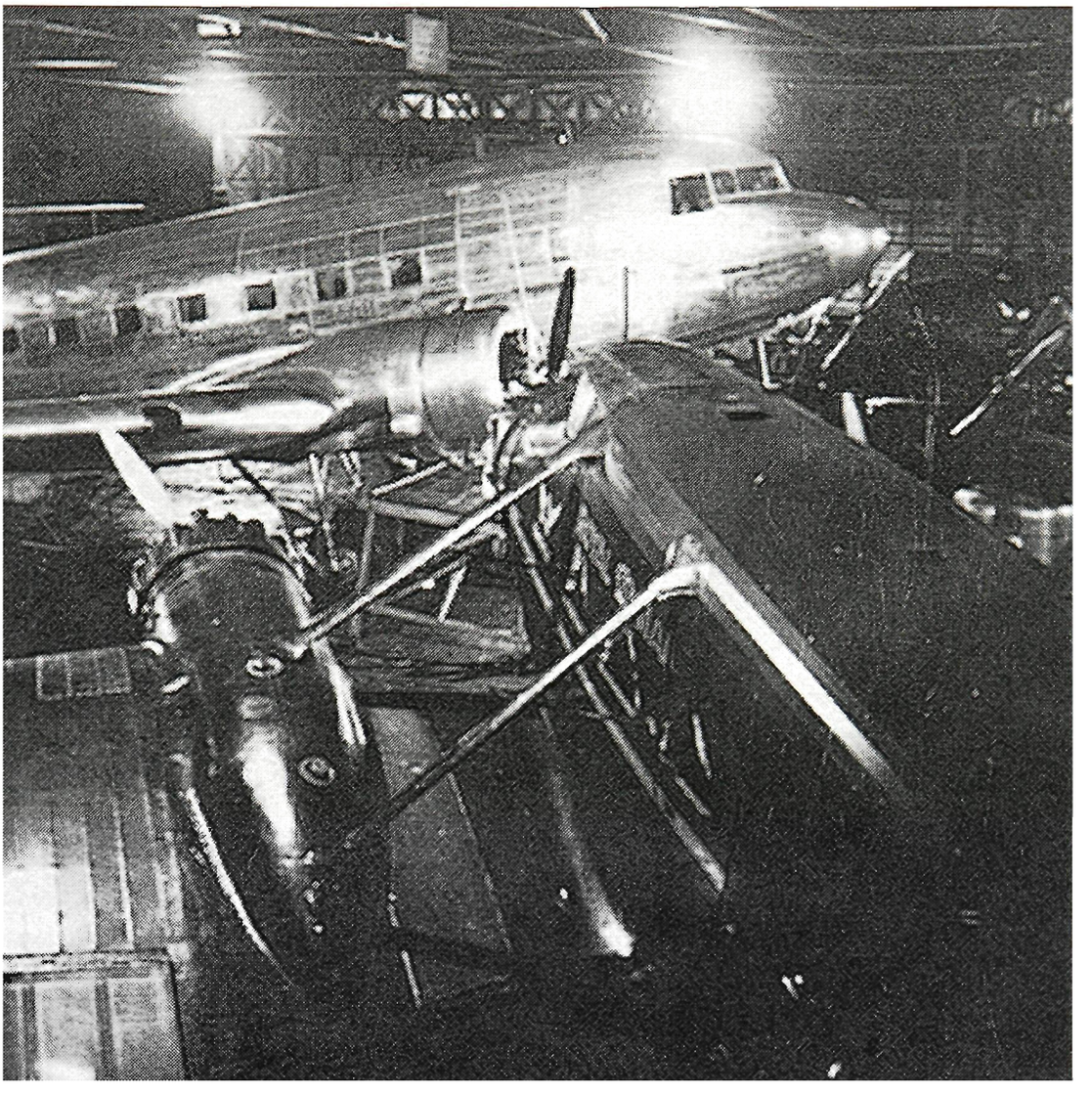

Figure 4: Inside AOA's hangar no. 6 circa 1938. In the foreground is one of the company's two remaining Stinson airliners. In the background is the ANA DC3 *Kyilla*, VH–UZJ. Source: Trevan Jackson Collection

On the southern side of the Grenier cemetery, 'Lucky Bill' Rankin constructed a concrete-walled structure (hangar no. 7) with a coat-hangar roof in the late 1930s to provide hangarage and house an aircraft engineering facility.

A number of peripheral buildings were also constructed throughout the decade. The Queensland Aero Club (after 1936 the Royal Queensland Aero Club) constructed its clubhouse on the aerodrome's northern side in 1931. The clubhouse was approached via Boundary Road. Vacuum Oil built an office at the entrance to the airfield nearest the Government hangar. The Civil Aviation Board constructed a power house, a meteorological office and toilet facilities. A timber control tower was erected in 1937.

Late in the 1930s, a Lorenz beacon tower was erected between the QANTAS hangars and Beatty Road.

The need for passenger terminal facilities on most Australian capital city aerodromes had been apparent since the mid-1930s. By October 1936 preliminary plans for control and administration buildings at Archerfield, Mascot and Parafield (SA) were completed by Commonwealth designers in Canberra. Problems with funding initially delayed the construction of these terminal facilities.[37] Changing priorities during the Second World War altered priorities yet again. Work on the Archerfield control building did not commence until early in 1941.[38]

The 1930s was a decade of marked development for the Australian air transport system and, by consequence, development of the aerodrome system. As such their state in the 1930s complies with the phase of system evolution which Hughes noted as being dominated by development. Above all this was a decade of change. Events both extraordinary and everyday on the nation's aerodromes provided a window into the patterns and dynamics created by technological advancement, economic uncertainty and political conservatism. Archerfield Aerodrome during this period is a suitable frame.

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[37] Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW* (Canberra: Govt Printer, 1938), pp. 1-32; Parliamentary Standing Committee on Public Works, 'Report relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot', *CGG*, 3 (1937–38–39–40), pp. 233-9; *ABJQ*, October 1936, p. 2.

[38] *ABJQ*, January 1941, p. 12.

Chapter 9

'Of all the various enemies that beset the struggling young airport, both before and after it is born, none is quite so insidious, or so dangerous, as Politics.'[1]

In the years between 1931 and 1939 the Australian system of aerodromes developed from a loose network of landing fields, dotted with gable hangars, to an interconnected arrangement of capital-city aerodromes supported by a regional network of licensed aerodromes. Late in the decade, another layer of infrastructure, landing areas for international flying boats, was added to the system. Though the need to move beyond the first generation aerodrome structure was largely a consequence of overseas technological advances and the commercial desires of air-service companies, it is to political forces that the slow manner in which these changes occurred must be attributed.

The structure of the aerodrome system in 1939, like the entire air transport system, developed at a pace dictated by politics, both internal and external to the country. While the Commonwealth government was certainly the core political institution involved, its international relations, with Britain and the Netherlands, and its relations with the States, each played a role in the development of the air transport system and its aerodromes. The desire for better communication, rapid improvements in technology, a concern for defence, a separation between domestic and international air services and a greater involvement of people in air activities again influenced political decision, and indirectly the decade's outcomes. The evidence as to just how political was the development of the system can be found in the documents of the times, and in the built fabric of aerodromes which have survived, such as Archerfield.

The decade of the 1930s was mostly a period of conservative government in Australia. As the festivities to celebrate the opening of Archerfield commenced in Aviation Week 1931, a Labor parliament under the leadership of James Scullin governed Australia. This government had replaced the Bruce-Page coalition in a resounding election victory in October 1929. The new government faced many difficulties, the most overwhelming of which was the impact of the Depression on the nation's economy.

Subsequent loss of faith in the ability of the Scullin government to remedy the nation's economic problems led to the election on 19 December 1931 of a United Australia Party

[1] Robert J. Pritchard, 'Politics and airports', *Airport Construction and Management*, 2 (August 1930), p. 10.

government under the leadership of Joseph Lyons. The Party was still in power in September 1939 when Prime Minister Menzies informed the nation that Australia was at war with Germany.[2] This declaration of Australia's military involvement in an eventual global war ended what had been, despite its apparent slowness, the most rapid period of Australian civil air transport development to that date.

The government of Joseph Lyons has been described as a 'dull and mediocre kind and government' and one which 'threatened to shut out the ideas of the rest of the world'.[3] While it may have been essentially conservative, the Lyons government did ensure Australian 'ownership' of the most important sector of the country's primary international aerial route. That government also negotiated its way through constitutional and State issues which might have reduced aviation to a secondary transport sector and left its administration unworkable.

In other ways, though, the Lyons government was slow to act. It provided subsidies to the companies which carried mail to ensure they remained financially viable. Having undertaken the role of proprietor of the system's major assets, this government however failed to direct sufficient funds to broad-based improvements on aerodromes until their need became more than apparent. The *Bulletin* brought this to the attention of its readers in 1937 when it reported, 'Where other countries are spending millions on ground organisation, Australia is still grudgingly spending thousands.'[4]

For example, aerodrome lighting for night flights was installed on capital-city government aerodromes in 1937. The cost of installation ranged from £873 12s 0d at Mascot to £2 750 at Archerfield.[5] No airways lighting was provided in between. By comparison, in 1933 a system of airways lighting, with beacons at intervals of 15 miles (24 kms) between aerodromes, already covered routes extending 18 000 miles (28 970 kms) across the United States.[6]

At its opening in 1928, the new 364 acre (147 ha) Croydon Airport boasted 103 feet (31.4 metres) high steel towers to support the main aerials for radio telegraphy, radio

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[2] Lyons died in office on 7 April 1939.
[3] Manning Clark, *The old dead tree and the young tree green*, vol. 6, *A history of Australia* (Carlton, Vic.: MUP, 1987), pp. 457-8.
[4] *Bulletin*, 8 September 1937, p. 13.
[5] *CGG*, 23 December 1936, p. 2,318; *CGG*, 24 March 1937, p. 572; *CGG*, 27 May 1937, p. 891; *CGG*, 9 September 1937, p. 1,534. Some airways lighting is reported between Perth and Kalgoorlie in the late 1920s.
[6] Deborah Douglas, 'Airports as systems and systems of airports: Airports and urban development in America before World War Two', in William M. Leary, ed., *From airships to Airbus: The history of civil and commercial aviation*, (Washington & London: Smithsonian Institute Press, 1995), p. 65.

telephony and direction finding. There was also 'an emergency diesel-electric power installation so that the whole essential network of communications would never break down.'[7]

In Australia, buildings to house radio and meteorological offices and auxiliary power generators were only just being constructed on capital-city aerodromes in 1937. Many thousands were being spent, but the overall figure was far from the millions spent in other countries, and it was long overdue. This attitude of fiscal stringency, adopted to deal with the difficulties of the Depression, continued until the intractable forces at work within the system allowed the Commonwealth no other option than to increase its financial support of civil aviation.

For the Commonwealth government, the dominant air transport issue of the decade was not aerodromes but the improvement of mail services between Australia and Britain. Two important and related themes underlie Commonwealth decisions and actions in this area—the need for faster communication between Britain and the Dominion outposts, and the state of Empire defence preparedness in both Europe and Asia. Less important, though still influencing the outcome of system development, was an additional influence, the matter of national prestige. Understandably, as the decade moved towards its belligerent conclusion, defence concerns accelerated into a position of primacy.

Communication always was a driving force in transport. Though it was possible for telegraphic messages to be sent rapidly between England and Australia after 1872, by 1900 it still took thirty-two days for a letter to travel from London to Melbourne.[8] Aircraft were seen as a means of reducing this time. The initial impetus came from the European end, where routes to be established by the British 'chosen instrument', Imperial Airways, were regarded as a means both of holding together the Empire and of retaining a British upper hand in relationships with its Dominions.

Australian Prime Minister Stanley Bruce, who spent sixty days in transit to attend the 1926 Imperial Conference in Britain and return home, noted that aircraft 'even in their present state of comparative perfection have introduced a significant factor into the economic and social relationship of mankind.'[9] A special sub-committee on imperial air communications formed at the 1926 conference recommended, 'Particular attention should be paid to the maintenance of existing and the construction of new aerodromes,

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[7] Douglas Cluett, Joanna Nash, and Bob Learmonth, *Croydon Airport: The great years 1928–39* (Sutton, Surrey: London Borough of Sutton Libraries and Art Services, 1980), pp. 47-9.
[8] H. Robinson, *Carrying British mail overseas* (London: George Allen & Unwin, 1964), pp. 268-72.
[9] *Aircraft*, 31 July 1927, p. 149.

so far as local resources permit, with a view to the ultimate creation of a complete system of Empire Air Routes.'[10]

Here was the first mention of the political motivation needed to connect the Empire by air. By March 1929, subsidised Imperial Airways aircraft were flying a regular service to Karachi. By December of the same year that service was extended to Delhi. In February 1932 Imperial Airways commenced a service between Cairo and Cape Town. That same year an airmail letter posted in Melbourne travelled by air to Perth, by weekly mail steamer to the Indian sub-continent and by air between Karachi and London.[11] If an outward-bound letter made all connections on time, a reply from London could be received in fifty-four days, a saving of five days over an all-sea journey.

Improved communication was regarded as essential to the defence of the Empire. During this period Australia's relations with Britain as a nation, and the British Empire as a whole, were the key to Australia's defence strategies. Following the 1923 Imperial Conference, Australia aligned her defence policy to an expectation that a British force automatically would be relocated to Asia in the event of a war in the Far East. This dependence led to retrenchment in the permanent military forces in Australia, and only a slow growth of the fledgling Royal Australian Air Force after its 1921 formation.

Further reductions in staffing of military forces, particularly in the RAAF, occurred during the Depression when Australia's aerial defence lay in the hands of 101 officers and 745 other ranks.[12] At the same time a greater emphasis was placed on the possible role of civil air transport as a means of attaining and retaining a body of skilled Australian aviation personnel. This idea of a defence advantage through the development of civil aviation first appeared in the debate on the Air Navigation Bill in 1920, and was expounded periodically in parliamentary debates on civil aviation right up to the Second World War.[13]

In a 1932 discussion on air force funding, Senator Hardy pointed out that, 'the object of a civil aviation department is to provide assistance in times of national emergency.'[14] In 1933 the Minister for Defence, Senator George Pearce, explained Australia's insistence on operating the Darwin to Singapore sector of the imperial airmail route as due in part

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[10] D. M. Hocking and C. P. Haddon-Cave, *Air transport in Australia* (Sydney: Angus & Robertson, 1951), p. 85.
[11] *BC*, 5 December 1932, p. 12; Hocking and Haddon-Cave, *Air transport in Australia*, p. 17; Robert L. McCormack, 'Man with a mission: Oswald Pirow and South African Airways, 1933–39', *Journal of African History*, 20 (1979), pp. 546-7.
[12] J. Grey, *A military history of Australia* (Cambridge: CUP, 1990), pp. 134-5.
[13] *CPD*, 5 November 1920, p. 6,233.

to 'the importance of that route in relation to defence.'[15] Three years later he reported money could only be spent on aerodromes which were on the national airways, and thus essential for defence.[16]

Towards the end of 1931 a Commonwealth interdepartmental committee consisting of representatives from the Departments of Treasury, the Postmaster-General, Defence and the Interior was formed to consider how an airmail service between England and Australia might be effected. The committee considered three options, an Imperial Airways only service, one run by the Dutch and a service operated by a purely Australian company.[17] In the report it submitted to Cabinet in December 1932, the committee preferred the Australian option. It also concluded that the Commonwealth should, 'in principle, encourage the establishment of regular aerial services, and where such services are established or proposed they should be examined to ascertain whether government assistance in the direction of provision of ground facilities or a small subsidy could be justified.' [18]

What became the first stage in achieving regular and rapid aerial communication between Australia and England was inaugurated in December 1934. A new company made up of equal 49% shares each of QANTAS and Imperial Airways, with the remaining 2% held by referee Sir George Julius, was awarded the contract for the sector from Brisbane to Singapore.[19] For this service, Brisbane-based Qantas Empire Airways Ltd (QEA) received an annual subsidy of £63 685.[20] A typical outward flight departed from Archerfield, picked up the mail from southern states at Charleville a few hours later, spent the first night at Cloncurry and reached Darwin at the end of the second day. The following two-day journey between Darwin and Singapore was broken by an overnight stay at Sourabaya (present-day Surabya).[21] Imperial Airways flew the airmail and any passengers to Europe from Singapore.[22]

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[14] *CPD*, 3 November 1932, p. 1,815.
[15] *CPD*, 1933, 4 July 1933, p. 2,778-9.
[16] *CPD*, 17 September 1936, p. 263.
[17] Koninklijke Luchtvaart Maatschappij (KLM) had provided a service from Europe to the NEI since October 1930. The smaller air service, Koninklijke Nederlandsch-Indische Luchtvaart Maatschappij (KNILM) operated throughout the NEI.
[18] *BC*, 5 December 1932, p. 12.
[19] Dutch historian Marc Dierikx claims IA held 51%, in effect that the referee would be expected to back IA in any dispute.
[20] Hocking and Haddon-Cave, *Air transport in Australia*, p. 20.
[21] The first flights between Darwin and Singapore were not flown by QEA as the four-engine DH86 which had been purchased especially for the service was grounded due to airworthiness problems. QEA DH86s did not fly the Archerfield to Singapore section until late February 1935.
[22] W. H. Pilkington, 'Leaves from Mr W. H. Pilkinton's diary of his return trip by air from Australia to England', *Man and Aerial Machines*, 65 (November–December 1997), pp. 49-52.

Historian Leigh Edmonds blamed the eight-year delay between the 1926 Imperial Conference and the inauguration of the 1934 imperial airmail route on technological problems and the British Government's policy of wanting a monopoly airline operating the route.[23] For a number of years too, aircraft lacked sufficient range and reliability to undertake all segments of the 13 000 mile (20 920 km) journey.

In the late 1920s airships had held promise as a means of long-distance travel with minimum need for refuelling stops and British airship development was underwritten extensively by its government. Trial flights across the North Atlantic Ocean were conducted successfully. In a subsequent and highly politicised proving flight to India the ill-designed airship R101 crashed in France in October 1930. Amongst others, British Director of Civil Aviation Sir Sefton Brancker and the Air Minister, Lord Thompson, were killed. As a consequence, all British funding of airships for civil purposes ceased. The focus of development for long-range travel returned to fixed-wing aircraft.[24]

The British Government's desire for a monopoly airline operating the route also delayed the general establishment of more rapid communications. The Dutch 'chosen instrument' KLM was in a position to operate between Europe and Asia earlier than Imperial Airways, yet was delayed due to the need for reciprocal arrangements regarding use of British aerodromes en route. Dutch historian Marc Dierikx believes Britain and Australia presented joint opposition to Dutch aspirations to operate through to Sydney. KLM certainly provided a speedier service and by 1934 the number of KLM passengers considered 'English' had risen to 40%.[25] What the British saw as a matter of national prestige, Dierikx believes was a policy of obstruction, especially in not allowing the Netherlands East Indies (NEI) regional carrier KNILM to operate into Australia until 1938.[26]

The second phase of achieving regular communication between Britain and Australia commenced in 1938. This involved QEA aircrew flying Empire flying boats, aircraft which could belong to either Imperial Airways or QEA, along the Australian sector of

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[23] Leigh Edmonds, 'Australia, Britain and the Empire Air Mail Scheme, 1934–38', *Journal of Transport History*, 20 (1999), p. 92.

[24] Basil Collier, *Heavenly adventurer: Sefton Brancker and the dawn of British aviation* (London: Secker & Warburg, 1959), pp. 227-32; Douglas Botting, *The giant airships* (Alexandria, VA: Time-Life Books, 1980), pp. 127-31.

[25] Marc L. J. Dierikx, 'Struggle for prominence: Clashing Dutch and British interests on colonial air routes, 1918–42', *Journal of Contemporary History*, 26 (1991), pp. 341-5.

[26] Dierikx, 'Struggle for prominence', pp. 346-8. Permission for this was granted because Empire Air Mail Scheme flying boats needed access to refuelling bases in the NEI.

the Empire Air Mail Scheme (EAMS) route, that is between Rose Bay in Sydney Harbour and Singapore. This second stage required another four years of negotiations.

The EAMS proposal unveiled by the British Government in 1934 proposed an end to the airmail surcharge and lowering the overall rate to one and a half pence per ounce (28 grams) England to Australia.[27] This scheme, sometimes referred to as the all-up scheme, was planned to commence in 1938. Imperial Airways flying boats were to be used instead of land planes. Australia rejected the first British proposal of 1934, partly because the Commonwealth would lose the surcharge (formerly 1s 3d per half ounce [14 grams]) while at the same time would have been committed to an annual subsidy of £150 000 paid to Britain for the service.[28] After some twenty-nine separate considerations of modified proposals, Australia agreed to the scheme finally at the end of 1936.[29] Allocation of aircraft and preparation of landing facilities meant the first EAMS flight from Australia did not leave Sydney until 4 August 1938. It carried eight passengers, 265 lbs (120 kgs) freight and 207 lbs (94 kgs) of mail.[30]

The political pressure that Empire involvement placed on a nation also can be seen through the development of the South African air transport system during the same period. Nationalist-party politician Oswald Pirow strongly supported aviation, believing that national prestige would be enhanced by a regular and efficient show of air services throughout South Africa. Pirow was concerned that Imperial Airways, as well as conducting the passenger route from Britain to Cape Town, wished to control his country's internal air transport. Where possible he blocked their efforts, even promoting the purchase of German Junkers aircraft to be used by the nationalised South African Airways (SAA), the Union's 'chosen instrument'.[31] By 1937 he had negotiated Imperial Airways out of South Africa, reducing the EAMS to delivery only as far south as Durban, before SAA took over.[32]

In Australia the technological shift from land planes to flying boats necessitated duplication, albeit less expensively, of facilities along the coastline between Darwin and Sydney. It moved the arrival and departure of international aircraft away from the established aerodromes and temporarily avoided the need to expand land aerodromes to take larger aircraft. Flying boats required only refuelling facilities, a protected alighting

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[27] The rate from Australia to England was two pence per ounce (28 grams).
[28] Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 134.
[29] Edmonds, 'Australia, Britain and the Empire Air Mail Scheme', pp. 94-8; Hocking and Haddon-Cave, *Air transport in Australia*, p. 89; Robinson, *Carrying British mail overseas*, p. 290.
[30] John Gunn, *The defeat of distance: Qantas 1919–39* (St Lucia, Qld: UQP, 1985), p. 353.
[31] McCormack, 'Man with a mission', pp. 543-6.

area and a motor launch to ensure such reaches of water were free from obstructions. Even this the Commonwealth was slow to provide. In a later recollection of some of the difficulties QEA faced, Hudson Fysh was unusually critical:

> The fight for full facilities! What a job it was, what constant pressure it took for tantalisingly slow results. These were the days when Australia showed no action, or organised action, in getting things done in anything which involved construction and the expenditure of capital.[33]

The move to flying boats led inevitably to the removal of QEA's head office from Brisbane. Even as the new service commenced in 1938, construction of its base at Rose Bay in Sydney was incomplete.[34]

While international relations may have dominated the establishment of schemes to deliver airmail and thus shaped the air transport system to a considerable extent, the Commonwealth's relationship with the States also influenced the manner in which the system developed. The first issue to cause concern between the Commonwealth and the States was the fear held by the latter that Commonwealth subsidisation of air transport would reduce their market dominance and profitability in the area of rail transport.

According to Hughes, as a new system develops, it may also bring about the destruction of an alternate system.[35] This is what the Australian States feared. In a March 1921 editorial, *Aircraft* magazine answered one of the early criticism of subsidies to the WAA and QANTAS outback routes by pointing to 'the vast amount of public and borrowed money already sunk into the construction and maintenance of certain State-controlled, experimental railways which never have been made to pay, and in all probability never will.'[36] Such investments the States were unwilling to lose.

In 1926 Controller Brinsmead stated his belief that with civil aviation there was no attempt to compete with railways or other organised transport.[37] This, he said, was born out by the fact that subsidy payments were made to airlines not in conflict with State railway services. The determination to avoid duplication of services expressed by Brinsmead seems to have been given less emphasis after discussion on aerial

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[32] McCormack, 'Man with a mission', pp. 547-50.
[33] Hudson Fysh, *Qantas at war* (Sydney: Angus & Robertson, 1968), p. 73.
[34] Gunn, *The defeat of distance*, p. 342.
[35] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 52.
[36] *Aircraft*, 10 March 1921, n.p.

communication at the 1926 Imperial Conference in Britain. The change of policy is reflected in a 1927 statement supportive of air transport by Prime Minister Bruce:

> An aeroplane service between two large cities that are already linked by an adequate train service that enables the transport of business men by night must combine all of the attributes of speed, safety, reliability, reasonable cost and regular frequency to be an effective supplement or complement to the railway.[38]

Regardless of this conservative policy of regarding air transport as a supplementary system, the arguments against Commonwealth subsidising air-service operations in opposition to State railways continued into the 1930s. In July 1931 Ben Chifley, the Minister for Defence in the Scullin Labor government, reported that the Commonwealth was unable to provide financial assistance to Kingsford Smith's ailing ANA(1) operation between Brisbane and Melbourne. He did so while reminding his fellow government members of their criticism of the previous (Bruce) government's subsidising air services operating in opposition to government-owned railways.[39]

Though it no doubt suffered reduced influence, Australia's rail system was not destroyed by the development of the air transport system. While air transport provided fast service for small numbers of passengers and certain high-value goods, railways were better at carrying heavy goods with considerable physical mass. Though air transport was blamed for retarding growth of the railways system, lack of uniformity in rail gauge from state to state was equally as important a stumbling block. In a 1933 talk entitled 'Transport and Defence', Lt Col. J. J. Murray noted that while the railways would provide the most efficient means of long-distance transport of troops, because of the changes due to gauge differences 'it would take approximately twelve days to move a division of about 20,000 men with artillery from one capital city to another.'[40]

Criticism of subsidising air services which ran parallel to railway lines even found a place in the debate surrounding the 1936 referendum on aviation. This referendum came about as the Commonwealth endeavoured to validate its powers to control civil aviation sixteen years after it believed the matter had been settled legislatively.

On 1 November 1934 Sydney pilot Goya Henry was fined for flying while his pilot's licence was suspended. Henry challenged the authority of the Commonwealth to fine

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[37] *Aircraft*, 1 May 1926, p. 155.
[38] *Aircraft*, 31 July 1927, p. 148.
[39] *CPD*, 29–30 July 1931, p. 4,629.
[40] *SMH*, 11 October 1933, p. 14.

him, his case eventually being heard in the High Court. In its decision this court effectively declared the regulations for controlling civil aviation throughout the Commonwealth invalid. The grounds for this decision were that some of the regulations made since the passing of the *Air Navigation Act (1920)* were in conflict with the fundamental principles of the International Air Navigation Convention of 1919, upon which the subsequent regulations were based.[41]

State enabling legislation meant to be passed in 1920 had not been and, as the matter of aerial navigation was not an issue when the Constitution was written, it had not been dealt with in that document. The Commonwealth hoped that a referendum and the subsequent passing of a bill to be called the *Constitution Alteration (Aviation) Act 1936* would close the matter by adding 'air navigation and aircraft' to section 51 of the Constitution.

Historian Don Shearer believed the Commonwealth was unwise in attaching this seemingly innocuous alteration of the Constitution to an amendment dealing with the marketing of dried fruit. Along with the tendency of Australians to vote against changes to the Constitution, this action would appear to be partly responsible for the negative outcome.[42] So that the proposed changes might be understood, every elector received a pamphlet which argued the cases for and against both amendments. The Labor-supported case against the aviation question endeavoured to convince the voter that a 'Yes' choice would wreck the railway systems:

> You, the electors, have £311,486,688 invested in railway equipment upon which interest must be paid. There are 79,145 employees in the State railways. Their livelihoods are at stake.[43]

By comparison, the case presented for the amendment was argued logically and legislatively, and perhaps underestimated the sentiments involved. On 6 March 1937 the amendment was rejected in all States.

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[41] 'Aerial navigation – Convention for the regulation of', *CPP*, 4 (1920–21), pp. 479-524; Commonwealth of Australia, *The acts of the Parliament of the Commonwealth of Australia passed during the year 1920: Commonwealth acts vol. 18* (Melbourne: Govt Printer, 1920), p. 159; *R v Burgess; Ex parte Henry*, 55 CLR 608, (1936).

[42] G. A. (Don) Shearer, The foundation of the Department of Civil Aviation 1919–39, MA thesis, University of Melbourne, 1970, p. 60. Shearer was also an employee of the Department of Civil Aviation.

[43] Commonwealth of Australia, *Federal referendum: The case for and against* (Brisbane: Govt Printer, 30 December 1936), p. 12.

To resolve the issue, a conference of State and Federal Ministers was held in Melbourne on 16 April 1937. It was agreed the Commonwealth would draft the necessary enabling legislation for the States.[44] A new set of Air Navigation Regulations was gazetted on 5 August 1937 to encompass, amongst other things, the *Air Navigation Act (1936).* The validity of this act was confirmed in a second Goya Henry case in which the new regulations were upheld.[45] This Melbourne conference also raised the issue of public loss of confidence in the aviation industry, unrest in part due to the legislative uncertainty. The Premier of Tasmania even suggested 'the appointment of a royal commission or some similar body was essential to restore public confidence.'[46]

By 1937 the operational efficiency of the body charged with the administration of civil aviation was doubted by many within the industry. On 8 April 1936 a four-member Civil Aviation Board, still within the Department of Defence, had replaced the original three-section Civil Aviation Branch.[47] Edgar Johnston, who had taken over from the incapacitated Horace Brinsmead, was referred to thereafter as the controller-general of civil aviation. The controller of operations, responsible for the flying operations section and the aircraft section was Arthur H. Cobby. The controller of ground organisation, the same A. R. (Roley) McComb so closely involved with Eagle Farm Aerodrome in the 1920s, now looked after all the nation's aerodromes.[48]

Concerned individuals within the civil aviation industry were worried about two particular facets of the Board. The first was the strong influence of military matters and defence personnel in the civil sphere. The second was that the Board was not funded adequately enough to undertake the tasks that the development of the air transport system required. *Aircraft* published articles on the matter throughout 1937, pushing for a public enquiry so that there would be a 'general demand for the Government to give the Civil Aviation Board the staff, money and freedom from interference that it needs.'[49] The administration of civil aviation was limited, wrote an *Aircraft* correspondent, by 'the funds provided by the Government and the independence of action allowed the Board.'[50]

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[44] *Age*, 17 April 1937, p. 27.
[45] *CGG*, 5 August 1937, p. 1,338; Commonwealth of Australia, *The acts of the parliament of the Commonwealth of Australia passed during the year 1936*, (Canberra: Govt Printer, 1936); *R v. Poole, Ex parte Henry*, 61, CLR 634 (1939).
[46] *Age*, 17 April 1937, p. 27.
[47] *CGG*, 7 April 1936, p. 621.
[48] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 35. Brinsmead was injured in an air accident while travelling on a KLM aircraft in Asia. Repatriated to Australia, he did not return to his post in the Branch.
[49] *Aircraft*, May 1937, p. 7.

The *Bulletin* was more forthright. In the same week when the first ANA(2) DC2 aircraft were placed on the route between Brisbane and Adelaide one of its correspondents commented:

> Aeroplanes are now definitely in advance of landing grounds, which continue to be a disgrace, and equally in advance of training facilities for pilots and beacon facilities for routes. With the time in sight when Australia will be seven days from London and three days from China, Mascot still has a gravel runway which big planes and little planes, autogiros and joy-riding obsolescents, fast mail planes and training Moths share in an atmosphere of irritated democracy which must be unique in the world.[51]

Evidence of how little the Commonwealth spent on civil aviation is apparent from a survey of tenders for work on aerodromes advertised in issues of the *Commonwealth Government Gazette*. Having reduced the amount of money spent on government aerodromes to as little as possible between 1930 and 1932, with signs of recovery the Commonwealth at first tackled the problems associated with neglected maintenance. Drainage repairs were conducted on Perth's Maylands Aerodrome.[52] Paint was applied to some buildings at Essendon Aerodrome.[53] Some improvements were made at the Camooweal, Brunette Downs and Roma landing grounds.[54]

Between May and October 1934, having spent sums of between £300 and £1 120 on improvements at Roma, Camooweal and some capital-city aerodromes, the Commonwealth spent a significant £2 398 3s 6d on construction of runways at Charleville.[55] As the DH86 aircraft operating the Australian sector of the imperial airmail route then about to commence were quite capable of operating on the all-over grass aerodromes then in existence, this unusually large expenditure on upgrading has to be attributed to Charleville's position as one of the compulsory stops on the 1934 Melbourne Centenary Air Race. The preparation of runways at Charleville ensured that the racing aircraft with their higher landing speeds were catered for.[56] Other aerodromes less under the focus of international interest and publicity did not receive the same

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[50] *Aircraft*, August 1937, p. 5.
[51] *Bulletin*, 8 September 1937, p. 13.
[52] *CGG*, 5 January 1933, p. 30; *CGG*, 19 January 1933, p.89; *CGG*, 30 November 1933, p. 1,661.
[53] *CGG*, 9 March 1933, p. 338.
[54] *CGG*, 19 January 1933, p. 89; *CGG*, 20 April 1933, p. 530.
[55] *CGG*, 27 April 1933, p. 564; *CGG*, 11 May 1933, p. 733; *CGG*, 31 May 1934, p. 833.
[56] SMH, 23 October 1934, p. 11. This newspaper reported that although heavy rain had recently fallen, the new runways at Charleville were in excellent condition. Flood lighting and guiding beacons were also in place. The lead plane (Scott and Campbell-Black) had arrived there at 10:40 p.m. the previous evening.

treatment. Charleville was the aerodrome on the international airmail route from which mail for Melbourne and Sydney was flown south to Cootamundra and thus a justifiable expense. National prestige may also account for the desire to have this compulsory landing point as up-to-date as possible.

As the economy improved in the mid-1930s, so too did the calls for government assistance. In March 1935 Minister for Defence Archdale Parkhill acknowledged that:

> Constant and numerous applicants are being made from practically every centre in the various states for Commonwealth assistance towards the construction of aerodromes. Some persons in various country towns suggest that it would be of advantage to construct aerodromes there and immediately the Commonwealth Government is asked to provide the money.[57]

Though local boosters might have imagined an aviation-led recovery for their town, the finance was not forthcoming from the Commonwealth. As the Minister told his fellow members in 1935, 'I desire to make it clear that the amount of money available for expenditure on aerodromes is in no sense adequate.'[58] Despite that advice, later the same year the member for the Darling Downs, Sir Littleton Groom, requested an extension to the Toowoomba (Qld) aerodrome. This licensed government aerodrome of 87 acres 1 rood 19.4 perches (35.5 ha) had been established early in 1928. Groom claimed an increase in the size and therefore in the importance of the town necessitated the extension. The aerodrome was extended in 1938, though this was to meet the Toowoomba City Council's requests that the site be 'more suitable for use by the larger types of commercial aircraft now in operation.'[59]

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[57] *CPD*, 20 March 1935, p. 187.
[58] *CPD*, 20 March 1935, p. 187.
[59] *CPD*, 30 November 1935, p. 1,157; *CGG*, 16 February 1928, p. 328; *CGG*, 26 January 1928, p. 94; Minute paper for executive council no. 61 dated 22 November 1938, Toowoomba Aerodrome Part 1, QL875 Part 1, J56/11, NAA (Qld).

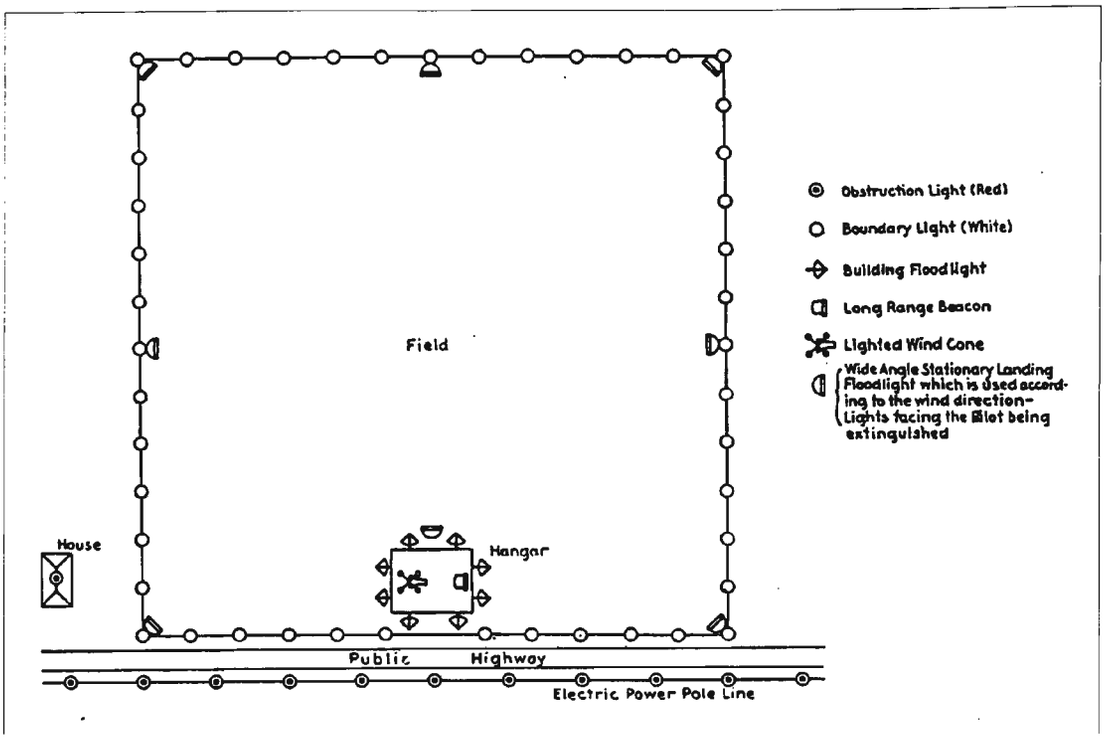

Figure 5: Plan of airport lighting for square airfield
Source: Archibald Black, *Civil Airports and airways*, p. 157

Advances in technology forced the first round of major expenditure on Government-owned aerodromes from 1936. Though flying and landing at night by scheduled services did occur from the late 1920s, it could not be conducted regularly until aerodromes in the capital cities were equipped with electric, rather than kerosene flare illumination.[60] (See Figure 5.) Late in 1936 the Commonwealth invited tenders for the lighting of Archerfield.[61] (See Figure 6.) This required globe lighting amounting to £2 750 to be placed on the perimeter, the building area, and at the wind indicator.[62] Lighting the other capital-city aerodromes commenced in 1937. Because most were smaller in area than the 279 acre (112 ha) Archerfield, the costs were substantially less.[63]

[60] *BC*, 13 June 1929, p. 11.
[61] For reasons as yet unknown Archerfield was usually the first aerodrome to receive these new facilities.
[62] *CGG*, 23 December 1936, p. 2,318.
[63] The contract to light the 179 acre (72 ha) Mascot aerodrome was for £873 12s 0d. Parafield's 300 acres (121 ha) cost £1 565 to illuminate with boundary lights. Perth's 125 acre (50 ha) Maylands Aerodrome was illuminated for £897.

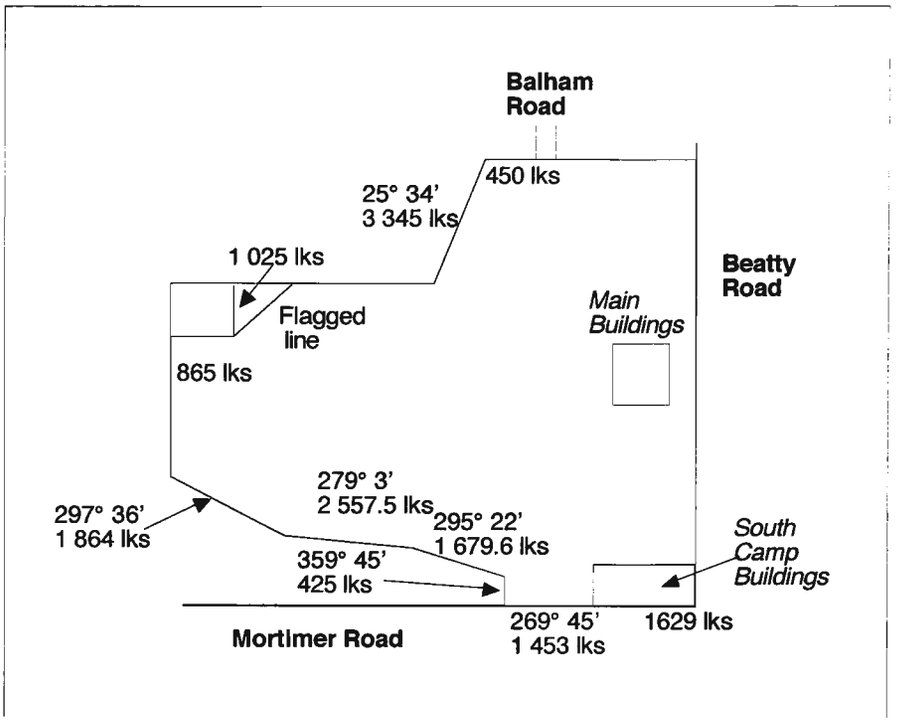

Figure 6: Author's sketch of boundary lights, Archerfield Aerodrome 1943. The original 1937 perimeter did not extend as far north as Balham Road, running instead horizontally just north of the main buildings.
Source: Plan dated 18 June 1943, Archerfield Aerodrome, LS783, J1018/2, NAA (Qld)

In 1936 Minister for Defence Archdale Parkhill explained why lighting on capital-city aerodromes was being provided in preference to their development in places such as Gladstone (Qld). Once again a Minister for Defence stated that the policy the government was compelled to adopt was one of 'spending the comparatively limited amount of money available for civil aviation at the airports and aerodromes which are on the national airways and are essential for defence.'[64]

Having made the decision in the early 1920s to establish aerodromes on subsidised routes, the Commonwealth was committed to providing the funds necessary to retain and maintain them. In the United States the federal government by the Commerce Act of 1926 elected not to become involved in the funding of aerodromes. The Republican administration of the time feared not only the prohibitive costs but also the federal-state politics and accusations of 'pork-barrelling' which would result if the federal government became the patron of ground facilities.[65] Funding for aerodromes in the USA was provided in the main by the respective municipal authorities. While that nation's system of aerodromes was by consequence slow to develop its network

[64] *CPD*, 17 September 1936, p. 263. This is one of the first found Australian usages of 'airports', as opposed to aerodromes.

structure, the inability of the Australian Commonwealth to finance new aerodrome buildings and extensions until the latter years of the 1930s resulted in much the same end.

Issues of the *Commonwealth Government Gazette* from 1937 show this eventual and marked increase in spending. That year buildings to house the officers in charge of transmitters and meteorological equipment were constructed on capital-city aerodromes. Radio transmitter buildings were built at Kempsey, Kalgoorlie and Rockhampton in 1938.[66] Government aerodromes which could act as emergency landing grounds (ELGs) for airliners travelling the major air routes at night also received lighting. This was the case for Goulburn in New South Wales, Benalla in Victoria and Western Junction in Tasmania.[67]

Aircraft's continued criticisms of the administration now centred on the Board's inability to have those ground facilities made operational. The use of radio navigation equipment depended on it being certified. This process was delayed by lack of a suitable test aircraft. In March and June 1937 the Board was given Cabinet approval to purchase an aircraft as long as it was of British manufacture. Because this involved delay while a suitable aircraft was designed and constructed in Britain, the Board submitted (19 May 1937) and re-submitted (23 September 1937) its request for an American aircraft. On 14 March 1938 Cabinet gave permission for the purchase of a British Percival Q6 aircraft, as well as the hire of a Lockheed 12 for around 300 hours of test time.

By June 1938 two radio navigation beacons were ready for testing. By August another five were ready.[68] In September an order for a Percival Q6 from Britain finally was placed. Then the finance member of the Board, M. C. Langslow, prevaricated over the hourly hire rate for the Lockheed 12. This concern about hire costs commenced in February 1938 and was still being debated when on 25 October 1938 the ANA(2) DC2 *Kyeema* carrying fourteen passengers and four crew crashed into the Dandenong Range with a total loss of life. Commonwealth hesitancy in providing the financial resources needed to complete the system of radio navigation then evaporated, the administration of civil aviation was restructured and a rebuilding of faith in air travel commenced.

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[65] Douglas, 'Airports as systems and systems of airports', p. 58.
[66] *CGG*, 7 April 1938, p. 1,264; *CGG*, 7 July 1938, p. 1,879; *CGG*, 8 December 1938, p. 2,806.
[67] *CGG*, 29 July 1937, p. 1,299. *CGG*, 4 November 1937, p. 1,937; *CGG* 2 December 1937, p. 2,154.
[68] MacArthur Job in *Aircrash* reports three beacons ready for testing by the end of August and a total of six beacons ready by mid-October.

The establishment of the air transport system and by consequence the aerodrome system involved solving a number of related problems. The first, of improving communication between Europe and Australia, resulted in the establishment of an airmail scheme in which Australians gained first-hand experience in all aspects of international air-service operation, from piloting and engineering to navigation and administration. Another problem, of ensuring the defence of the country, led to Government landing and alighting areas being available in strategically important locations. Some had night and radio-navigation facilities. This did prove advantageous when at the end of the decade it was realised Britain might be too busy fighting in Europe to assist in Australia's defence in the Pacific. Some problems faced by the builders of the system were intractable and beyond prediction. In often-dramatic ways these problems forced the slow hand of government to finance the construction of facilities which in turn reduced the chance of accidents and thus increased the safety of passengers. In the documents of the times, and the built fabric of Archerfield and other system aerodromes, is the evidence of the resolution of these problems.

Chapter 10

'Though the future is somewhat obscure at the moment, I can assure you we are ready to go ahead with big things when the time arrives that this can be done without the danger of going broke in the procedure.'[1]

Despite early economic setbacks, the air transport system worldwide expanded between 1930 and 1939. Subject to the same underlying technological and social forces, so too did the air transport system in Australia. Hours flown increased nearly 300%; distance covered increased over 400%. Yet at same time the Australian system developed a technological style quite different to that which evolved in other countries. Unlike Europe and the United States, the Australian island-continent was dry and generally flat, its population sparse. Here the country was less affluent, its aviation more regulated. The air transport system influenced, and was influenced by these factors. The role played by economics in development during this decade is evident in the country's aerodromes, and how the companies that operated from them fared.

Historians agree that serious misgivings were being expressed about the strength of the Australian economy even in the 1920s.[2] At the Imperial Conference in 1926, Prime Minister Bruce invited a delegation to visit Australia to report on the development of Australia's resources. When the British Economic Mission finally arrived in Brisbane late in 1928, the *Brisbane Courier* reported the group of four was most impressed by 'the cheery personality of the Australians, their virility and the fact that nearly everyone seemed to be associated with some altruistic movement.'[3]

In their report on Australia's economy, however, the British businessmen warned that the protective use of tariffs and arbitration of wages had raised costs to an extent likely to damage the primary industries, the sector on which they believed health of the nation's economy heavily depended.[4] The Mission's assessment of air transport was that it was 'difficult to over-estimate the benefit to be derived from the development of

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[1]Hudson Fysh to Edgar Johnston, letter dated 5 January 1932, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.
[2] Gordon Greenwood, *Australia: A social and political history* (Sydney: Angus & Robertson, 1974), p. 340; Stuart Macintyre, *The succeeding age 1901–42*, vol. 4, *The Oxford history of Australia* (Melbourne: OUP, 1986), pp. 251-2.
[3] *BC*, 18 October 1928, p. 13.
[4] 'Report of the British Economic Mission to Australia', *CPP*, 2 (1929), pp. 1,231-72.

this service', but also that 'it should gradually be self-supporting, at which stage the present Government subsidy should be withdrawn.'[5] This did not occur in the 1930s.

A fall in export prices for primary products in 1929, followed by another in 1930, resulted in a reduction in business activity and an increase in public debt and unemployment. The Australian economy moved towards depression. In an attempt to improve the state of the economy, and after an advisory visit by English banker Sir Otto Niemeyer, the States resolved at a meeting in Melbourne in 1930 to balance their budgets and drastically reduce their levels of borrowing. Despite these measures, by the start of 1931 unemployment had increased to 25.8%.[6] Sustenance, in the form of ration orders, was distributed to the unemployed. Later, relief work was made available.

According to Stuart Macintyre, the timing of the recovery was by no means obvious, though by the end of 1933 the worst of the Depression was over.[7] With recovery, the government debt reduced from a peak of £25 370 000 in 1930–31 to £4 500 000 in 1932–33.[8] Business and the economy improved very gradually throughout the remainder of the decade.

The Brisbane *Telegraph* in its financial supplement of early 1933 could see some signs of that improvement at a local level. It reported that in the previous year, company registrations had increased slightly. Bankruptcies had decreased. Certain 'sheltered' companies such as CSR Company Ltd, Millaquin and the City Electric Light Co. Ltd of Brisbane remained viable, but local department stores had suffered downturns. Retailers Allan and Stark Ltd and McDonnell and East Ltd reported a loss for 1931 and only a small profit in 1932. Profit for McWhirters store reduced by £17 206 during the same period. Breweries though, still tended to earn 'fairly good profits'.[9]

While many of the world's developed countries were in economic turmoil, air transport worldwide in the 1930s was in a period of slow but steady growth. According to Hughes, a major explanation for growth is 'the drive for high diversity and load factors and a good economic mix.'[10] At this point in their development, air transport systems had to grow to survive. Airlines needed to explore the viability of additional routes, to

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[5] 'Report of the British Economic Mission to Australia', pp. 1,252.
[6] Macintyre, *The succeeding age*, p. 253.
[7] Macintyre, *The succeeding age*, p. 286.
[8] *Official year book of the Commonwealth of Australia*, vol. 32 (Canberra: C'wealth Govt Printer, 1939), p. xxxi.
[9] *Telegraph*, 20 January 1933, Financial Supplement, p. 16.
[10] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 72.

ensure as many available seats as possible were occupied on each flight and to generate income, if possible, through a mix of aviation-related activities. In Australia, as in the rest of the developed world, airline networks expanded during the 1930s.

This unexpected growth during a period of economic depression can be attributed to those themes already noted as underlying aviation development in the 1930s: the provision of subsidies aimed at improving communication, improvements in technology, the inherent potential of aviation as a civil rather than a military enterprise and airline network consolidation, particularly in the domestic sphere. Not so apparent in the statistics, though still evident, is the increasing enthusiasm people were gaining for the experience of flight.

Without subsidisation, few airlines would have survived the 1930s. In Europe some airlines developed as the 'chosen instrument' of national policy. Airlines which held this particular status could dominate routes financially because, as the provider of a service sanctioned by the government, commercial viability was secondary to national prestige. As Table 2 indicates, the level of government support provided to individual airlines in Europe mid-decade varied considerably from country to country:

Table 2: Income and subsidies, in US dollars, of major European airlines, 1936.[11]

AIRLINE	COUNTRY	TOTAL INCOME WITH SUBSIDY	AMOUNT OF SUBSIDY	SUBSIDY % OF INCOME
KLM	Netherlands	$2 927 027	$210 661	7.2%
ABA	Sweden	$900 000	$168 000	18.7%
Imperial Airways	Great Britain	$7 387 512	$2 047 656	27.7%
SABENA	Belgium	$840 448	$228 565	34.3%
Deutsche Luft Hansa	Germany	$12 012 019	$5 091 034	42.4%
Air France	France	$47 190 550	$30 973 174	65.6%
Ala Littoria	Italy	$5 061 055	$3 431 123	67.8%

Any government money received by Australian airways or air-service operations in the 1930s came from one of three sources. The first was the Department of Defence, which paid by mileage flown or weight of mail carried. Administered by the Civil Aviation Branch, this subsidy provided a guaranteed minimum amount paid for any subsidised flight. The second source was the Postmaster-General's Department (PMG), which paid for the carriage of mail each flight by weight. The third was a special grant to civil aviation of £3 000, allocated after 1934. At its most expansive, this grant was extended to

[11] Marc L. J. Dierikx and Bram Bouwens, *Building castles of the air: Schipol Amsterdam and the development of airport infrastructure in Europe, 1916–96* (The Hague: Sdu Publishers, 1997), p. 27.

only six companies, individuals or organisations.[12] All subsidies were paid on the basis of improving communication for the residents and businesses of Australia.

The first form of assistance, subsidies provided by the Civil Aviation Branch of the Department of Defence after 1921, provided a guaranteed lump sum per annum. For subsidised companies, obtaining finance for the purchase of capital equipment such as new aircraft and hangars was easier. Generally considered the better option, this first form of assistance was also more difficult to obtain.

Companies flying particular routes might obtain Commonwealth money through contracts awarded by the Postmaster-General's Department. From 1931 PMG contracts provided airline operators on specific routes with an average of eight shillings per pound (0.45 kg) for the weight of mail actually carried. As the use of domestic airmail increased, this second form of assistance was sufficient to ensure regularity of income and profitability.

The third form of financial support emerged as a direct, if somewhat belated response to the effects of the Depression on aviation commerce. In July 1933 Sir George Pearce announced a grant of £3 000 to be spent solely on assisting the industry. Applications for the grant were received from forty-one companies or individuals.

Of the Queensland applications, Brisbane aviation booster T. H. Bishop (Skytravel Ltd) asked for support for a once-weekly service between Brisbane and St George in western Queensland. Tom McDonald (North Queensland Airways) requested £780 for a thrice-weekly service between Cairns and Cooktown. Geoff Wickner asked for £500 assistance in the completion of a low-wing, two-seat monoplane he had designed.[13] Rockhampton Aerial Service, formed by Harold Fraser in 1930, submitted two applications for the grant money: the first was for £500 to help fund the regular Rockhampton-to-Brisbane route he flew; the second was for nine pence per mile (0.45 km) on a service between Rockhampton and the inland community of Mt Coolon.[14]

The last of the Queensland applications came from Ron Adair's Aircrafts Pty Ltd (APL), which asked for a subsidy of £650 (5s 9 d per mile) for a Brisbane-to-Cracow

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[2] In 1934 this grant went to four companies, one individual (the loan of an aircraft to Frank Roberts for experiments on the transportation of fish) and one organisation (the Far West Children's Health Scheme for the hire of plane and pilot [Nancy Bird] for an aerial baby health clinic).

[3] In the latter part of the 1930s Wickner travelled to England, where he become involved in aeronautical design. During the Second World War he flew as a ferry pilot for the Air Transport Auxiliary. His aircraft designs included the Wicko Lion and the Wicko Wizard.

service. At the time Cracow had no telephone or telegraph and was 32 miles (51 kms) by road from the nearest town of Theodore. Adair proposed that a flight of less than three hours from Brisbane would relieve the two-day journey to Rockhampton which Cracow's gold-mining residents normally faced.[15]

Aircrafts Pty Ltd had survived since incorporation on 5 August 1927 by operating a Brisbane-to-Toowoomba service and charter operations when possible.[16] By the year ending 30 June 1933 the company was barely functioning, flying less than an average of one hour per day and covering only 30 000 miles (48 280 kms). The annual report revealed a net loss of £1 202 4s 9d.[17] Even joy flights, the saviour of many small operators, had fallen off considerably. In his director's report Adair announced however that prospects were 'brightening up'.[18] Around the same time he wrote somewhat differently to Controller Edgar Johnston, 'I am afraid I can see the writing on the wall...it looks like just waiting until we will be all out.'[19]

When all forty-one applications for the £3 000 special grant had been considered, only six organisations received funds. Two were Queensland companies. Adair's APL received £650 per annum to support its Brisbane–Cracow route. Rockhampton Aerial Service received £858 for a Rockhampton-to-Mt Coolon flight. Both were once weekly in each direction. Funding was renewed annually until 1938.[20]

Commercial prospects certainly improved for the Queensland recipients of the special grant money. In April 1934 Adair advised Johnston in personal correspondence that 'last year we made a profit of £500, and this year will equal that at least, and have also written off our plant on the books—but this has only been through the strictest economy and personal retrenchment.'[21] The company announced a surplus of £140 18s 10s the following year. This was despite the destruction of its Hawk Moth in an accident at

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[14] Applications for participation in special £3 000 civil aviation grant, Four minor services. Special £3,000 allocation for civil aviation, 192/102/45, MP131/1, NAA (Vic.).
[15] Edgar Johnston, minute paper dated 11 December 1933, Four minor services. Special £3,000 allocation for civil aviation, 192/102/45, MP131/1, NAA (Vic.).
[16] *BC*, 23 August 1929, p. 18.
[17] Report of directors for year ending 30 June 1933, APL, Register of Companies Office, Brisbane, 104A/1937, A/33754, QSA.
[18] Report of directors for year ending 30 June 1933, APL, Register of Companies Office, Brisbane, 104A/1937, A/33754, QSA.
[19] Ron Adair to Edgar Johnston, letter dated 19 June 1933, E. C. Johnston, Miscellaneous correspondence 1927–35, CAHS.
[20] 'Annual report of the auditor-general for the year ended 30 June 1934', *CPP*, 4 (1932–33–34), pp. 2,433-4; 'Annual report of the auditor-general for the year ended 30 June 1938, *CPP*, 5 (1937–38), p. 2,145.
[21] Ron Adair to Edgar Johnston, letter dated 23 April 1934, E. C. Johnston, Miscellaneous correspondence 1927–35, CAHS.

Archerfield in May 1935. Annual hours increased to 450 and mileage to 47 495 (76 435 kms). This figure included the Cracow flights, indicating only a marginal if any increase in normal business.[22] In the latter part of the 1930s and with the introduction of a two-engine DH84 Dragon aircraft, APL extended its routes to Goondiwindi, St George, Rockhampton, Kingaroy, Monto, Wondai and Thangool.[23] Had it not been for the special grant, the company could not have offered this expanded network of regional Queensland routes.

The other Queensland company in receipt of the special grant money was less fortunate. Registered by Harold Fraser with £5 000 capital in April 1930, Rockhampton Aerial Service (RAS) commenced operations in October 1931 by delivering newspapers from Rockhampton to Duaringa, Springsure, Emerald, Clermont, Mt Coolon and Cracow.[24] By mid-1933 RAS held the lease for the Rockhampton Aerodrome site and had constructed one hangar. The company also employed two pilots, an engineer and an assistant. According to Harold Fraser, in August 1933 RAS was losing £500 per annum and he would be 'reluctantly compelled to suspend operations' unless it was successful in its grant application.[25] Unfortunately, from 1934, a series of five accidents in a period of just over two years placed a financial drain on the company which even receipt of the grant money could not halt.[26] Rockhampton Aerial Services was taken over by Airlines of Australia (AOA) in September 1936.

Of the thirteen aviation companies formed in Queensland in the four-year period between 1929 and 1933, only the two which were in receipt of government support of some form of government support were still in operation in 1934.[27] The companies

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[22] Schedule C, APL, Four minor services. Special £3,000 allocation for civil aviation, 192/102/45, MP131/1/0, NAA (Vic.); Report of directors for year ending 30 June 1935, APL, Register of Companies Office, Brisbane, 104A/1927, A33754, QSA.

[23] John Wilson, 'A brief history of Queensland Airlines Pty Ltd', *AHSA Aviation Heritage*, 30 (1999), p. 21.

[24] *Aircraft*, 1 August 1931, p. 13; Register of Companies 1930–32, Register of Companies Office Brisbane, A/18950, QSA; Taxi & medical trips from 1 January 1934 to 10 August 1934, Four minor services. Special £3,000 allocation for civil aviation, 192/102/45, MP131/1, NAA (Vic.); Glenn S. Cousins, *Men of vision over Capricorn: A story of aviation history in Central Queensland* (Brisbane: Boolarong Press, 1994), pp. 63-70.

[25] Harold Fraser to CCA, letter dated 7 August 1933, Interdepartmental committee on air communications, 192/127/66 Part 1, MP347/1/0, NAA (Vic.); A. C. Tulloch to DDG for Allied Works, memo dated 13 October 1943 (attachment by A. J. Lavercombe dated 8 October 1943), Rockhampton Aerodrome, QL422 Part 1, J56/11, NAA (Qld). On 2 October 1936 RAS transferred its interest in the lease of the aerodrome site to Harold Fraser for £1 000.

[26] VH–UER force-landed on the beach near Bundaberg on 5 May 1934. Off Caloundra, it force-landed into the sea again and was wrecked on 7 December 1935. VH–UFW force-landed on a beach and overturned on 1 April 1934. Incoming tide damaged it after another forced landing on 29 December 1935. The aircraft was written off after its engine fell out near Capella on 19 July 1936.

[27] The thirteen companies formed included Aircraft of Australia Company (1930), Airschools and Taxis Company Ltd (1930), Airways (Interstate) Ltd (1930), Brisbane Airways Ltd (1930), Burnett Air

which failed did so because in economically stringent times the small customer base each served could not support an operation which was not subsidised. In general these companies were short-lived. Reliable Airtravel Ltd flying an aircraft named *Warrego* operated between Brisbane and Cunnamulla in 1935. Burnett Air Navigation flew from Brisbane to Murgon via Nanango and Kingaroy between July 1931 and October 1932. Skytravel (Aust.) Pty Ltd serviced the Brisbane–St George route from November 1930 to February 1931.[28] *Glorious Queensland*, the four-seat Junkers F.131 aircraft owned by T. H. Bishop's Skytravel (Aust.) Pty Ltd, though still on Archerfield in April 1931, was sold to a company in South Africa a short time later.[29]

The second theme behind the 1930s growth of air transport, especially in the latter years of the decade, was the improvement in technology. At least some technological advances were due in part to the economic pressure which the Depression placed on the aircraft manufacturing industry in the United States. When the stock market crashed in 1929, the makers of aircraft there turned their full attention to the one sector of the market where demand was increasing—the production of commercial transport aircraft.[30] Larger aircraft meant more carrying capacity, a higher possible load factor and inevitably, growth. The first of the all-metal, low-wing monoplanes, Boeing's Model 247, was somewhat over-shadowed by the larger Douglas DC2. Australians had the opportunity to compare both through the enormous publicity which examples of each received when placed second and third in the 1934 Melbourne Centenary Air Race. (See Figure 7.) The role of technological development in air transport and aerodrome expansion will be discussed more in the next chapter.

Navigation Ltd (1930), C. C. Matheson Flying School (1930), Downs Air Service Ltd (1931), Eagle Aeronautical Constructions of Australia Co Ltd (1931), Kingsford Smith Aero College Ltd (1932), Mackay Airways Ltd (1930), Maryborough Airways and School of Flying (1931), New England Airways (1931), Rockhampton Aerial Services (1930), Sky Travel (Australia) Pty Ltd (1930) and Skyways (1933).

[28] *Aircraft*, 1 August 1931, p. 13. Howard G. Quinlan, 'Air services in Australia: Growth and corporate change, 1921–96', *Australian Geographical Studies*, 36 (1998), pp. 157-8; Register of Companies 1930–32, Register of Companies Office Brisbane, A/18950, QSA; Letter to shareholders, 18 April 1935, Reliable Airtravel Ltd, Register of Companies Office, Brisbane, 155/1934, A34006, QSA.

[29] *The Week*, 15 April 1931, p. 21; Memorandum & Articles of Association, 27 March 1930, Sky Travel (Aust.) Pty Ltd, Register of Companies Office, Brisbane, A/33908, QSA; Unidentified aircraft 1920–30, Photographic collection, JOL.

[30] Deborah G. Douglas, The invention of airports: A political, economic and technological history of airports in the United States, 1919–39, PhD thesis, University of Pennsylvania, 1996, p. 306.

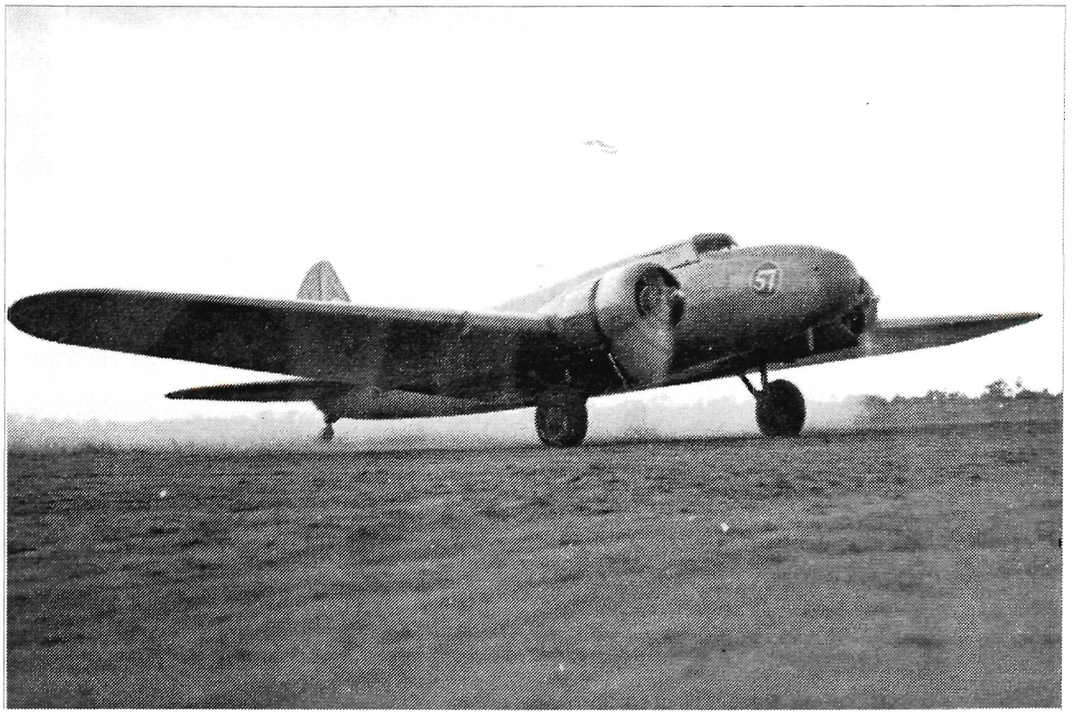

Figure 7: Boeing 247D taxiing at Charleville, 23 October 1934. Flown by Americans Roscoe Turner and Clyde Pangborn, this aircraft was placed third in the air race.
Source: AHSA (Qld) via Richard Hitchins

The third theme underlying aviation growth was the fact that its overall potential was just beginning to be explored by air transport companies in the 1930s. For such companies, attaining commercial viability was more than being aware of improvements in technology. It was finding, often by trial and error, the right mix of technological components to suit commercial, as opposed to the military applications. Worry about keeping QANTAS commercially competitive produced the executive anguish evident in documents written both contemporaneously and reflectively by Hudson Fysh.

The engine–airframe match of the DH50 provides one example. QANTAS constructed five of these British-designed aircraft in its Longreach hangar in the late 1920s. Instead of the usual powerplant, a Jupiter engine was substituted in three of those produced. In his memoirs four decades later Fysh wrote of the 1928 event with underlying irony. The company, he acknowledged, 'nearly doubled the horsepower, and incidentally the cost of producing the aircraft—without making any more payload or volumetric capacity to carry it available'.[31] On the positive side he added that 'the much greater reliability of the Jupiter and the longer periods between overhauls constituted a great saving.'[32] In the

[31] Hudson Fysh, *Qantas rising* (Adelaide: Rigby, 1965), p. 189.
[32] Fysh, *Qantas rising*, p. 189.

early 1930s when the aircraft were still causing problems, Fysh complained in a letter to Edgar Johnson about two of the engines which had 'cracked up', concluding, 'There is no doubt the flying game is still chock full of worries and uncertainties.'[33] While increased horsepower would have equated to greater speed, a useful asset for a fighter aircraft, improvements in payload were far more important to the commercial operator.

Fysh's actions and correspondence indicate a business manager forever considering how events might benefit his company. In 1930 QANTAS offered hangarage at Eagle Farm to another company, the first ANA. 'It shows our endeavour for goodwill, saves Kingsford Smith money, provides extra business for ourselves and keeps a new organisation for repair and housing of aircraft out of Brisbane,' Fysh explained at the time in a letter to the company's chief pilot, Lester Brain.[34]

At separate times QANTAS investigated the purchase of land outside the boundaries of both Eagle Farm and Archerfield aerodromes. To allow for future expansion, in 1930 the company purchased from Servanus Otterspoor a block of five acres (2 ha) on the eastern side of Beatty Road at Archerfield, adjacent to where their hangars were situated.[35] The commercial acumen of Hudson Fysh, and his constant monitoring of what aviation might provide in the way of business, contributed to the success of QANTAS, the company which subsequently played an important role in the commercial development of the Australian air transport system, especially at an international level.

The early years of the 1930s no doubt were difficult for airlines worldwide. In Europe in 1931 a total of thirty-one airlines operated 762 aircraft of German Dutch, French or British manufacture.[36] In 1939 airlines numbering one fewer operated only seventy-seven more aircraft. Twelve percent of the total number of those aircraft were now of American manufacture.[37] According to historian Marc Dierikx, no European airline showed a profit before 1940.[38] Subsidised as they were, and protected by bilateral agreements as to ticket and freight costs, airlines competed only in the areas of speed and comfort. Britain (Imperial Airways) and the Netherlands (KLM) competed on the route to Asia, the political influences of which were noted in the previous chapter.

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[33] Hudson Fysh to Edgar Johnston, confidential letter dated 14 November 1932, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.
[34] Hudson Fysh to Lester Brain, letter dated 14 November 1929, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.
[35] Hudson Fysh to Lester Brain, letter dated 14 July 1927, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML;P. A. Edwards, valuations dated 28 November 1942, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld).
[36] Ronald E. G. Davies, *A history of the world's airlines* (London: OUP, 1964), p. 69.
[37] Davies, *A history of the world's airlines*, p. 121. These figures do not include the then USSR and Czechoslovakia.

The fourth theme underlying system growth during the decade was the consolidation of airline companies and routes. Economic benefits could be gained by changes in company structure. Standardisation of aircraft types reduced maintenance costs. A singular corporate structure increased administrative efficiency. While the trend is clear in all developed countries, in the United States this largely economic feature of system growth was politically charged.

The US airline system had its beginnings in federal support after 1925 of the carriage of mail by air. Though federal politicians were slow to establish a regulatory framework and left the development of aerodromes to municipal authorities, they did not object to funding what was regarded as an extension of an already existing government service which assisted in communication—the delivery of mail.

From 1925 government airmail contracts for sectors which generally followed the established rail routes were allocated according to a bidding system. Many small companies were formed to operate these sectors. Few carried passengers. Following Charles Lindbergh's solo flight of the Atlantic Ocean in 1927, the previously neglected airmail companies found more than adequate investment money available to buy out the opposition or invest in new aircraft. By 1930 the more than thirty smaller air-service operations had been reduced to four major operators—American Airways, Eastern Air Transport, United Air Lines and Transcontinental Air Transport (later TWA).

Newly appointed US Postmaster General Walter Folger Brown, keen to foster national passenger air transport, used his power over the awarding of airmail contracts to rationalise the existing competitive situation into 'three transcontinental routes, several north-south lines and only one operator per route.'[39] With a change of government in March 1933 came accusations that Brown's arranging of 'spoils conferences' for the largest airlines only was unconstitutional, unethical and possibly illegal.[40] The Roosevelt administration cancelled all contracts and gave the task of delivery of airmail to the Army Air Corps which, ill prepared and ill equipped, lost twelve pilots in the first five weeks. Newly renamed airline companies—American Airlines, Eastern Air Lines, TWA Inc. and an unchanged United Air Lines—won the new round of airmail contracts. Steady growth marked American air transport for the remainder of the decade. According to

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[38] Dierikx and Bouwens, *Building castles of the air*, p. 26.
[39] O. E. Allen, *The airline builders* (Alexandria, VA: Time-Life Books, 1981), p. 88.
[40] Douglas, The invention of airports, p. 150.

Deborah Douglas, this drama over airmail contracts was what triggered a change in US federal policy towards greater control over aviation, and that included airports.[41]

Australian airlines commenced their development earlier, though lacking a large population base they were slower to grow. The increased expense of establishing an airline, as well as the Commonwealth's restriction on the importation of aircraft constructed in the US until late 1935, restricted the number of medium-to-large operators to a group which included ANA(1) until 1931, AOA, WAA, MMA, QANTAS and the well-financed ANA(2) on domestic routes, with QEA operating the international route to Singapore. Though the system at the outbreak of the Second World War owes much to the role of government subsidies, some credit also must be given to the entrée of surface transport companies into air transport. These motor and shipping interests possessed the funding required for the consolidation of smaller air-service companies into airlines.

The genesis of ANA(2) was Tasmanian Air Services, which in April 1934 won the subsidy contact to deliver airmail between Melbourne and Hobart. This included the overseas airmail brought to Australia by Imperial Airways and QEA. Ivan and Victor Holyman, the principals of the subsequently renamed Holymans Airways Pty Ltd, came from a family with connections to shipping. With added financial backing from two other shipping companies in 1934, and a further two in 1936, a new company was formed—the second ANA. The 1936 consolidation was a complicated arrangement. Holymans Airways merged with the Adelaide Airways, owned by the Orient Steam Navigation Company Ltd and the Adelaide Steamship Co. Ltd. In this way, ANA(2) gained South Australian regional routes as well as the Adelaide-to-Perth subsidised route which Adelaide Airways had taken over from WAA.

Another surface transport concern moved into air transport in the south-east Queensland region. George A. Robinson established the New England Motor Company (NEMC) in 1918 to provide bus services in the Lismore district and to Brisbane. By 1927 a NEMC vehicle departed Brisbane daily at 7:45 a.m., arriving in Lismore at 5:30 p.m. A daily return Murwillumbah-to-Brisbane service also operated, taking five hours each way.[42] Aircraft engineer Trevan Jackson, who grew up at Coraki (NSW), recalled that 'the New England Motor Company used to cut big tourers and sedans, Hudsons, Cadillacs,

[41] Douglas, The invention of airports, p. 154.
[42] *BC*, 5 November 1927, p. 28.

Studebakers etc. in half and lengthen the chassis to take extra doors, then add two or three more passenger seats.'[43]

Encouraged by Lismore pilot Keith Virtue of Virtue's Air Travel, on 1 January 1931, Robinson formed New England Airways (NEA) to fly between Lismore and Brisbane.[44] With the demise of ANA(1) and QAN in the first half of 1931, NEA took over the route of the former and the assets of the latter. Operating from Archerfield from 17 July 1931, NEA benefited by a payment from the Postmaster-General's Department for the airmail it carried between Brisbane and Sydney.

Because operations south required a maintenance base on Mascot Aerodrome, the company purchased the hangar originally erected by Kingsford Smith and Ulm's ANA(1).[45] Robinson wished to expand NEA's routes but needed capital. In November 1935 the plant, staff and assets of NEA were taken over by a new concern, Airlines of Australia Limited (AOA), backed by the investment group British Pacific Trust Ltd. From funds raised through the sale of 75 000 shares, twin-engine Monospar ST18 aircraft were purchased from Britain so that services might be expanded north along the Queensland coast and possibly south, beyond Sydney to Melbourne and in competition with ANA(2).[46]

After import restrictions on American aircraft were removed late in 1935, AOA imported four Stinson aircraft into Australia. These faster, three-engine airliners flew both south and north from Archerfield.[47] In September 1936 AOA took over its northern competition, Rockhampton Aerial Services, in this expansion becoming a greater threat to its southern opposition, ANA(2). Negotiations between financier British Pacific Trust and ANA(2), driven partly by the latter's concern for its inter-capital-city routes, led to a merger by share sale of AOA and ANA(2) in March 1937. British Pacific Trust Ltd effectively withdrew. Robinson of AOA was sidelined. The combined operation took over Tom McDonald's North Queensland Airways Pty Ltd (NQA) in October 1938. AOA eventually was absorbed into ANA(2) in July 1942.

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[43] Trevan Jackson, Random ramblings of an early bird 1934–51, unpublished manuscript, 2001, p. 2.
[44] Valerie R. Dennis, Circuits and bumps: The development of commercial aviation in Queensland between 1920 and 1940, PostgradDip thesis, University of Queensland, 1997, p. 49.
[45] Company prospectus, Airlines of Australia Ltd, Register of Companies Office, Brisbane, 10/1939, A34054, QSA; Liquidator ANA to Sec. DOD, letter dated 21 November 1933, Mascot Aerodrome – Lease of hangar allotment to ANA, CL10996, SP228/1, NAA (NSW).
[46] *Aircraft*, 2 December 1935, p. 12.
[47] Two of these, VH–UHH and VH–UGG, were destroyed in separate crashes on 19 February and 28 March 1937 respectively.

By the end of the decade a small number of major airline companied dominated the structure of the Australian air transport system. MacRobertson-Miller Aviation Co. Ltd (MMA) was the west's largest air-service company. ANA(2) and AOA operated services from Perth through the south of the continent and the major capital-cities, then north to Horn Island at the tip of Cape York Peninsula. QEA flew internationally while QANTAS worked its remaining outback Queensland routes. Specific intercity routes dominated the network. Though consolidation had reduced the number of operators, no airline could yet survive by the carriage of passengers alone. In its reliance on subsidies and its process of consolidation, the air transport system in Australia developed similarly to systems overseas. As in the USA, well-financed companies began to dominate particular routes. In technological style though, it differed.

Technological style is the end result when national, regional and local factors shape a particular system. Hughes referred to the concept as by consequence being appropriate to the description of that system.[48] For reasons that include historical experience, geography and local conditions, the Australian air transport system differs in technological style from the systems which developed in Europe and in the USA.

Natural geography contributed to technological style, and ultimately affected where aerodromes were sited and how they expanded. In the 1930s the inter-capital-city routes grew to dominate the network structure of Australian air transport for the first time. These networks, and the placement and influence of city aerodromes, still dominate the network today. In the USA the network style developed along transcontinental lines, stretching much like their rail systems between New York and Los Angeles, via regional hubs such as Chicago and Atlanta. Considerably more airports were developed to cater for these routes, as the comparison in Table 3 shows:

Table 3: Comparison of numbers of licensed aerodromes, USA and Australia, 1926–38.[49]

YEAR	AUSTRALIA: TOTAL NUMBER OF AERODROMES, GOVERNMENT AND LICENSED.	USA: TOTAL NUMBER OF AIRPORTS, MUNICIPAL AND PRIVATE.
1926	55	823
1930	96	1 037
1938	271	1 833

[48] Hughes, 'The evolution of large technological systems', pp. 68-70.
[49] Paul Barrett, 'Cities and their airports', *Journal of Urban History*, 14 (1987), pp. 114-5; *Official year book of the Commonwealth of Australia*, vol. 23 (Canberra: C'wealth Govt Printer, 1930), p. 216; *Official year book of the Commonwealth of Australia*, vol. 31 (Canberra: C'wealth Govt Printer,

Australian routes were generally longer and less populated than in Europe. The expense of operating extended routes to isolated regions reduced both competition and frequency of service. Generally only one air-service company could afford to operate into country areas or routes not linking Australian capital cities. APL's subsidised Brisbane-to-Cracow service commenced weekly in each direction in 1934. That same weekly service was still flown five years later with no need for duplication.[50] Capital-city aerodromes received flights with increased frequently though. New England Airways commenced Brisbane-to-Sydney flights twice weekly in each direction from 17 July 1931. Daily (except Sunday) services commenced on 1 September 1932, a reflection of increased demand from the public.[51]

The 1930s no doubt were difficult years for the Civil Aviation Branch and the companies which operated from and into Archerfield. Having purchased, cleared and fenced the 'Rocklea' site, the Civil Aviation Branch spent little on the airfield until 1934. As early as March 1930 Hudson Fysh was advised that light, power and telephone might not be installed there because, as Edgar Johnston explained, 'you no doubt realise that finances are very low at present'.[52] Finances must have been found as these services were in place when the aerodrome opened in April 1931.[53]

Conditions were made a little easier for tenants of government aerodromes nationwide by a rebate of one third on hangar rentals from 1 March 1931. This discount was granted, Controller Brinsmead explained, because 'in the present difficult times it is considered that some measure of assistance is due to those aircraft operators who are tenants of this Department.'[54] An added rationale may have been the desire to preserve aviation's skilled workforce. Similar reductions occurred on all government-owned aerodromes.

For QANTAS, aerodrome site rental was less of a liability than for other companies. According to the contract for their Camooweal–Brisbane route, QANTAS was required

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1938), p. 170; C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 179.

[50] *Official year book of the Commonwealth of Australia*, vol. 27 (Canberra: C'wealth Govt Printer, 1934), p. 194; *Official year book of the Commonwealth of Australia*, vol. 32 (Canberra: C'wealth Govt Printer, 1939), p. 145. By comparison, QEA commenced the Brisbane–Singapore service once weekly using the DH86 on 26 February 1935. This service was duplicated (operated twice weekly) from 16 May 1936.

[51] Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 101.

[52] Edgar Johnston to Hudson Fysh, letter dated 21 March 1930, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.).

[53] *BC*, 2 April 1931, p. 15.

to pay a rental of only one shilling per annum on its hangar sites at Charleville, Cloncurry, Longreach and the site for hangar no. 4 on Archerfield.[55] By comparison, annual ground rental for their hangar no. 5 on Archerfield was £164 1s 3d.[56]

As from 1 September 1934 a rental rebate of two-thirds of the original rental applied to all hangar allotments at Government civil aerodromes.[57] This greater discount continued until 31 December 1935 and was replaced by a 50% rebate of the contractual figure on capital-city aerodromes. This last reduction was withdrawn gradually, being one third of the original amount again after 1 January 1937. On that date country aerodromes lost all rebate.[58]

QANTAS was the largest operator on Archerfield, but the same percentage rebate applied to Henry Williams in November 1935 when he erected a Comet steel frame hangar on no. 3 lease site. For a lease 70 feet 6 inches square (462 square metres), running for a period of nine years, Williams paid a rental of £62 2s 6d per annum subject thereafter to the standard rebates. This hangar was occupied by Frank Higginson & Co., an engineering concern that also provided hangarage for the APL aircraft operated by Ron Adair.

In line with cutbacks on spending by the Commonwealth, the Civil Aviation Branch reduced both its expenditure on wages, as per the *Financial Emergency Act (1930)*, and on aerodromes.[59] Cutbacks meant fewer new aerodromes were constructed and less spent on those already existing. Some work was conducted on aerodromes as part of the relief work program, though nowhere near the amount conducted on aerodromes in the United States. In 1934, in the US state of Florida alone, the total expenditure on airport projects by the relief agencies amounted to nearly $US1.1 million.[60] A total of eleven US federal agencies spent nearly $US138 million on civil airports and landing areas nationwide between 1933 and 1938.[61]

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[54] Horace Brinsmead to managing director QANTAS, letter dated 28 March 1931, Archerfield hangars 4 and 5, QL128, J56/11, NAA (Qld).
[55] A. Percival to James Orwin (WD Brisbane), memo dated 26 August 1931, James Orwin to managing director QANTAS, letter dated 16 October 1931, Archerfield hangars 4 and 5, QL128, J56/11, NAA (Qld). This was known as a peppercorn lease.
[56] Contract for lease between Commonwealth and QANTAS, dated 14 August 1931, QL128, J56/11, NAA (Qld).
[57] A. Percival to WD Brisbane, memo dated 5 September 1934, QL128, J56/11, NAA (Qld).
[58] Sec. Property & Survey Branch to Sec. DOD, memo dated 26 September 1935, QL128, J56/11, NAA (Qld).
[59] *CGG*, 31 May 1934, p. 838.
[60] Douglas, The invention of airports, pp. 354-5.
[61] Douglas, The invention of airports, p. 601.

Civil aviation benefited little from Australian relief programs, though not for the lack of trying. In 1932 the Commonwealth introduced a scheme which was to provide £3 million funding for industrial works nationwide. Queensland was allocated £620 000, half of which was provided by the Commonwealth, half to be found by the State Government. Works were administered through the State Employment Council (SEC) but undertaken by applicant companies or local councils.[62]

Controller Edgar Johnston used formal and informal channels to try to divert some of this relief program money towards the construction of aerodromes. In June 1932 he corresponded on the matter with QANTAS' Hudson Fysh, stating:

> We have been able to secure quite a few pounds of this money for expenditure on Commonwealth aerodromes [in New South Wales]. We have also prompted interested municipal councils in that State to approach the Employment Council to have funds allocated to them for preparation of aerodrome sites. I am also anxious to get some of these funds for expenditure on aerodromes in other States and am writing to interested councils in these other States along the same lines, suggesting that they make application to the Employment Council when appointed.[63]

At the third meeting of the Queensland State Employment Council committee which dealt with relief proposals related to industry and mining, requests from nine Queensland councils were considered. None asked for funds to construct or repair aerodromes.[64]

Johnston even asked Fysh if he could 'do anything in a quiet way to have any of the members [of the State-appointed Employment Council in Queensland] made sympathetic towards the requests for funds for aerodromes.'[65] No mention of such an approach appears in State Employment Council committee minutes to November 1932.

In July 1932 the SEC committee discussed a proposal directly from the Defence Department for £23 400 to be spent on aerodromes in Queensland. Members of the committee argued that as the aerodrome asset belonged to the Commonwealth, there

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[62] *CPD*, 24 May 1932, p. 1,281.

[63] Edgar Johnston to Hudson Fysh, personal & confidential letter dated 8 June 1932, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.

[64] Minutes of a meeting dated 20 May 1932, State Employment Council – Reports of proceedings of meetings of the Industry, Mining and Works Committee, 28 January 1932 to 11 November 1932, PRV11468, QSA.

would be no advantage for the State. The matter was referred to the Premier for a determination.[66] Relief money being allocated for labourers constructing or repairing aerodromes in Australia was not accepted as readily as in the United States. Battling to spend the relief money quickly to alleviate hardship over the winter months, the Queensland SEC committee in the end allocated its quota to road construction and water supply projects.

Despite this, numbers of licensed public aerodromes increased during the early years of the 1930s because their preparation was regarded as a positive expenditure of public money at a local level. The *Brisbane Courier*'s aviation columnist Propeller, a firm believer in the future of aviation, informed his readers of the preparation of an aerodrome at Stanthorpe during 1930. No regular aerial services operated to the town, but he believed that 'with the return of normal conditions new air routes will be opened up.'[67] Stanthorpe then would be able to 'reap the benefits of foresight and citizenship'.[68]

Table 4 indicates an increase of 69% in the number of licensed public aerodromes nationally between 1930 and 1931. At the same time the number of government aerodromes actually decreased by one. The following year the number of licensed public aerodromes increased a further 42%. The aerodrome system continued to expand despite economic setbacks because like the air transport system it was in a period of growth. With or without Commonwealth financial support, local authorities did not want their towns to be passed by from lack of an aerodrome.

Table 4: Numbers of Australian aerodromes 1928–32[69]

YEAR	GOVERNMENT OWNED AERODROMES	LICENSED PUBLIC AERODROMES	EMERGENCY LANDING GROUNDS (ELGS)	TOTAL, NOT INCLUDING ELGS
1928	46	13	94	59
1929	56	19	108	75
1930	58	39	114	97
1931	57	66	121	123
1932	58	94	124	152

[65] Edgar Johnston to Hudson Fysh, personal & confidential letter dated 8 June 1932, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.
[66] Minutes of a meeting dated 22 July 1932, State Employment Council – Reports of proceedings of meetings of the Industry, Mining and Works Committee, 28 January 1932 to 11 November 1932, PRV11468, QSA.
[67] *BC*, 4 April 1931, p. 15.
[68] *BC*, 4 April 1931, p. 15.
[69] *Official year book of the Commonwealth of Australia*, vol. 26 (Canberra: C'wealth Govt Printer, 1933), p. 194.

Reliable reports of relief program money spent on aerodromes by municipal authorities are difficult to locate. In 1934 Ron Adair was the first to land at the Morgan Park reserve at Warwick. A gang of relief labourers supervised by the Warwick Town Council had cleared the ground over a period of five months. According to Adair's passengers, staff reporters from the *Courier-Mail*, 'They did not conceal their pride in being associated with the notable event'.[70] Where the funding for this originated has yet to be established.

Direct Commonwealth funding allowed relief work to be conducted on Mascot Aerodrome. In June 1932 a tender was accepted for 4 000 cubic yards (3 088 cubic metres) of fill to be delivered to the airfield.[71] In his autobiography engineer Doug Fawcett, whose mother held the catering rights to the aerodrome in the early 1930s, recalled how fill was transported in large steel tipping buckets which 'would be released and tipped at the sound of the foreman's whistle and waiting men would start spreading the sand.'[72]

Archerfield Aerodrome was not a typical Australian capital-city aerodrome. Constructed to the latest standards in 1930, it required little extraordinary expenditure, unlike Mascot, Essendon and Maylands. Archerfield's air-service operators still faced problems common to all aviation companies. The economic influences on these companies, the need for subsidies, the desire to expand, the threats raised by consolidation as other companies expanded and the promises of technology still allow this aerodrome to reveal how economic factors influenced Australia's air transport and aerodrome systems in the 1930s.

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[70] *CM*, 11 April 1934, p. 13.
[71] *CGG*, 23 June 1932, p. 832.
[72] *CGG*, 24 October 1929, p. 2,238; *CGG*, 13 November 1930, p. 2,249; Doug Fawcett, *Pilots and propellers: A lifetime in aviation* (Bathurst, NSW: Crawford House Publishing, 1997), p. 76.

Chapter 11

'To leave England on Saturday morning and arrive in Melbourne on Tuesday afternoon is, on all previous records, a performance even yet hardly credible.'[1]

Not only did air transport systems throughout the world grow during the 1930s, they evolved to represent progress itself. Distance was measured now in hours rather than miles or kilometres. So much did wings symbolise the spirit of this new transport system that architects incorporated them into the designs for the more specialist buildings they now erected on aerodromes.

Behind these advances were the men and women of technology, the aeronautical engineers who in the early 1930s developed aircraft which allowed airline companies to move beyond government subsidies towards a self-sustaining, passenger-carrying industry. The greatest improvements were in aerodynamics and powerplant technology, but the problems of flight by night and in bad weather also were solved. Each new innovation, each design modification which created speed or power, measured progress.

Developing to keep pace with the advancing technology of aircraft, the design of aerodromes moved into its third generation phase, the archetypal configuration of an airport we recognise today. A modern passenger terminal building sometimes crowned with a control tower housed ancillary services such as air traffic control, meteorology and administration. A concrete apron rationalised and directed the movement of passengers from terminal to aircraft, away from life-threatening contact with propellers or moving planes. Hidden from the public face of the aerodrome, large maintenance hangars accommodated airframe sections and 'shops' for engine overhaul, specialist welding and instrument repair and fitting. Along the way the terminology modernised. Airways and air-service operators became airlines. In Australia, as usual a few years behind changes overseas, aerodromes moved a step closer to being referred to as airports.

The aircraft indelibly linked to 1930s are the low-wing, all-metal monoplanes recognised best in the Douglas DC series. They represented speed, safety, modernity and an aerodynamic efficiency not associated with passenger aircraft such as the Avro Ten of the previous decade. Despite the fact that they were innovative, these new designs all involved some degree of compromise.

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[1] *SMH*, 24 October 1934, p. 12. (editorial)

Any individual component must add to performance (either by increasing speed, safety or range) without adding excessively to aircraft weight if it is to enhance the economic viability of the whole aircraft. The result is usually calculated in passenger-seat-miles. What made the Douglas DC3 so popular was that when all its innovations were taken into account, this twenty-one passenger aircraft carried more people at a lower operational cost. The Ford Tri-motor, a 1920s aircraft carrying eleven passengers and similar in design to the Avro Ten, cost 2.63 cents per seat-mile to operate. The DC3 operated at 1.27 cents per seat-mile. Cruising at 190 mph (305 kph), it was clearly a more attractive vehicle for airline operation.[2]

Creating the efficient commercial airliner of the 1930s involved making improvements in two key areas—aerodynamic efficiency and powerplant performance.[3] Improvements happened gradually and as a result of a complex of ideas and forces. As noted by John B. Rae in his history of the American aircraft industry, 'It was a series of changes, no one of which was sufficient by itself.'[4] The resultant modern airliner in turn forced changes on aerodromes built in the 1920s to accommodate aircraft of that earlier decade.

In the first of the key areas of developments in aircraft technology, aerodynamic improvements were made by the introduction of a single cantilevered wing. For commercial aircraft, this design gradually replaced the biplane configuration. An all-metal fuselage rather than a fabric-covered one added to streamlining and increased cruise speeds. The use of aerodynamic devices such as flaps allowed that speed to be slowed to a safer pace for landing.

More representative of the older style of aircraft, fabric-covered QANTAS DH86 biplanes operated to Singapore from hangar no. 5. The more advanced tubular-steel framed Stinson monoplanes, which Airlines of Australia (AOA) flew between Townsville and Sydney, were serviced in hangar no. 2. (See Figures 8 and 9) QANTAS' Hudson Fysh compared these two quite different designs of aircraft in a letter to Controller Johnston, interestingly for a pilot making no reference to the Stinson's more modern features of low wing and retractable undercarriage:

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[2] Deborah G. Douglas, The invention of airports: A political, economic and technological history of airports in the United States, 1919–39, PhD thesis, University of Pennsylvania, 1996, p. 561; Ronald Miller and David Sawers, *The technical development of modern aviation* (London: Routledge & Kegan Paul, 1968), p. 27.

[3] Miller and Sawers, *The technical development of modern aviation*, p. 48.

[4] John B. Rae, *Climb to greatness: The American aircraft industry, 1920–60* (Cambridge, Mass.: MIT Press, 1968), p. 74.

> We are all impressed with the Stinson Tri-motor and I have had a run in it in the cabin and the cockpit. I feel it should suit the inter-city runs quite well. The cabin, of course, is not nearly up to the standard of the DH86, but it is nicely fitted and its smallness will not be noticed on inter-city work.[5]

Figure 8: Interior view of AOA Model A Stinson airliner
Source: Trevan Jackson Collection

Figure 9: Interior view of QANTAS DH86
Source: AHSA (Qld) via Richard Hitchins

Improvements in powerplant and propulsion, the second key area of developments in aircraft technology, came in the form of greater engine power, variable pitch propellers and improvements to fuel. Two engine design standards emerged from the First World

[5] Hudson Fysh to Edgar Johnston, letter dated 24 April 1936, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.

War. By the mid-1930s those in the forefront of British engine manufacture favoured an in-line arrangement of cylinders for aircraft engines. The QANTAS DH86 aircraft each weighed 10 250 lbs (4 649 kgs) and were powered by four, in-line, Gipsy Six engines, each rated at 200 horsepower. In the United States air-cooled radial engines dominated development. The Boeing 247 at 12 650 pounds (5 738 kgs) weight was powered by two 550 horsepower Pratt and Whitney Wasp radial engines. The first of the Douglas DC series, the DC1 weighing 17 500 pounds (7 938 kgs), made its initial flight in July 1933 on two 710 horsepower Wright Cyclone radials.[6]

More powerful engines allowed greater weight to be carried, but without any improvement in speed on the thick wings of the aircraft designed in the 1920s. Finer, more aerodynamic wings therefore were produced to carry additional weight at a higher cruise speed. The problem of reducing that speed sufficiently to land safety was overcome by the British Handley Page company's invention of flaps. This aerodynamic device at the trailing edge of the wing increased wing area and curvature, simulating a thicker and therefore safer wing for landing. On the Stinson airliner the flaps operated electronically.

Other incremental changes contributed to the overall economic advantages introduced by the modern airliner. The average time between engine overhauls, an efficiency welcomed by airline operators, increased from 300 flying hours in 1929 to 500 flying hours in 1936.[7] Propeller design advanced with the introduction from the Hamilton Standard company of a 'governed' or variable pitch propeller in 1935. High-speed aircraft required this mechanism on their propellers so that they would be efficient when taking off (in fine pitch), and equally as efficient when cruising (in course pitch).[8] Variable pitch propellers were fitted to the Wright Cyclone engines of the Douglas series as well as on the engines of the Stinson airliners.

Engine designers also discovered that more power could be developed when fuel with a higher octane rating was used. Tetra-ethyl lead added to fuel from California produced an octane rating of 80/87, which became an industry standard.[9] While this higher octane rating did not make a DH60 training plane go faster, the more efficient burn of fuel from consistently standard batches provided a small financial bonus for companies operating multi-engine airliners.

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[6] O. E. Allen, *The airline builders* (Alexandria, VA: Time-Life Books, 1981), p. 126.
[7] Miller and Sawers, *The technical development of modern aviation*, p. 88.
[8] A. C. Kermode, *Mechanics of flight* (London: Pitman Publishing, 1972), p. 146.

In a 1994 article on the value of retractable landing gear, technology historian Walter Vincenti argued that improvements in aircraft design involve the resolution of tension between conflicting requirements. In his particular case study, retractable landing gear as a component needed to add to performance, but not appreciably to overall weight, if it was to improve design. Component development costs could not be high, and whatever the innovation, it needed to be reliable and easy to maintain.[10] Most of those criteria apply to the aerodynamic and powerplant innovations mentioned above.

Vincenti's argument can be applied to areas other than aircraft components. Improvements in aeronautical technology also created tension between conflicting requirements on the ground. One of the first of these tensions was to ascertain what type of landing surface best suited the new, faster aircraft, and calculate how it could be achieved within budgetary allocation.

As fabric gave way to metal in the air, at major aerodromes the all-over field disappeared under the prepared surface of a landing strip or runway. The traditional explanation for the introduction of runway configuration is that grass proved inadequate for faster and heavier aircraft. In 1962 Reynyer Banham explained, 'because they [new generation airliners] were fast they could afford to be tolerant of wind direction, even if their weight made them intolerant of grass surfaces, and landing and take-off operations were soon concentrated on a few narrow concrete strips.'[11]

Yet in Britain and Australia, concrete runways were slow to gain acceptance. A number of reasons may have contributed to this. In 1929 Charles Ulm of ANA(1) expressed his concern that mud on a concrete runway would make it slippery, even for an aircraft with brakes. As a witness to the Parliamentary Standing Committee investigation of Mascot in 1938, Allan Murray-Jones of de Havilland Aircraft stated concrete runways were very hard on tyres.[12] By the end of the decade the editor of *Flight* grudgingly acknowledged, 'The steadily increasing weight and take-off speed of transport machines will probably

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[9] Though it was replaced as a standard by 100/130 octane AVGAS, 80/87 octane remained obtainable in Australia until the early 1980s.

[10] Walter G. Vincenti, 'The retractable airplane landing gear and the Northrop 'anomaly': Variation selection and the shaping of technology', *Technology and Culture*, 35 (1994), p. 8.

[11] Reyner Banham, 'The obsolescent airport', *Architectural Review*, 132 (1962), p. 252.

[12] Parliamentary Standing Committee on Public Works, 'Report together with minutes of evidence and plan relating to the proposed development of the civil aerodrome at Mascot, NSW', *CPP*, 3 (1929–30–31), p. 895; Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW* (Canberra: Govt Printer, 1938), p. 32.

mean that the landing areas at our larger terminals will need to be modified to take at least one major runway.'[13]

In his 1930 treatise on aerodrome design, engineer W. R. Baldwin-Wiseman viewed the problem of landing surface as one of maintenance. He wrote that with an 'increase in the number and weight of planes and in speed of approach in landing and speed in taking off, the damage to the turf by the tyres of undercarriages, tailskids and trampling feet, especially in prolonged wet weather, renders some other form of surface necessary.'[14] Exactly what form of surface had yet to be specified in 1937 when the British Air Ministry laid down the minimum standards for aerodromes used by heavy airliners. In these specifications, aerodromes receiving commercial airliners were required to construct and maintain landing strips in four directions. Three of these were to be 3 000 feet (915 metres) by 600 feet (183 metres), the fourth 3 900 feet (1 189 metres) by 1 200 feet (366 metres) wide.[15] Surface format still remained a problem though. According to a *Flight* evaluation of Croydon Airport in 1938:

> Probably half a dozen expensive accidents have occurred with medium-sized machines in the last year...and the cause in almost every case has been the nature of the surface on which the pilot is expected to put down while his landing vision may be almost entirely and suddenly obscured by snow or heavy rain.[16]

Factors other than weight and size of aircraft had a strong influence on exactly when runways were introduced. Cost was a major consideration, in varied ways. The first paved runway in the USA was constructed in 1923 at Boston Municipal Airport where the cost of improving its filled land for omnidirectional use was so great that improvements were made only in those areas of predominant wind direction.[17] Alternatively, the first concrete runway was constructed at Ford Airport in Michigan in 1929, where cost was not a restrictive factor.[18] In Australia, where all capital-city aerodromes were funded by the Commonwealth, cost was of prime concern. As in

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[13] *Flight*, 20 January 1938, p. 77.
[14] W. R. Baldwin-Wiseman, 'Some ground aspects of aviation', *Society of Engineers*, (1 December 1930), p. 242.
[15] Watcyn Williams, Civil airports, Dick Sanders Collection, 1953, p. 5.
[16] *Flight*, 27 January 1938, n.p.
[17] Wood Lockhart, 'A pilot's perspective on airport design', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Art Institute of Chicago and Prestel-Verlag, 1996), p. 215.
[18] Ford Airport was a private airport at Dearborn in Michigan used for company purposes. It did not serve greater Chicago. Indications are that when aircraft noise bothered the Ford family's recreation, the airport was closed on Sundays.

Britain, concrete runways were not constructed until the Second World War, and then as a consequence of the introduction of even heavier aircraft.

Improvements in aircraft technology placed pressure on Australian aerodromes because the Government, though aware of overseas developments, was slow in preparing the ground system for the new aircraft technology. The *Bulletin* alerted its readers to the aerodrome system's shortcomings when ANA(2) introduced the fourteen-passenger Douglas DC2 on the service between Brisbane and Adelaide in 1937. 'Aeroplanes,' the *Bulletin* correspondent wrote, 'are now definitely in advance of landing grounds, which continue to be a disgrace, and equally in advance of training facilities for pilots and beacon facilities.'[19]

Where some kind of landing surface was necessary, Australia's aerodrome owners constructed landing strips. These were a cheaper alternative to formed runways. Such a strip would likely be gravel-surfaced, or where necessary sprayed with road oil having an asphalt content of 60% to 70% so as to provide a waterproof layer.[20] Mascot was provided with an all-weather landing strip of gravel during 1930–31. The situation had not changed by 1937 when Edgar Johnston described the landing strips there as consisting 'largely of spoil from demolished Sydney buildings, which is rolled in with a heavy roller, and on top of which there is a coating of French's Forest gravel, which is watered and heavily rolled.'[21]

Two landing strips each 1 334 feet (406 metres) by 75 feet (23 metres) were completed at Charleville in October 1934 specifically to cater for the competitors in the MacRobertson Centenary Air Race.[22] Essendon was provided with landing strips of 3 000 feet (915 metres) north to south and east to west, as well as a run of 3 750 feet (1 143 metres) north-west to south-east in 1935.[23] Archerfield Aerodrome remained an all-over grass airfield.

The introduction of commercial night flying was not so much an improvement in design as the consequence of air-service companies wanting to generate greater income from a more reliable piece of machinery. In the United States non-passenger airmail flights at night were conducted from 1924. To achieve this, rotating beacons were located every

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[19] *Bulletin*, 8 September 1937, p. 13.
[20] Baldwin-Wiseman, 'Some ground aspects of aviation', p. 244.
[21] Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW*, p. 8.
[22] *CGG*, 31 May 1934, p. 833; Arthur Swinson, *The great air race: England-Australia 1934* (London: Cassell, 1968), p. 38.
[23] *Age*, 17 January 1935, p. 8.

25–30 miles (40–48 kms) along each route. Major aerodromes were permanently lit. Operations were safer in fine weather.

Night flying attracted Australian companies and pilots as well. Early in 1929 pilot and engineer Tom Young fitted neon lights under the wings of VH–UGH to advertise Wunda Wax polish during what he claimed was the first night flight over Brisbane.[24] Similar activities were conducted in southern States and, to aid in the delivery of Australian airmail, rotating beacons with a visible range of 66 miles (106 kms) were located between Adelaide and Kalgoorlie.[25]

While navigating at night in fine weather by following beacons lights was not difficult, landing in the dark presented the dual problems of identifying the direction from which the wind was blowing and estimating the height of the aircraft above the ground. On capital-city aerodromes, temporary illumination usually was installed first. As a young boy living next to Mascot Aerodrome in the early 1930s, Doug Fawcett often helped out with that aerodrome's temporary night flying arrangements:

> There was always a panic if the wind changed, and we would have to scurry to alter the whole flare-path. Kerosene flares were used until the Chance light came into being. This was a large search light, getting its power from a generator driven by a four-cylinder car engine. The whole unit was fitted to a trailer and towed into position by a small truck or pulled by hand. The light was directed into wind at the take-off or touchdown point, creating a long, brightly lit flare path.[26]

What Fawcett did not mention, perhaps because he did not regard it as significant, was that the light was not provided by the Civil Aviation Branch but had been purchased by ANA(1) to ensure the safety of their airliners arriving at Mascot after last light.[27] (See Figure 10.)

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[24] Greg Banfield, 'Transcript of interview with Tom Young', *AHSA Aviation Heritage*, 32 (December 2001), p. 164.
[25] Baldwin-Wiseman, 'Some ground aspects of aviation', p. 249.
[26] Doug Fawcett, *Pilots and propellers: A lifetime in aviation* (Bathurst, NSW: Crawford House Publishing, 1997), pp. 74-5.
[27] Parliamentary Standing Committee on Public Works, 'Mascot Aerodrome report', p. 895.

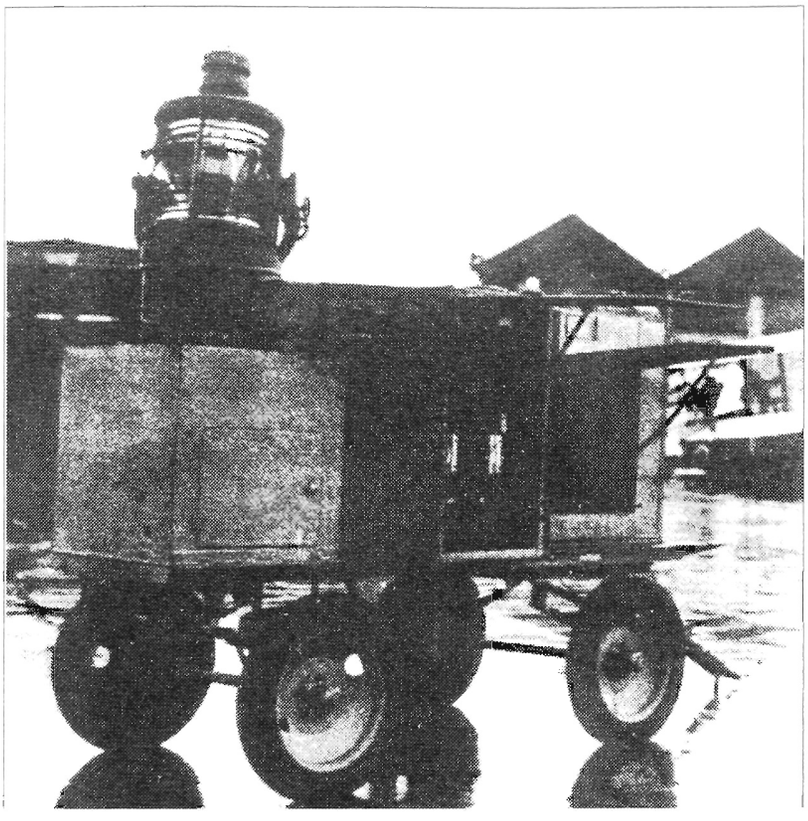

Figure 10: A mobile Chance floodlight beacon.
Source: *Flight,* 11 September 1931

Facilities were more primitive on Eagle Farm in the late 1920s. Reporting to Hudson Fysh, QANTAS pilot Lester Brain wrote: ' There have been a number of enquiries in recent weeks for night flying for advertising and other purposes but we do not consider we should attempt these without proper equipment. Adair however made several flights one night a few weeks ago with the aid of a pocket torch and landing flares on the ground here.'[28] After flying activity moved to Archerfield, night joy flights were conducted using ground flares and, after April 1931, special electric floodlights. According to the *Brisbane Courier*, around 1 000 people attended the first night when joy flights were available. The use of the floodlights 'resulted in a vast improvement.'[29]

That permanent aerodrome lighting would improve safety was brought more spectacularly to the attention of the public and the politicians after an 11 June 1936 flight between Mascot and Archerfield. Having located Brisbane, deteoriating weather forced the pilot of the AOA Monospar, *Captain Cook*, to fly back south towards Lismore after sunset. Monitoring its progress, Archerfield aerodrome officer Andy

[28] Lester Brain to Hudson Fysh, letter dated 26 November 1929, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.
[29] *BC*, 9 April 1931, p. 12; *BC*, 10 April 1931, p. 7.

Lauchland advised the Beaudesert Electric Authority to flash the town lights when the aircraft appeared overhead. The pilot then conducted an emergency landing in the illumination provided by car headlights. At the end of its landing roll the Monospar came to rest against a fence. One slightly injured passenger was former Prime Minister William M. Hughes. According to AOA pilot Keith Virtue, Hughes' cryptic comment after the accident was that 'It may well be that lights may soon shine where hitherto darkness had prevailed.'[30] (See Figure 11.)

Figure 11: AOA Monospar *Captain Cook* after night landing near Beaudesert on 11 June 1936
Source: Hopton Collection

Other criticism had been voiced earlier. Lord Semphill, chairman of the aeronautical section of the London Chamber of Commerce, flew himself on a return trip to Australia in a de Havilland Puss Moth in 1934. According to the *Brisbane Courier* he was surprised that a city of the importance of Sydney had an aerodrome which could not be used twenty-four hours a day.[31]

In May 1936 the Commonwealth authorised £38 943 to be spent in part on lighting selected aerodromes on the Inter-capital Air Route.[32] Further allocations of money followed. With them the upgrade of the system from the style of the 1920s to that of the

[30] *AIR*, April 1961, p. 3; *CM*, 9 March 1961, p. 3; Joan Priest, *Virtue in flying: A biography of pioneer aviator Keith Virtue* (Sydney: Angus & Robertson, 1975), p. 82.
[31] *CM*, 28 December 1934, p. 10.
[32] *SMH*, 15 May 1936, p. 11. Of this total amount £10 800 was for underground cable for boundary lights and £5 042 was to be spent at Essendon. The remainder (£23 100) was for the development of nine emergency landing fields between Brisbane and Sydney.

1930s commenced. From late 1936 the Commonwealth accepted tenders from local contractors for electrical work on particular capital-city and regional aerodromes. Mascot, Parafield (SA), Maylands (WA), Cambridge (Tas.) and Archerfield were illuminated at a cost of £8 519 1 s 2d.[33] At Archerfield the contract for night lighting installation was won by the Brisbane Electrical Company with a bid of £2 750. The Gilbert Lodge Company of Sydney won the contract for supply of boundary light fittings on all capital-city aerodromes with a bid of £1 098 3s 4d.[34] Intermediate aerodromes where airliners could land in an emergency, at Goulburn, Holbrook (NSW) and Western Junction (Tas.) cost £2 216 to illuminate.[35]

Lighting an aerodrome involved more than just the airfield. Where necessary, approach lights were placed one or two miles from aerodromes. Twelve fixed and twelve revolving approach beacons were installed nationwide. Archerfield's 1 500-watt revolving beacon was atop a 60 feet (18 metres) tower built on Mt Gravatt. From July 1937 it rotated at six rpm between sunset and pre-dawn.[36] On the actual aerodrome site, red obstruction lights were mounted on masts and high buildings. Orange boundary lights were usually spaced at intervals of 300 feet (91 metres) around the landing area. The ends of designated landing directions were indicated by a row of green lights.

The idea of beacon lights to indicate a route for scheduled or air mail aircraft, as had been used in the USA, failed when the weather was treacherous. The problem of flight without visual reference to the ground was solved by the introduction of radio. Though transceiver radio sets added to the overall weight of the aircraft and in turn reduced payload, the safety they provided was of greater value. With radio accepted as an integral part of aircraft being imported from the USA, the tension created by the fact that it was available, and ground facilities were not, had to be resolved.

In aviation, radio serves three purposes—for communication, navigation, and in conjunction with instrument landings. The attributes of communication and navigation developed first, and simultaneously. Aeradio, the name given to the provision of radio facilities for aviation in Australia, was slow to develop. Experimental and temporary operations were conducted at Charleville in 1934, providing a direction-finding capability for competitors in the MacRobertson Centenary Air Race.[37] In October 1936

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[33] *CGG*, 24 March 1937, p. 572; *CGG*, 27 May 1937, p. 891; *CGG*, 9 September 1937, p. 1,299; *CGG*, 20 January 1938, p. 805; *CGG*, 23 December 1936, p. 2,318.
[34] RQAC newspaper clipping book no. 1, p. 345; *CGG*, 23 December 1936, p. 2,318; *CGG*, 14 January 1937, p. 51.
[35] *CGG*, 29 July 1937, p. 1,299; *CGG*, 9 December 1937, p. 2,195; *CGG*, 20 January 1938, p. 805.
[36] *Telegraph*, 27 July 1937, n.p.
[37] Only three of the twenty competitors were radio-equipped.

the Minister for Defence announced that £132 000 would be spent on radio (wireless) aids and £157 000 on buildings along the Inter-capital Air Route.[38] Prior to this, with dedicated air radio stations only at Darwin, Essendon and Sydney, the few scheduled aircraft which carried radio transceivers used the Coastal Radio Service, the network which served the maritime system. It was hardly adequate.

As putting dedicated air transport radio facilities in place takes time, lives were lost in the interval. On 19 February 1937 the AOA Stinson airliner VH–UHH crashed in bad weather on the Lamington Plateau. The Coroner's report indicated, amongst other contributory factors, a need for up-to-the-minute weather reports on air routes and the utilisation to the fullest extent of radio aids.[39] The use of radio for position reporting purposes would also have narrowed the search area to less that somewhere between Brisbane and Sydney. At the time of the accident only one AOA Stinson was fitted with radio. After the accident AOA pilot Keith Virtue and manager George Robinson both argued there was little advantage in having radio in any of the company's aircraft without dedicated ground facilities.[40]

Archerfield's first Aeradio building, referred to as a 'temporary radio and meteorological office', was constructed for £207 10s 0d in mid-1937 by V. J. Phillips of New Farm.[41] Equipped by Amalgamated Wireless (Australasia) Ltd, it was one of twelve new stations established nationally. Each station comprised an Aeradio building, often inclusive of a meteorological office as was Archerfield's, and a transmitter complex approximately one kilometre distant. The Aeradio operator was a busy person. According to civil aviation historian Roger Meyer his duties were to

> Transmit and receive, by wireless telegraphy or telephony, messages to or from aircraft and other ground stations, to operate DF [direction finding] equipment, to have a knowledge of the radio and power equipment at this station to be able to effect running repairs and make adjustments as required and at outstations where no meteorological officer was stationed, to prepare and broadcast meteorological reports at regular intervals.[42]

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[38] *ABJQ*, October 1936, p. 2.
[39] Macarthur Job, *Aircrash: The story of how Australia's airways were made safe 1921–39*, vol. 1 (Weston Creek, ACT: Aerospace Publications, 1991), p. 107. Radio reports of worsening weather in this particular case might not have been a valid expectation. The Stinson was only approximately thirty minutes into its flight when it crashed.
[40] Job, *Aircrash 1921-1939*, p. 107.
[41] *CGG*, 19 August 1937, p. 1,438; Plan dated 30 June 1937, Archerfield Aerodrome – Radio and meteorological offices, W6167, J2774/1, NAA (Qld).
[42] Roger Meyer, *Aeradio in Australia* (Canberra: AGPS, 1985), pp. 15-16.

The first Archerfield Aeradio building was destroyed by fire on 1 November 1938. Radio equipment to the value of £350 and meteorological equipment worth £500 were lost. Moorooka police Sergeant J. Nicol reported to the Coroner's Court 'an indication of stuff having been burned just outside the building on the south-east corner', but no direct cause was found.[43] Plans for a new and larger Archerfield Aeradio building were drawn up in December 1938. It is not clear whether this building was constructed or whether staff worked from the wooden control tower until the Civil Aviation administration building was completed in 1941.[44]

Archerfield's Aeradio transmitter complex was constructed on 6 acres (2.4 ha) of land acquired from Edward G. Sheldon of Coopers Plains on 24 February 1938.[45] On this land south of Boundary Road and east of Postle Street (then Coronation Avenue), the radio transmitter building, an aerial coupling hut and masts were erected. William Clarry of Greenslopes completed the brick transmitter building in mid-1938, at a cost of £920.[46] Being on low land next to Stable Swamp Creek, it occasionally flooded during heavy rain, a matter of some concern to those stationed there[47].

Early use of radio for navigation purposes required the Aeradio operator to ascertain the position of the aircraft which was sending a pre-arranged signal, calculate its position, then advise the pilot. Known as the Bellini-Tosi direction-finding system, it was a time-consuming procedure and prone to atmospheric interference. An improved system for finding lateral position was possible only with the installation in aircraft of radio receivers. These enabled the pilot or navigator to establish the aircraft's position by means of signals interpreted when near fixed, ground-based, directional beacons. Referred to locally as the 'Lorenz', this radio range equipment when installed was Australia's first system of radio navigation fully dedicated to aviation purposes.

Squadron Leader C. S. (Carne Scarlett) Wiggins of the RAAF had recommended its introduction following his 1935 visit to Europe and the United States, though the system when installed did not function as originally conceived. Instead of using the ultra-high frequency equipment developed by the Lorenz company of Germany for aerodrome approaches, Australia adapted the system to en route navigation. In this Australian adaptation, the system transmitted a steady 'A' and 'N' in Morse code from a number

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[43] *CM*, 2 November 1938, p. 2; *CM*, 25 February 1939, p. 7.
[44] *CM*, 29 October 1936, p. 15; Plan dated 16 December 1938, Archerfield Aerodrome – Meteorological building, W6675, J2774/1, NAA (Qld).
[45] *CGG*, 24 February 1938, p. 1,027; James Orwin to Messrs Chambers McNab & Co., letter dated 9 March 1938, Archerfield – Radio transmitter site, QL1300, J56, NAA (Qld).
[46] *CGG*, 10 March 1938, p. 1,123.
[47] A. R. (Ray) White, interview with author, 30 December 2000.

of towers projecting their beams along the major routes. Listening for the signals allowed the pilot to establish whether he was on the 'A' side (dot-dash) or the 'N' side (dash-dot), or perhaps 'flying the beam', the area around the point at right angles to the aerials where the Morse code patterns overlapped into a continuous tone. The Lorenz transmitters cost £4 636 each. Six were imported. Roley McComb found aviation authorities in Britain and European very interested in knowing more about the Australian adaptation of the technology worked when he toured there in 1938.[48]

On Archerfield the Lorenz beacon tower was located between Beatty Road and the QANTAS hangars. That the *Courier-Mail* elected to report this radio range beacon ready for testing early in November 1938 can be attributed in part to the critical backlash which had occurred after the crash of the ANA(2) DC2 *Kyeema* near Mt Dandenong the previous week.[49] Archerfield's Lorenz was functional, but unable to be used because it had not been tested by the Civil Aviation Board. The political and bureaucratic delays that led to the Lorenz beacons not being tested in time for the winter weather of 1938 were explained in a previous chapter. On Archerfield the delay is evident in the documents. Plans for the radio transmitter building which stood at the base of the Lorenz beacon tower were drawn on 7 July 1937. The tender for its construction by G. and H. Heaven of East Brisbane for £480 10s 0d was accepted in November 1937. In effect, the building was constructed nearly a year before it was tested and certified ready for use by passenger aircraft on other than training flights.[50]

With their lateral position known using the Lorenz system, aircraft could then establish their longitudinal position through a ground marker beacon that provided an aural indication to the pilot when the aircraft passed over this second beacon. Incoming pilots when in cloud could use the marker beacon as a positioning aid for an approach made flying on instruments.[51] On Archerfield this beacon was located immediately to the south of the hangar precinct, just west of the Grenier pioneer cemetery. (See Figure 35 in Chapter 14.)

To refer to the use of radio range and marker beacons as instrument landing aids would be correct, but a misnomer in the understanding of such terminology today. The system was at best primitive, but better than nothing for coping with weather conditions when

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[48] *Aircraft*, 1 October 1937, p. 18; *Aircraft*, 1 December 1937, p. 16; *Aircraft*, 1 June 1938, p. 11.
[49] *CM*, 2 November 1938, p. 5.
[50] *CGG*, 18 November 1937, p. 2,069; Plan dated 7 July 1937, Archerfield Aerodrome – Radio beacon building, W6179, J2774/1, NAA (Qld).
[51] Radio range beacons between capital cities provided an en route indication of position. On the Brisbane-to-Sydney route beacons were located at Evans Head, Coffs Harbour and Kempsey, as well as at the terminal aerodromes of Archerfield and Mascot.

cloud prevented navigation by reference to the ground. While of assistance when flying towards the aerodrome, the beacons were of little use during takeoff when fog covered the airfield, as periodically happened at Archerfield during the winter months. Not until after the Second World War would radio form the basis of technological assistance for actually landing aircraft in poor weather, either through an instrument landing system (ILS) or ground control approach (GCA).[52]

Airlines of Australia lost its second Stinson airliner (VH–UGG) in an early morning take-off from Archerfield six weeks after the Lamington accident involving VH–UHH. (See Figure 12.) On 28 March 1937, piloted by Stuart (Ginger) Cameron and carrying newspapers and one passenger for Townsville, VH–UGG failed to climb through the fog and crashed into trees near Oxley Creek, on the aerodrome's south-western boundary. At the time, as was common practice in Britain and Europe, the decision to take-off in adverse weather rested entirely with the operating company and its pilots.[53]

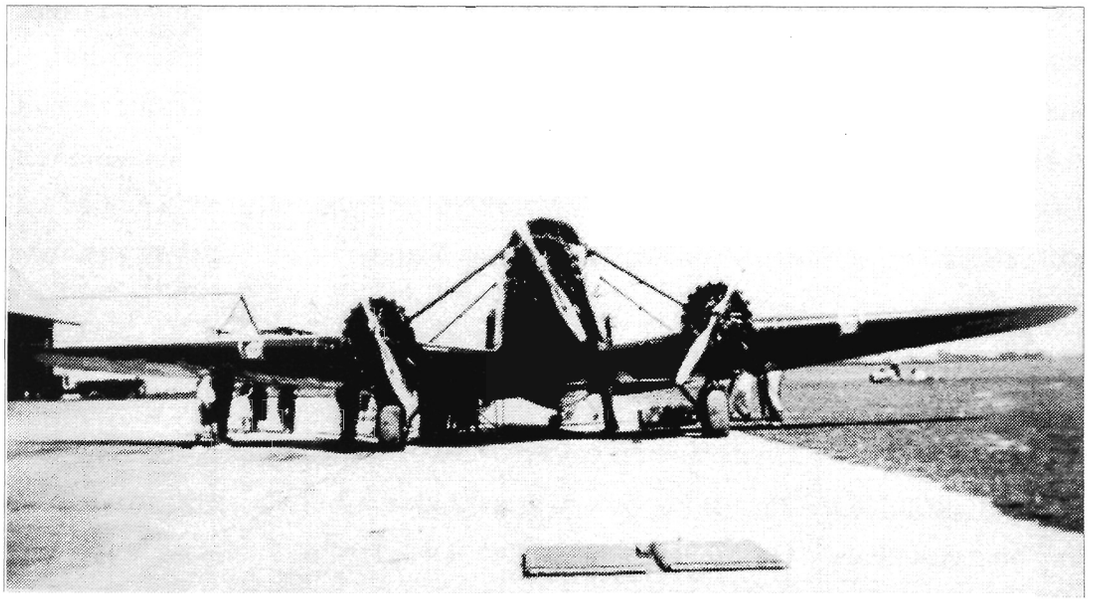

Figure 12: AOA Stinson VH–UGG parked in front of hangar no. 2 on Archerfield circa late 1936. In the foreground are the covers of an underground refuelling facility.
Source: Tom Bowers Collection

As aerodromes became busier, some kind of control was needed. In the USA suggestions for an air traffic control system had become an issue of safety by 1935. In that year New Jersey's Newark Airport, one of the nation's busiest, recorded fifty to sixty uncontrolled landings and departures per hour. A rudimentary system of rules and

[52] Erik K. Conway, 'The politics of blind landing', *Technology and Culture*, 42 (2001), pp. 81-106.

communication was in place at major aerodromes in the USA by July 1936. Federal control of the system followed.

England's busiest airport, Croydon, possessed a control tower integrated into the design of its 1928 terminal building. Controllers monitored radio to establish which aircraft were approaching, but permission to taxi and takeoff was given by a controller in the tower using an Aldis lamp shone directly at individual aircraft.

Australia's busiest aerodrome, especially at weekends, was Sydney's Mascot. On 24 January 1937 one of country's few female commercial pilots crashed after becoming airborne from a takeoff roll during which her aircraft had clipped a taxying aircraft. She and her two joy-riding passengers were incinerated.[54] Within days the Minister for Defence announced that temporary control towers would be erected at the principal capital-city aerodromes and a control officer appointed to direct traffic during peak periods. Control towers were integral to the design of the new terminal buildings planned for capital-city aerodromes but lack of finance had delayed their construction. At this particular time too the Civil Aviation Board was unsure it had the authority to control traffic as the legislative uncertainty over Commonwealth and State jurisdiction over aviation had still to be resolved.[55]

Archerfield's temporary control tower was completed in July 1937. Caretaker and groundsman Andy Lauchland, now having gained his pilot's licence, undertook the duties of controller by flashing an Aldis lamp at moving or stationary aircraft during peak flying times. The wooden tower, identical to that constructed on Mascot, was positioned to the west of hangar no. 6 and just north of where the civil aviation administration and terminal building would be built in later years. (See Figure 49 in Chapter 18.) The *Courier-Mail* reported that it was the 'means of which it is hoped to control aircraft so that a fatality such as recently resulted in the death of two young fliers will be impossible.'[56] The accident to which this report referred was a mid-air collision south-east of the aerodrome on 19 June 1937 in which pilots Esther Tully and John W. Barrett were killed.[57]

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[53] VH–UGG, Archerfield Aerodrome – Queensland, 28 March 1937 – Pilot T. S. Cameron, 175, MP187/4, NAA (Vic.); Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW*, p. 10.
[54] *SMH*, 25 January 1937, p. 9.
[55] *SMH*, 28 January 1937, p. 12; Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW*, p. 10.
[56] *CM*, 17 July 1937, p. 15.
[57] *CM*, 21 June 1937, p. 14; Collision VH–UAV/VH–UAN, Archerfield, 19 June 1937, 178C, MP187/4, NAA (Vic.).

Other aerodrome services of a less conflicting nature, such as the provision of fuel and maintenance of the surface of the airfield, also established a more progressive form during this decade. Aircraft needed fuel supplies and these had to be stored safely. Aircraft fuel on Archerfield was supplied by either the Shell company or Vacuum Oil. One of the first events of the 1931 Aviation Week on Archerfield was the dedication of the Shell underground refuelling unit, referred to as a bowser, on the airside of hangar no. 5. This unit was supplied from an underground tank containing 1 000 gallons (4 546 litres). In 1935 Shell erected a 'kiosk' to house their new Sussex refuelling wagon which carried fuel to where aircraft were parked.[58] The Vacuum Oil company's building was located on the north-east corner of hangar no. 1, at one of the road entrances to the airfield service road and appears to have conducted less business prior to the war.

Airfield maintenance took on a greater priority as aircraft size increased. Prepared landing strips and runways required grading and sweeping. All-over fields had to be mown. In the latter part of the decade, Civil Aviation Board employee Andy Lauchland, the man who had used a horse and a piece of railway line to level Eagle Farm aerodrome, was provided with a tractor for Archerfield.[59] Costing around £300, these machines were, as C. P. Hunter described in his 1939 article on aerodrome maintenance, 'essential'.[60]

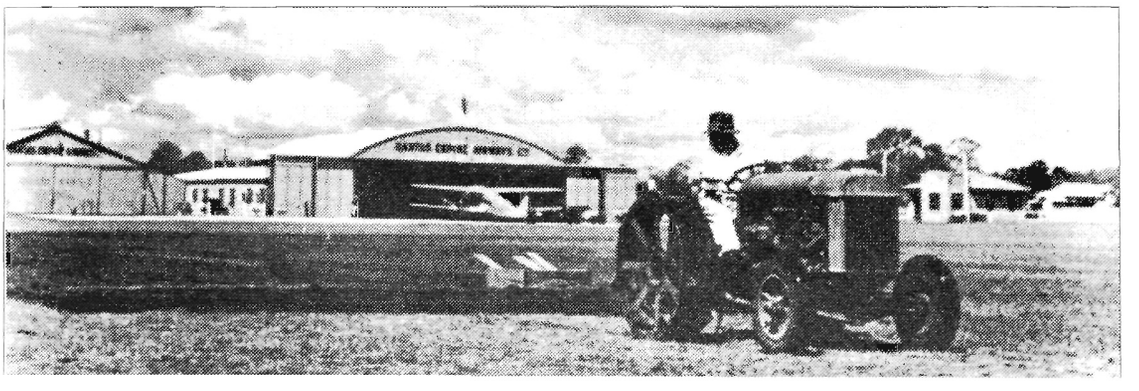

Figure 13: Tractor working on Archerfield in the late 1930s. In the background can be seen the no. 5 hangar occupied by QANTAS and to its right the Shell kiosk constructed in 1935. It is not known whether the driver is Andy Lauchland.
Source: *Aircrash* vol. 1, p. 79

[58] *BC*, 13 April 1931, p. 14; *Together*, May 1931, p. 13; *Shell House Journal*, June 1935, p. 10.
[59] Job, *Aircrash 1921-1939*, p. 79; Herbert Trelour to WD Qld, letter dated 3 June 1941, Archerfield no. 2 EFTS, K169, BP243/1, NAA (Qld).
[60] *CGG*, 23 March 1939, p. 470; *CGG*, 8 June 1939, p. 1,046; *Aeroplane*, 1 February 1939, pp. 138-40.

Improvements in aircraft technology were the driving force behind the expansion of facilities at capital-city sites within the Australian aerodrome system in the 1930s. Had innovators and designers not provided airline companies with aircraft profitable enough to survive without subsidies, there would have been few passengers and little need to change the system which had proved quite adequate for the aircraft of the 1920s. These technological innovations packaged into a fast, passenger airliner created tension for those who owned the aerodromes. In the case of Australia, the introduction of new aircraft technology required the Commonwealth's acceptance of an important concept—that in terms of lives and political fallout, the cost of not upgrading the system by providing landing strips, lighting and radio facilities on its capital-city aerodromes would be greater than the cost of providing them.

Chapter 12

'The heavy storms of the night before had made the aerodrome a trifle soft but it was a tribute to Archerfield, which has been praised as one of the finest aerodromes in Australia, that no machine had the slightest trouble in landing or taking off.'[1]

On 10 December 1934, with a pair of golden scissors presented to him by Prime Minister Lyons, the Duke of Gloucester cut a double ribbon of red and blue. All ceremony concluded, the idling QANTAS aircraft *Diana* and *Hippomenes*, and the letters and postcards they carried, departed on the first scheduled flight to connect Australia permanently with the global network of communication by air. The speeches that day were full of praise. The Duke stated he did not doubt the importance and significance of the inauguration. The Prime Minister applauded the new service for promoting goodwill amongst the nations of the world. Amid the fanfare, little notice was taken of the fact that Archerfield Aerodrome had become part of another system, the urban fabric of the city of Brisbane.

According to Mark J. Bouman, the siting and subsequent development of any modern airport is related to three factors—land use, the infrastructure of transportation and public utilities and the circulation of people in networks influenced by politics or economics.[2] The last factor is more relevant to the chapter that follows and is considered there. This chapter, a study of Archerfield's 1930s built fabric and its immediate surroundings, considers the importance of the land-use and transportation connections which linked this particular place to the city.

The land-use changes on and around Archerfield during this period were twofold. Most obvious was the construction of a complex of large hangars on flat, cleared land well south of the city centre. Less easy to identify was the gradual alteration of the immediate surroundings from mixed farming to what might be today described as acreage living. These dual changes in turn placed pressure on existing transportation and other services. Attending to the needs of the new 'technological' community on the fringes of the city of Brisbane created opportunities for people, especially those living nearby. As

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[1] *NQR*, 15 December 1934, p. 12.
[2] Mark J. Bouman, 'Cities of planes: Airports in the networked city', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich and New York: The Art Institute of Chicago and Prestel-Verlag, 1996), p. 177.

Bouman concluded, 'Each place is tied to the whole net in its own way: each knot is its own network.'[3]

The Commonwealth's 1928 purchase of land for an aerodrome between Coopers Plains and Rocklea suggested an industrial future for land that was then used for growing crops and producing milk, eggs and pigs. Situated on the outer edge of the newly amalgamated Brisbane city, the area's history had been a rural one.

Specific knowledge of earlier Aboriginal occupation relates only to the wider area. It is believed that the land around Oxley Creek, the Brisbane River tributary which today comprises Archerfield's western boundary, was part of the territory of the Yerongpan people who occupied the tract of country between Brisbane and Ipswich. The first white settlement in the district was an 1842 convict outpost frequented by Dr Henry Cowper on the banks of Stable Swamp Creek, near the present-day Riawena Street in Coopers Plains. The few remaining Aborigines in the district were removed to a reserve, at Deebing Creek near Ipswich, fifty years after this.[4]

The area now occupied by Archerfield Airport is predominantly the 640 acres (259 ha) of land purchased by Thomas and Mary Grenier in 1855 and named *Oomoroopilly*. This purchase constituted the entire portion 18 of the Parish of Yeerongpilly, County of Stanley.[5] As well as being bounded by Oxley Creek, the property had a small north-west boundary along Ipswich Road. One-chain roads to the land's north (later Boundary Road), east (later Beatty Road) and south (later Mortimer Road) formed the other limits. (See Figure 14.)

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[3] Bouman, 'Cities of planes', p. 179.

[4] J. G. Steele, *Aboriginal pathways in southeast Queensland and the Richmond River* (St Lucia, Qld: UQP, 1984), pp. 135-6; Cultural heritage assessment and management plan: Archerfield Airport, Brisbane (draft), March 2001, pp. 12-13.

[5] A tour of early Archerfield, BHG, October 1997, p. 2; Brian T. Grenier, *Thomas & Mary Grenier: Brisbane pioneers* (Brisbane: Brian Thomas Grenier, 2002), p. 207.

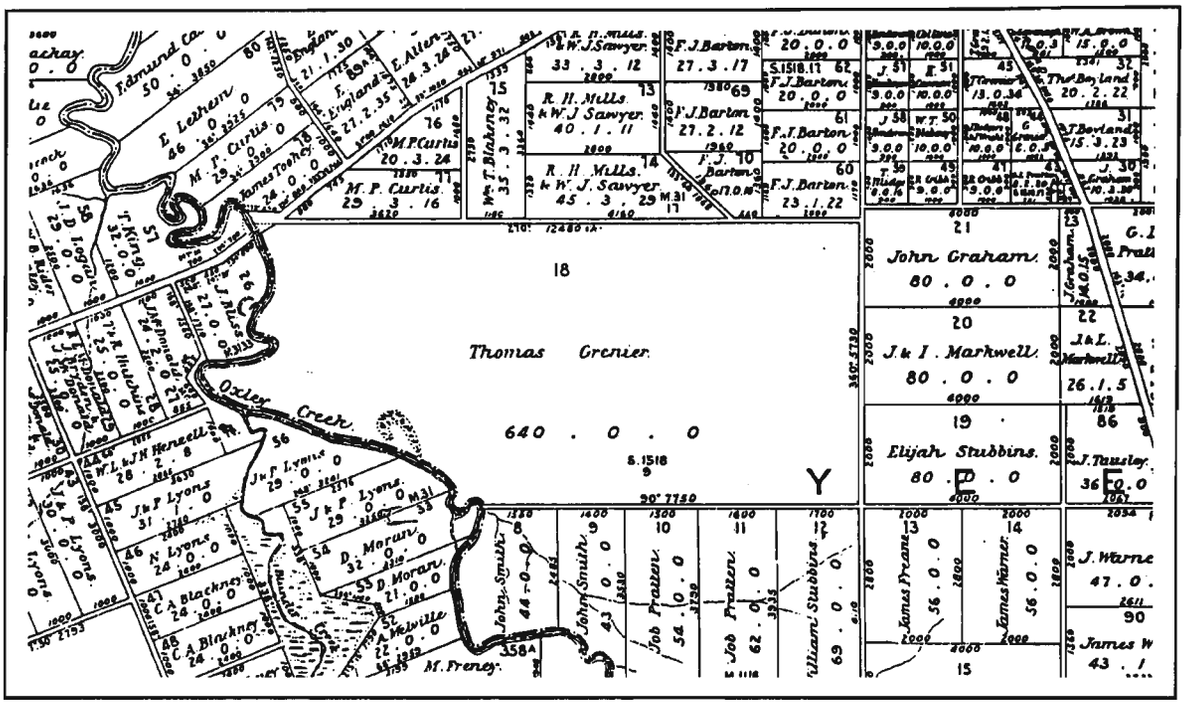

Figure 14: Part of Moreton 20 chain map showing the 640 acre *Oomoroopilly* belonging to Thomas and Mary Grenier
Source: Moreton 20 chain map Sheet, Survey Office, Department of Lands, Brisbane.

Owing to the death of Thomas and Mary Grenier's son Volney on 26 October 1859, a cemetery was established mid-way along the property's eastern edge (later Beatty Road).[6] Portion 18 in time was subdivided into five grazing blocks, still comparatively large in size for the district, and the cemetery block of just under one acre (.313 ha).

Following the death of Thomas Grenier in October 1877, Franklin Grenier became the owner of Subs 4 and 5 of Portion 18. He died in January 1889, leaving the land and its house, then named *Franklin Vale*, to his wife Ellen H. Grenier. Three years later the land was sold to John Tait. In February 1895 his wife Margaret Tait sold the just over 228 acres (92.5 ha) to Henry J. Beatty. He paid £200 for the land, which passed to Elizabeth Beatty after his death in October 1901.[7]

Subdivisions 2 and 3, totalling 277 acres 1 rood 12 perches (112.23 ha), were purchased by dairyman Charles Franklin in December 1910. These subdivisions had belonged previously to William Leichhardt Grenier and George A. and Sarah Grenier. Charles Franklin retained the name *The Willows*, which George and Sarah Grenier had chosen

[6] *Southern News*, 1 July 1999, p. 9; *A closer look at Coopers Plains* (Brisbane: CPLHG, 1993), p. 9; Grenier, *Thomas & Mary Grenier*, p. 103.

for the centre section of the original Grenier family holding. Details of how these sections of land became Brisbane's aerodrome are in Table 5. [8]

Table 5: Subdivision of the Grenier property *Oomoroopilly* based on its purchase, in segments, by the Commonwealth.[9]

PORTION 18, PARISH YEERONGPILLY, COUNTY STANLEY		
SUBDIVISION/S	AREA	AREA (METRIC)
Sub. 1 (not purchased by Commonwealth)	133 acres 1 rood 6.3 perches	53.94 hectares
Sub. 2 & resub. 3 of sub. 3	162 acres 2 roods 19 perches	65.81 hectares
Resubs 1 & 2 of Sub. 3	114 acres 2 roods 33 perches	46.42 hectares
Subs 4 & 5	228 acres 2 roods 17.9 perches	92.5 hectares
Sub. 6 (cemetery reserve)	3 roods 3.8 perches	.313 hectares

Situated on the fringes of the city of Brisbane and already served by a railway link, the Coopers Plains district seemed destined for a suburban rather than a rural future. Locating Brisbane's new landing ground there hastened the process of change. At the same time as decisions were being made about the location of the aerodrome, this pocket of land bordered by Coopers Plains, Rocklea and Oxley received a change of name that surprisingly had nothing to do with the aeronautics.

The Brisbane City Council (BCC) in 1928 conducted a civic survey from which the future of the relatively new city could be planned.[10] In a subsequent rezoning proposal, part of the Oxley ward was declared a noxious trades area. This was to facilitate the building of abattoirs in the vicinity, to which the dairy farmers of Coopers Plains objected.[11] The residents of Oxley were not far behind. At the centre of the abattoir issue was a difference of opinion between the State Government and the Brisbane City Council over whether or not, and where, any government-owned abattoirs should be established to provide 'a clean and hygienic method of slaughtering the city's meat supply.'[12]

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[7] Memorandum dated 7 January 1922, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).
[8] Copy of title search circa August 1929, Archerfield – Acquisition additional 68 acres, QL128/2, J56/11, NAA (Qld).
[9] *CGG*, 26 September 1929, p. 2,010; *CGG*, 12 June 1930, p. 1,173; *CGG*, 24 July 1930, p. 1,398; *CGG*, 22 October 1936, p. 1,905; *CGG*, 12 November 1942, pp. 2,621-2; *CGG*, 21 March 1946, pp. 690-1.
[10] *Reports and proceedings of the municipal council of the city of Brisbane during the year 1928* (Brisbane: Shaw Printing Co. Ltd, 1929), p. 401.
[11] Newspaper article circa April 1928, CPLHG Collection; Minutes of BCC Works Committee for 24 April 1929, Works Committee Minutes 31 January 1929 to 12 September 1929, BCC Archives.
[12] *QPD*, 31 July 1928, p. 41; *BC*, 1 August 1928, p. 12.

The Commonwealth was less involved, though still interested in the outcome of the zoning proposal. After record floods in 1927 emphasised the increasing unsuitability of Eagle Farm Aerodrome, Roley McComb, the surveyor of aerodromes in Queensland, returned in early 1928 to the Rocklea site rejected at the beginning of the decade. The favoured block, Elizabeth Beatty's farm, was positioned in the centre of the noxious trades area.[13]

After months of controversy, the State Government announced it was not interested in any Brisbane abattoir. Neither was the Brisbane City Council. In November 1928 the town clerk advised McComb that the proposed abattoirs were not likely to be constructed, nor by consequence would there be much development of noxious trades.[14] McComb proceeded with a final re-evaluation of the Rocklea site.

Though the idea of a government abattoir in the Oxley Ward was shelved, opposition to the noxious trades zoning was not. Through the Grand Council of Progress Associations, the citizens of Oxley pressed their objection to any association of their suburb with such an area. Following their second request to Council, and after 'exhaustive discussion' by the BCC Works Committee on 27 June 1929, it was resolved that the area proposed to be zoned as a noxious trades area be renamed Archerfield. Council approved this on 1 July 1929.[15]

Unfortunately no reason for choosing the name Archerfield was recorded in BCC documents located to date. However, a grazing property bearing the name had once existed nearby. In 1859 a Mr Farley purchased a 6 000 hectare section of the original *Woogaroo* property south-west of Brisbane.[16] Some believe he named his purchase *Archerfield*. Mr. C. Murphy subsequently purchased the holding in 1878. In the early 1880's the now identified *Archerfield*, then owned by Mary Elizabeth Murphy, was purchased by Michael 'Stumpy' Durack for £15 000. The *Archerfield* homestead, several kilometres west of the aerodrome site, was destroyed by fire in 1923.[17]

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[13] *BC*, 20 April 1928, p. 15; Isles Love & Co. Ltd to A. R. McComb, letter dated 6 March 1928, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).
[14] A. R. McComb, notes on Rocklea site dated 14 November 1928, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).
[15] Minutes of BCC Works Committee for 24 April 1929 and 27 June 1929, Works Committee Minutes 31 January 1929 to 12 September 1929, BCC Archives; *Reports and proceedings of the municipal council of the city of Brisbane during the year 1928* (Brisbane: Shaw Printing Co. Ltd, 1929), p. 277.
[16] The original *Woogaroo* was purchased by Dr Stephen Simpson, the first Commissioner for Crown Lands for Moreton Bay. Farley is believed to have come from Stanthorpe.
[17] *Satellite*, 30 July 1980, p. 1; Place names details report, 26 September 2001, Department of Natural Resources and Mines.

Aerodrome site selection is a balance between centrality and peripherality. Passengers and air-service companies prefer a site that is convenient to the city centre. Aerodrome developers need to consider the initial cost of land and its availability for future expansion.[18] Roley McComb, charged with the task of solving Brisbane's aerodrome problems, appears to have been aware of the need for such balance. Early in the process he concluded that the cost of acquiring the 228 acres (92.2 ha) at Rocklea, which included the *Franklin Vale* house now owned by Elizabeth Beatty, was less than the estimated cost of acquiring an additional area of 35 acres (14.1 ha) at Eagle Farm. Aside from its inadequate surface, the long-term future of Eagle Farm could not be assured without some increase to its then 91 acres (38.8 ha). Before costs associated with clearing the land and relocation of buildings, McComb estimated in a memorandum in July 1928 that moving to the Rocklea site would make a saving of £655.[19]

McComb, a former First World War pilot and flying instructor, was a careful and forward-thinking selector of aerodromes. He also advised the Civil Aviation Branch four months later, 'In view of the possible development of the future of the surrounding country [at Rocklea] the question of securing some additional land on the west might be considered.'[20] Notice was taken. Details of the acquisition of land for the first extension to Archerfield Aerodrome were published in the *Commonwealth Government Gazette* (*CGG*) at the same time as construction on Archerfield's first hangar commenced.[21]

The Rocklea aerodrome site was far from useable by aircraft when the notice of the original acquisition of Elizabeth Beatty's land appeared in the *CGG* in August 1929. Though the farmhouse was surrounded by some old cultivation paddocks near Mortimer Road on the land's southern boundary, over half of the new site was timbered with blue gum, Moreton Bay box and ironbark. Contractor William E. Brown & Co. of Coorparoo was paid £1 598 to complete the work of clearing the aerodrome by 14 May 1930. Bullock teams were used to stack the timber in windrows, after which it was burnt.[22]

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[18] Bouman, 'Cities of planes', pp. 180-1.
[19] A. R. McComb, notes comparing Eagle Farm and Rocklea circa July 1928, notes on Rocklea site dated 14 November 1928, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).
[20] A. R. McComb, notes on Rocklea site dated 14 November 1928, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld).
[21] *CGG*, 12 June 1930, p. 1,173; *CGG*, 24 July 1930, p. 1,398; Sidney Williams & Co. to CCA, letter dated 10 June 1930, Brisbane Aerodrome letters 679–816, 7/16/679, A2408/0, NAA (Vic.).
[22] *CGG*, 26 September 1929, p. 2,010; *CGG*, 13 March 1930, p. 438; Steve (Doc) Sims, interview with author 18 January 1997; Proposed aerodrome site, Rocklea, plan dated 23 July 1929, Archerfield Aerodrome – Acquisition additional 68 acres, QL128/2, J56/11, NAA (Qld).

Delays were inevitable. Hudson Fysh reported the aerodrome still had 'a great deal of timber on it' in June 1930. On 10 September the Works Department advised the Department of Defence that completion of the site preparation was still three weeks away.[23] Fences and toilets had to be erected, as well as internal roads formed. The clearing process was well enough advanced for five aircraft to land there on 2 January 1931, the day pilot Dudley P. Davidson was buried in the Grenier cemetery. Davidson, originally from England, was flying for QAN when killed in a crash at Maryborough on 31 December 1930. At the request of his family he was buried in the cemetery at the edge of Brisbane's new aerodrome.[24]

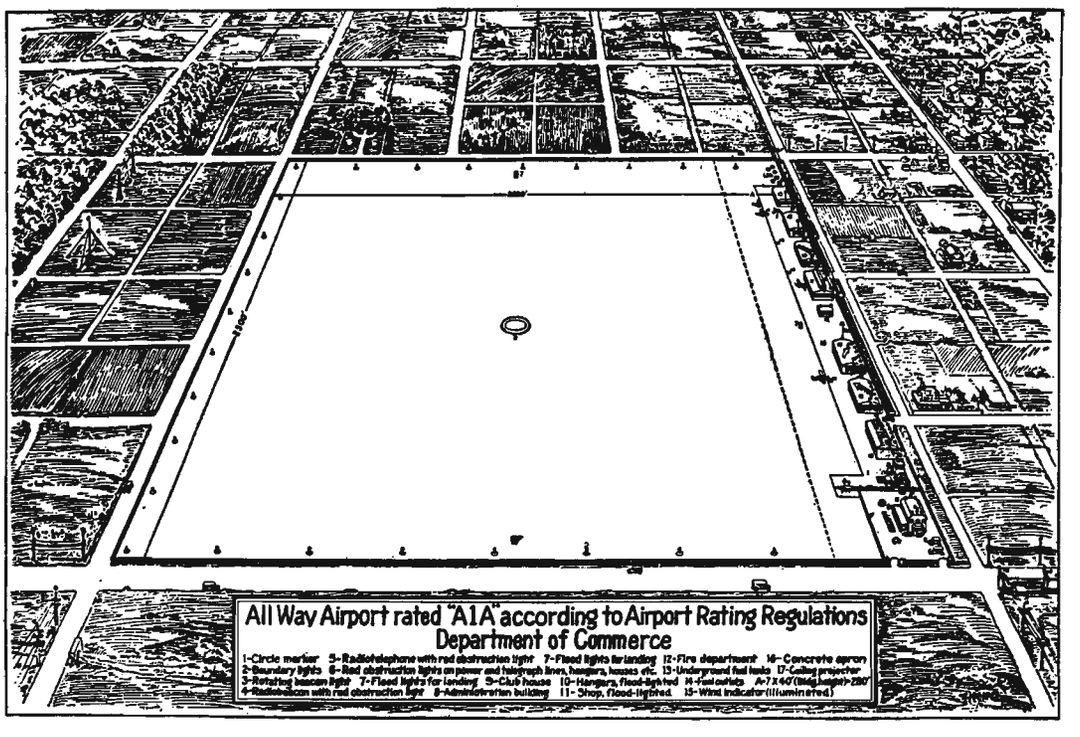

Figure 15: Airport rated 'A1A' according the Airport Rating Regulations, Department of Commerce, USA
Source: *Airports*, July 1928, p. 10

[23] Indications are that some of the fencing from Eagle Farm was recycled for use on Archerfield.
[24] *BC*, 3 January 1931, p. 16; Hudson Fysh to Lester Brain, letter dated 24 June 1930, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML; Dept of Works (Qld) to CCA, letter dated 10 September 1930, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.). Davidson is the only known pilot buried in the cemetery. The pilots who landed on Archerfield the day of the funeral were Lester Brain, Tom Young, Jack Treacy, R. C. P. (Cyril) Brett and Mr. K. Foxcroft-Jones.

Though many and varied were the designs being produced by overseas engineers beginning to specialise in the new field of aerodrome and airport design, the Archerfield layout reflected the accepted form of 1920s aerodromes, with hangars along a line running parallel with an aerodrome boundary. (See Figure 15.) The new aerodrome, with land falling slightly towards the north-west, favoured buildings being placed midway along the Beatty Road alignment at 60 feet (18.2 metres) above sea level, adjacent to the Grenier cemetery. To the south the land rose to a maximum of 80 feet (24.3 metres) above sea level. It dropped to 30 feet (9.1 metres) in the north-west. This gradual fall was acceptable to aircraft of the time, most of which lacked brakes.[25]

A Civil Aviation Branch plan from August 1929 shows the Queensland Aero Club clubhouse aligned with the hangars, rather than on Boundary Road where it was built in 1931. The larger QANTAS hangar is in a different position entirely. Future development of hangars is planned at angles radiating from the centre concourse area. No consideration appears to have been made for future terminal and administration facilities. In allowing the built sector to intrude into the landing space this 1929 draft, never executed, shows signs of planning more common in the 1930s. (See Figure 16.)

[25] Contour plan of AF at 1 inch to 200 ft, Archerfield Aerodrome re-survey 1943, QL3966/1/7, J56/11, NAA (Qld).

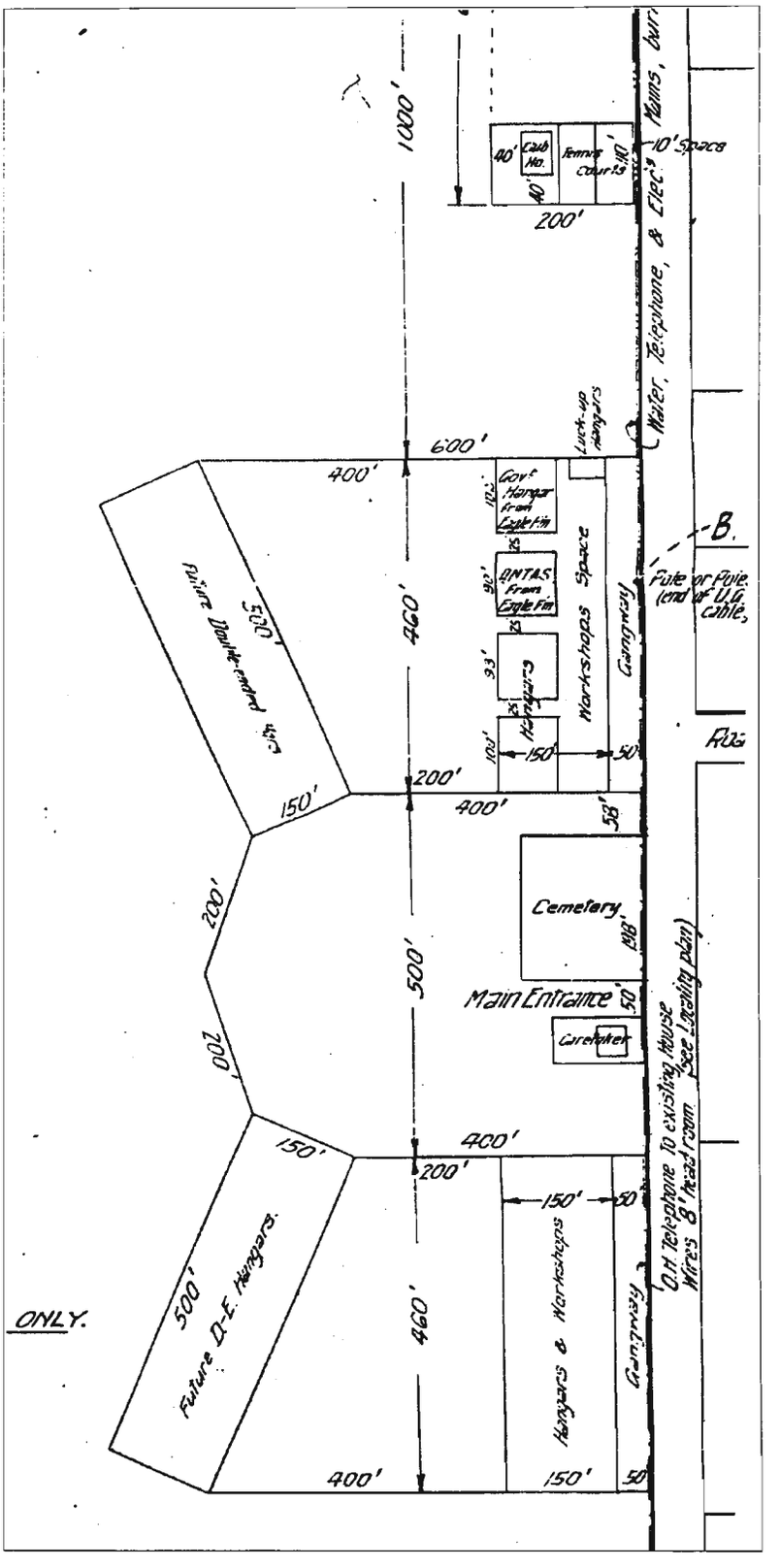

Figure 16: Proposed aerodrome site at Rocklea, August 1929
Source: Archerfield Aerodrome – Acquisition additional 68 acres, QL128/2 J56/11, NAA (Qld)

Engineer H. A. Lewis-Dale advocated one such design in a diagram he referred to as a typical layout.[26] (See Figure 17.)

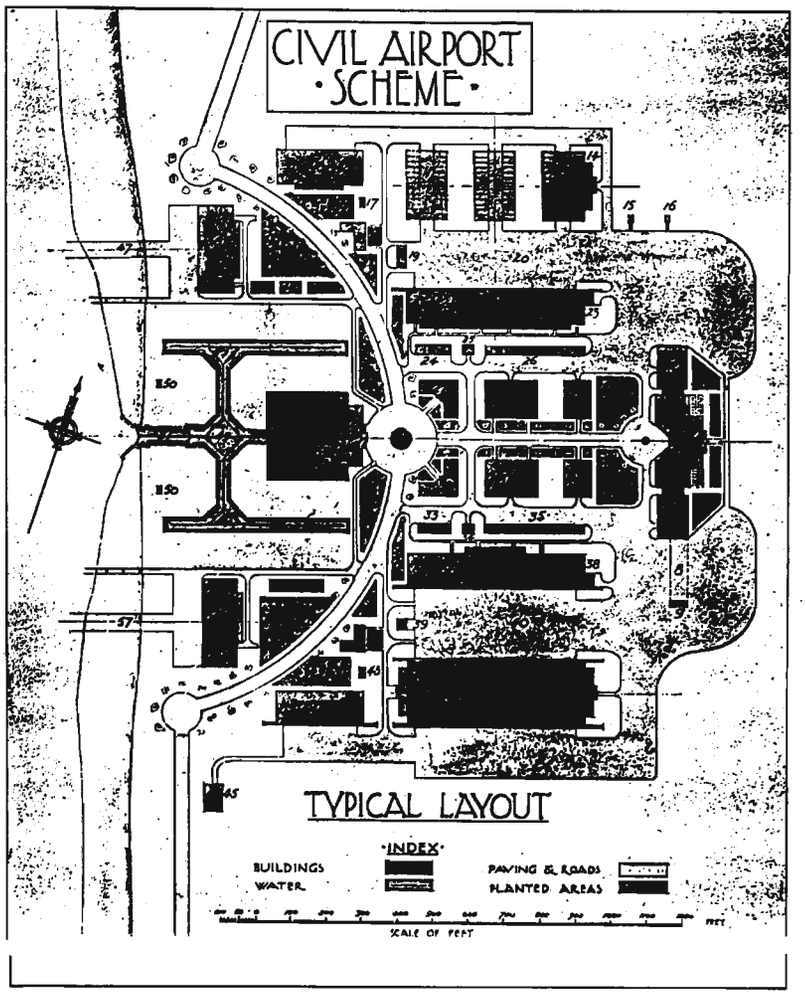

Figure 17: Civil Airport Scheme, typical Layout
Source: H. A. Lewis-Dale, *Aviation and the aerodrome*, facing p. 141

How Archerfield did develop to its prewar peak is shown best in a plan of buildings and layout prepared in 1938 and in aerial views.[27] (See Figures 18, 19 and 22.) The building labelled CAB, referred to sometimes as the Government hangar or hangar no. 1, was re-erected after a move from its former site at Eagle Farm. The hangar is of timber truss and large timber post construction and was set along a 72 feet (21.9 metre) alignment at 250 feet (76.2 metres) west of Beatty Road, the building line on which the first five hangars would be based. Hangar no. 1 originally had a building area of approximately

[26] Plan of landing ground at Rocklea dated 14 August 1929 (Y126), Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.).
[27] Archerfield – building and road layout (Y193), plan dated 1938, Archerfield Aerodrome – Re-survey 1943, QL3966/1/7, J56/11, NAA (Qld).

5 600 square feet (520.24 sq. metres). In 1937 a small addition was made to its eastern end.[28] In August 1939, E. J. Taylor of the Brisbane suburb of Hamilton was awarded a £1 300 contract to build a second hangar on its northern edge.[29] In the process the timber buttresses of the original section were moved to support the new.

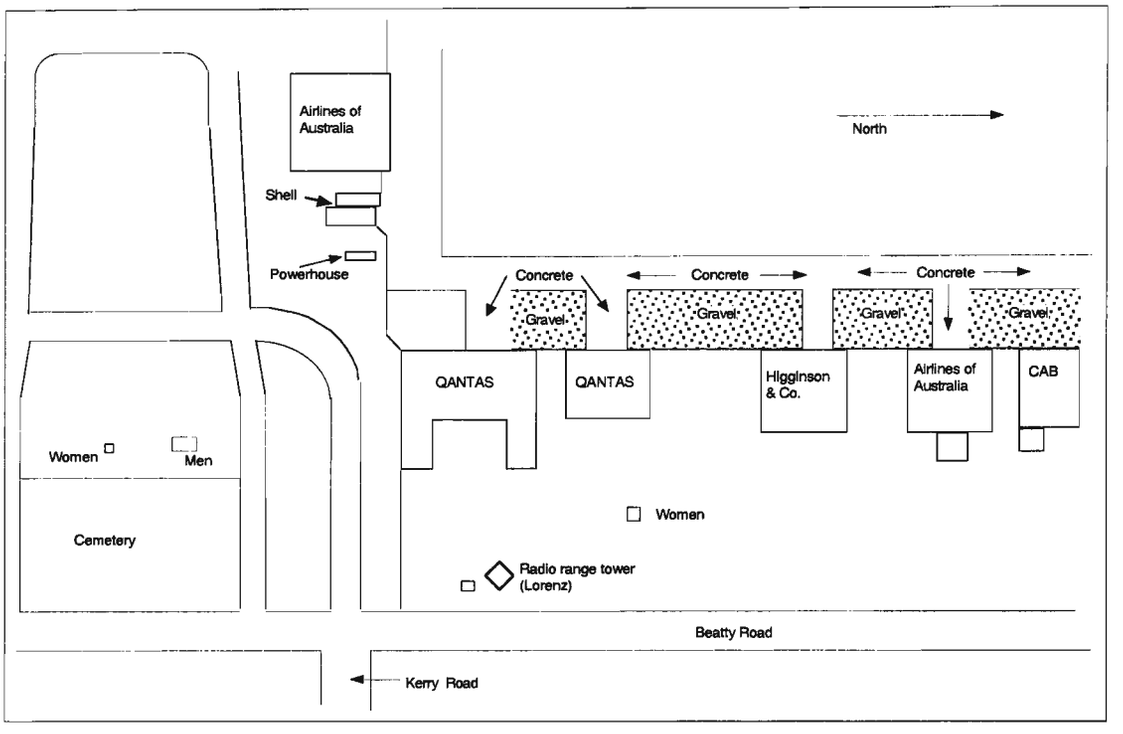

Figure 18: Copy of building and road layout, Archerfield 1938
Source: Archerfield Aerodrome re-survey 1943, 3966/1/7, J56/11, NAA (Qld)

Beside the CAB hangar was the timber, curved-roof hangar built by New England Airways early in 1934.[30] Referred to as hangar no. 2 and later as the Airlines of Australia hangar, blueprints for the building have yet to be located. Contemporary photographs indicate that it commenced as a small T-shaped hangar, which was extended over time. Slight level discrepancies in the concrete flooring bear this out.[31]

[28] *CGG*, 12 August 1937, p. 1,405.
[29] *CGG*, 3 August 1939, p. 1,412; *CGG*, 31 August 1939, 1,620.
[30] NEA to CCA, letter dated 26 November 1931 and letter dated 14 March 1934, Brisbane Aerodrome letters 679–816, 7/16/679, A2408/0, NAA (Vic.).
[31] Steve (Doc) Sims, interview with author, 18 January 1997.

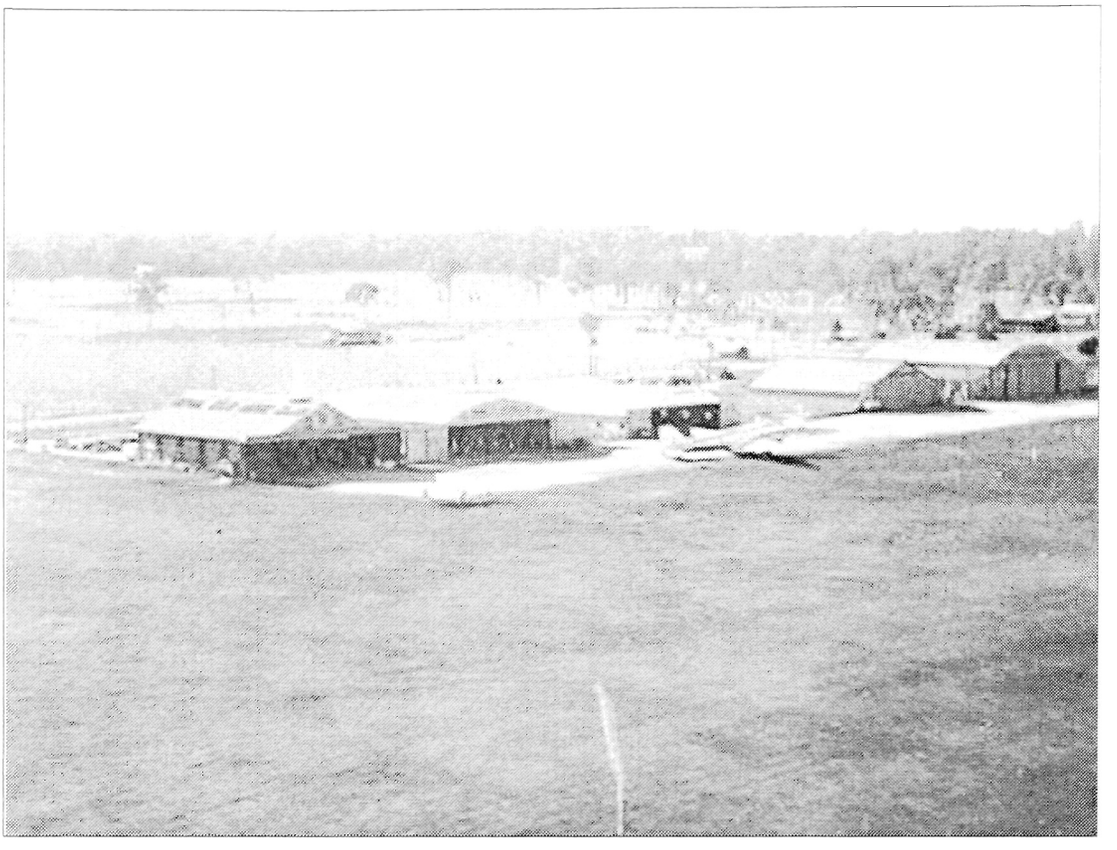

Figure 19: Aerial view of hangars and surroundings, Archerfield circa 1938. From left to right the hangars are numbers one to five. The house in the middle left distance belonged to Alex Spring. The Lorenz tower is situated between hangars no 3 and no 4.
Source: Esther L'Estrange photograph album, David Molesworth Collection

Hangar no. 3 was constructed by Sidney Williams and Co. for Henry Williams of West End in Brisbane. Work on this Comet steel frame hangar commenced on 28 November 1935.[32] On 30 March 1939 the site lease was re-assigned to Ethel B. (Ellie) Jones, the daughter of Henry Williams. Prior to the war, hangar no. 3 was occupied initially by Frank Higginson & Co, the company which serviced aircraft belonging to APL. Later it was occupied by Airwork Co., an aircraft service and pilot training organisation operated by Jones. In 1937 Higginson and Co. leased the empty site immediately to the south of the no. 3 hangar. This space was relinquished in September 1938, leaving a vacancy until the commencement of the Second World War.[33]

[32] Handwritten memo dated 28 November 1935, lease dated 4 February 1936, Archerfield hangar no. 3, QL270, J56/11, NAA (Qld).
[33] Dir. Works to Surveyor-General, memo dated 16 May 1936, A. Percival to Sec. DOD, memo dated 30 June 1937, Plan of site, Neg. 9347, E. Jones to Dir. Works, letter dated 21 September 1938, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld).

Figure 20: Monospar *Captain Flinders* outside AOA's hangar no. 2 circa 1936
Source: Tom Bowers Collection

Hangar no. 4, the steel-frame hangar originally constructed by Stewarts and Lloyds for QANTAS on Eagle Farm in 1927, was moved to Archerfield in June 1931. Removal costs of £200 10s 0d were paid by the Civil Aviation Branch.[34] The original section measured 90 feet (27.4 metres) by 72 feet (21.9 metres). A lean-to was added to its northern side in 1934. The hangar encompassed maintenance and storage facilities as well as a passenger lounge. Along with six aircraft, the passenger lounge was destroyed when fire broke out in one of the aircraft around midnight on 28 June 1939. A small catering office was included in the rebuild.[35]

[34] Horace Brinsmead to Hudson Fysh, letter dated 30 May 1931, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.).
[35] *CM*, 30 June 1939, p. 3; Susan Faulkner, QANTAS hangars Archerfield Aerodrome: Draft conservation plan, May 1995, p. 54; J. Orwin to QANTAS, letter dated 23 July 1934, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.).

Figure 21: APL DH84 Dragon VH–UXG in hangar no. 3 circa 1936
Source: Tom Bowers Collection

Work commenced on hangar no. 5, the larger QANTAS hangar, on 11 June 1930.[36] This hangar was designed by Sidney Williams and Co. with a span of 90 feet (27.4 metres) with 20-feet (6 metres) high walls. Seven main columns held the original span length of 87 feet (26.5 metres). Extensions measuring 30 feet (9.1 metres) ran both sides along the full length of the building's centre section. Typically, QANTAS executives planned for future expansion. The rear wall of the building was erected so that any alterations could be made without great cost or inconvenience.[37] This 12 750 square feet (1 184.5 sq. metres) building was erected on site for £3 793 14s 0d. Two 'wing' extensions were made beyond the rear wall in 1934.[38]

Hangar no. 6, originally on a lease measuring 170 feet (51.8 metres) by 110 feet (33.5 metres), was constructed by Airlines of Australia during 1938.[39] (See Figure 22.) Late in that year, some of the AOA engineers who had been based at Mascot were moved to Archerfield and into this hangar.[40] Catering facilities and a departure lounge were

[36] Hudson Fysh to CCA, telegram dated 29 May 1930, CCA to QANTAS, telegram dated 30 May 1930, Sidney Williams & Co. to CCA, letter dated 10 June 1930, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.).
[37] QANTAS specifications for tender closing 25 March 1930, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA, (Vic.).
[38] Hudson Fysh, *Qantas rising* (Adelaide: Rigby, 1965), p. 131; QANTAS to CCA, letter dated 20 May 1934, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.).
[39] Commonwealth and ANA(2), lease document dated 18 November 1938, Archerfield Aerodrome – Lease ANA hangar no. 6, QL278, J56/11, NAA (Qld).
[40] Trevan Jackson, Random ramblings of an early bird 1934–51, manuscript, 2001, p. 20.

constructed in the lean-to on its western side. Passengers arrived by bus from the city and were escorted through this section of the hangar to their aircraft.

Figure 22: Aerial view of Archerfield circa 1939. Hangars no. 1 to 5 are located along the north-south taxiway. Hangar no. 6 is directly beneath the aircraft. Hangar no. 7 is closest to the left edge of the photograph.
Source: *Aircraft*, 1 July 1939, p. 20

On 20 April 1938 approval was given to Queensland's 'Casket King', Bill Rankin, to construct a hangar on his 96 feet (29.2 metres) by 80 feet 6 inches (24.5 metres) lease site, the first hangar development to the south of the cemetery. Occupied by the Queensland College of Science in 1938, the building was usually referred to as hangar no. 7. Unlike all previous constructions on the airfield, Rankin's hangar had concrete-encased stanchions on its walls and eastern end and a roof framed with curved RSJs

(rolled steel joists). The building's airside doors opened to a width of 60 feet (18.2 metres).[41]

By 1938 a number of auxiliary buildings also had been erected. The included the offices of both the Vacuum Oil company and the Shell Oil company, a timber and fibro power house containing an auxiliary diesel, the wooden control building and the radio range tower (Lorenz beacon) with its accompanying transmitter building. (See Figure 22.)

After the long delay caused by the move from Eagle Farm, the Queensland Aero Club (QAC) built its clubhouse in a fenced semicircle of land on the southern side of Boundary Road, between Beatty and Ipswich Roads. The building was officially opened on 1 August 1931.[42] (See Figure 23.) Lack of Commonwealth funding during times of economic stringency was likely the reason why QAC, unlike the aero clubs in NSW and Victoria, had had to find its own funding. At Mascot the Aero Club of New South Wales was provided with a club house in 1927 that, according to Edgar Johnston was not very large 'though a fine and convenient building'.[43] The NSW club then paid a rental equivalent to 6% of the capital cost of the building and auxiliary services, an amount of £190 per annum in 1930.

The QAC clubhouse cost of £1 599 was raised by the sale of debentures. The building was designed by QAC's honorary architect Richard Gailey Jnr and consisted of two main rooms and an entrance verandah of 11.5 feet (3.3 metres) from which members and guest could watch the airfield activities while enjoying lunch, morning tea or afternoon tea. [44]

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[41] A. Percival to Sec. DOD, memo dated 20 April 1938, report by E. F. Warren dated 11 October 1949, Archerfield – Lease of hangar allotment to W. Rankin, QL312, J56/11, NAA (Qld).
[42] *BC*, 3 August 1931, p. 7.
[43] Parliamentary Standing Committee on Public Works, 'Report together with minutes of evidence and plan relating to the proposed development of the civil aerodrome at Mascot, NSW,' *CPP*, 3 (1929–30–31), p. 833, p. 838.
[44] *CGG*, 26 May 1927, p. 1, 223; *CGG*, 5 July 1928, p. 2, 112; *Aircraft*, 1 May 1931, p. 44; Minutes of AGM held 23 January 1929, General Meeting Minutes Book, RQAC; Minutes of AGM held 25 March 1931, General Meeting Minutes Book, RQAC; Valuation circa 1942, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld); Donald Watson and Judith Mackay, *Queensland architects of the nineteenth century: A biographical dictionary* (Brisbane: Qld Museum, 1994), p. 80.

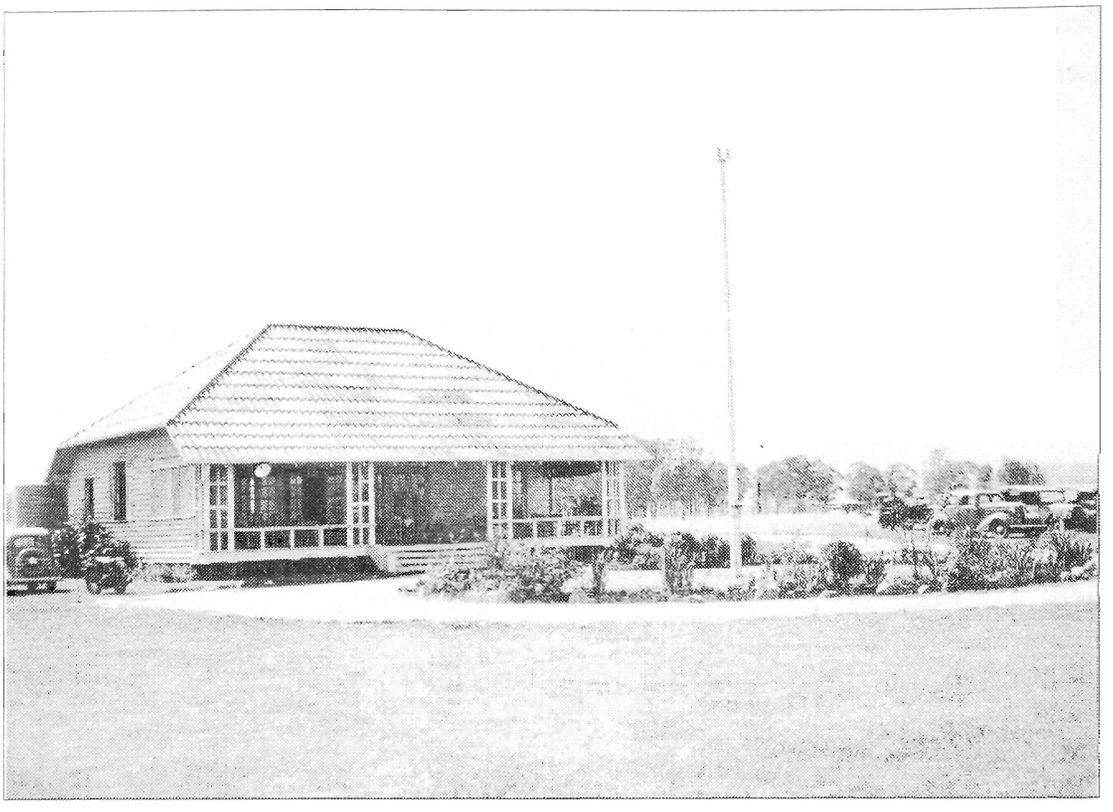

Figure 23: RQAC clubhouse circa 1937
Source: Ellen Chellingworth album, Cecilie Benjamin Collection

Dramatic land-use changes, such as the construction of hangars, are easier to identify than the changes which come with variation to transportation or utility services. As urban planning increased in importance, aerodrome designers in Europe and America were quick to identify the need for fast surface transportation between the aerodrome and the city. Judges in the Lehigh Airports Competition of 1929 advised that the entries emphasised rather forcibly 'that airports must be definitely related to the highways and traffic arteries of the communities they serve.'[45] In Europe where the population of a city was encouraged to take its recreation at the aerodrome, engineer W. R. Baldwin-Wiseman advised planners that to facilitate this secondary use, 'the railways should have easily accessible stations, on suburban steam or electric railways, affording fairly frequent connections with main line services.'[46]

In Australia in the 1930s the three inspectors of aerodromes responsible for site choices may have consulted local authority planners but they did not work closely with them. Neither was ease of public accessibility given the high priority it was granted in Europe.

[45] *American airport designs* (New York: Taylor, Rogers & Bliss Inc. for the Lehigh Portland Cement Co., 1930).

In the 1920s those parts of Rocklea and Coopers Plains that were distant from the railway line were ill served by public transport. Elizabeth Beatty employed twelve-year-old Ruby Eaton to harness a horse and sulky to drive her to the Rocklea railway station whenever she wished to visit the city. Jeannetta Harvey, who grew up in Beatty Road, was one of several students who in the late 1920s rode horses to the Rocklea State School.[47]

In 1928 Hudson Fysh compared the old and the new aerodrome sites. He declared that in all respects, surface transport at Rocklea (Archerfield) was inferior. The new aerodrome was one and a half miles (2.4 kms) from the Salisbury railway station, the same distance from the bus service along Ipswich Road and fully three and a half miles (6 kms) from the Ipswich Road tram terminus.[48]

Though QANTAS hoped the BCC would provide a public bus service between North Quay in the city and Archerfield Aerodrome in 1931, the council refrained from so doing. QANTAS was advised the service between the Ipswich Road terminus and the aerodrome conducted by a Mr Allen of the Sunnybank was acceptable.[49] Accounts of the difficulties of getting to Archerfield in the 1930s are plentiful. During the weeks she was studying engineering for her commercial pilot's licence, aviator Lores Bonney caught the tram from her Hamilton home to the Ipswich Road terminus, then 'walked or hitched a lift the last couple of kilometres through farming country to Archerfield.'[50] QANTAS engineer George Roberts carried three of his workmates each day in his car. Even at the outbreak of the Second World War, when approximately 250 people worked on the airfield, public transport arrangements were little better than they had been mid-decade.[51]

While ordinarily transport problems could be solved by a car, motorbike, pushbike or walking, the influx of people expected on the day of a pageant was another matter. An

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[46] W. R. Baldwin-Wiseman, 'Some ground aspects of aviation', *Society of Engineers*, (1 December 1930), p. 235.
[47] Ruby Trace, interview with author, 19 January 2001; Jeannetta Harvey, interview with author, 31 January 2001.
[48] Isles Love & Co to A. R. McComb, letter dated 6 March 1928, Isles Love & Co to DW&R (Qld), letter dated 15 March 1928, Archerfield Aerodrome – Survey, QL718/22, J56/11, NAA (Qld). Travelling outbound from the city the nearest railway stations were Rocklea, Salisbury then Coopers Plains. Salisbury was the closest.
[49] *Reports and proceedings of the municipal council of the city of Brisbane during the year 1930* (Brisbane: Globe Printing Co., 1931), p. 322.
[50] Terry Gwynn-Jones, *Pioneer airwoman: The story of Mrs Bonney* (Adelaide: Rigby, 1979), p. 55.
[51] Paul Byrnes, *Qantas by George! The remarkable story of George Roberts* (Sydney: Watermark Press, 2000), p. 109.

obviously impressed *Brisbane Courier* reporter provided an interesting account of one of the airfield's very early pageants:

> Crowds flocked there early from tram, car and train, and at the gates of the historic field where dreams of the past have been made to come true, luxurious motor buses and cars disgorged their loads of human beings, eager to sense the thrills part and parcel of the spectacular programme devised by the Queensland Aero Club.[52]

The plan provided by the *Brisbane Courier* on the day of the pageant showed ample parking space. (See Figure 24.)

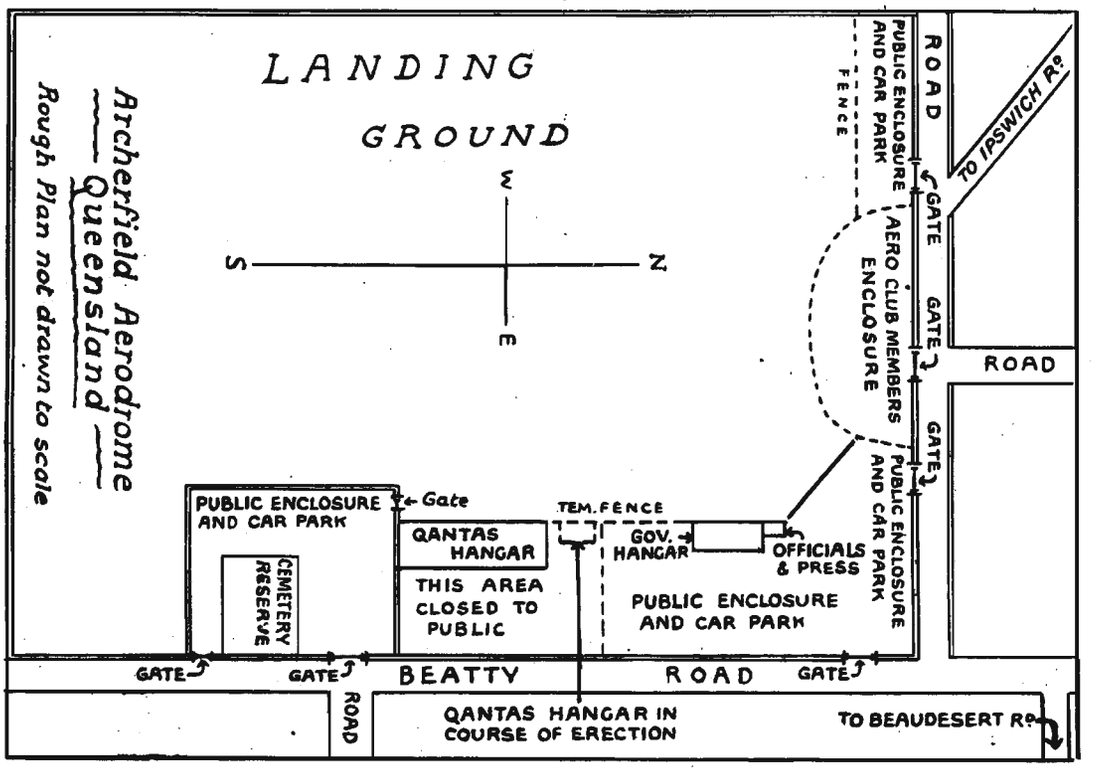

Figure 24: Plan of Archerfield for the viewing public
Source: *Brisbane Courier*, 23 May 1931, p. 14

When an aerial journey to London took twelve days, the thirty minutes taken to get to the aerodrome was immaterial. Travellers were content to check-in at a city office before riding in an airline company vehicle directly to the aircraft, or if there was a delay, to the airline's passenger lounge in one of the hangars. Those travelling north to

[52] *BC*, 25 May 1931, p. 6.

Rockhampton on AOA's Sunday service met the airline car in front of the city's Canberra Hotel in Ann Street at 6:00 a.m.[53]

For the ordinary people whose residences were in the immediate vicinity of Archerfield, profit could be found in the changes to land use. The sale of land provided financial opportunity for those nearest to the aerodrome's core of buildings. In 1936 Robert Wood subdivided the 5 acres (2 ha) of sub. 28 of portion 20, which he had acquired in 1924. (House no. 4 on Figure 25.) From him the Shell Company purchased re-sub. 2 (of sub 28, portion 20), a residential block of 32 perches (0.08 ha), for £80, equivalent to a rate of £1 000 per hectare. The company built a stylish weatherboard house (no. 5 on Figure 25) on the allotment for its refuelling officer.[54] This sale also appears to have been the catalyst for formal registration of resubs 1 and 4, upon which Oliver and Jane Shelley (formerly Jane Wood) had built their house (no. 6 on Figure 25) three years previously.[55]

In 1935, less than six months after the commencement of the Empire Air Mail service, QEA purchased 5 acres (2 ha) at the corner of Beatty and Kerry Roads from Servanus Otterspoor. This block cost the airline company £225 and was earmarked for future expansion. Compared to the house allotment sold by Robert Wood to the Shell Company, this land had cost QEA only £112 per hectare.[56] Of the aviation-related companies using Archerfield, QEA and Shell were the only companies to purchase land beyond the aerodrome boundary. Most were satisfied with a lease of hangar land costing approximately 2s 6d per square foot (12s 10d per sq. metre) per annum. In addition and as an encouragement to aviation, rebates ranging from 33% to 66% applied at all government aerodromes between 1931 and 1937.[57]

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[53] *CM*, 25 August 1936, p. 5; *Reports and proceedings of the municipal council of the city of Brisbane during the year 1930* (Brisbane: Globe Printing Co., 1931), p. 322.

[54] Shell company, title registered 16 September 1936, Folder 3, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld). Two years later John Irwin purchased the quarry block of land immediately to the south for £14 per acre.

[55] O. J. & J. E. Shelley, title registered, 3 September 1936, Folder 3, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld).

[56] Valuations by P. A. Edwards dated 28 November 1942, Archerfield – General extensions, QL718 Part 1 A, J56/11, NAA (Qld); QEA, title registered 17 May 1935, Folder 3, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld); Hudson Fysh to Lester Brain, letter dated 14 July 1927, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML. Hudson Fysh had been considering a similar type of land purchase at Eagle Farm in 1927 but had hesitated when news of the move to Archerfield was made public.

[57] Memo Sec. Property & Survey Branch to Sec. DOD, memo dated 26 September 1935, Archerfield hangars 4 and 5, QL128, J56/11, NAA (Qld).

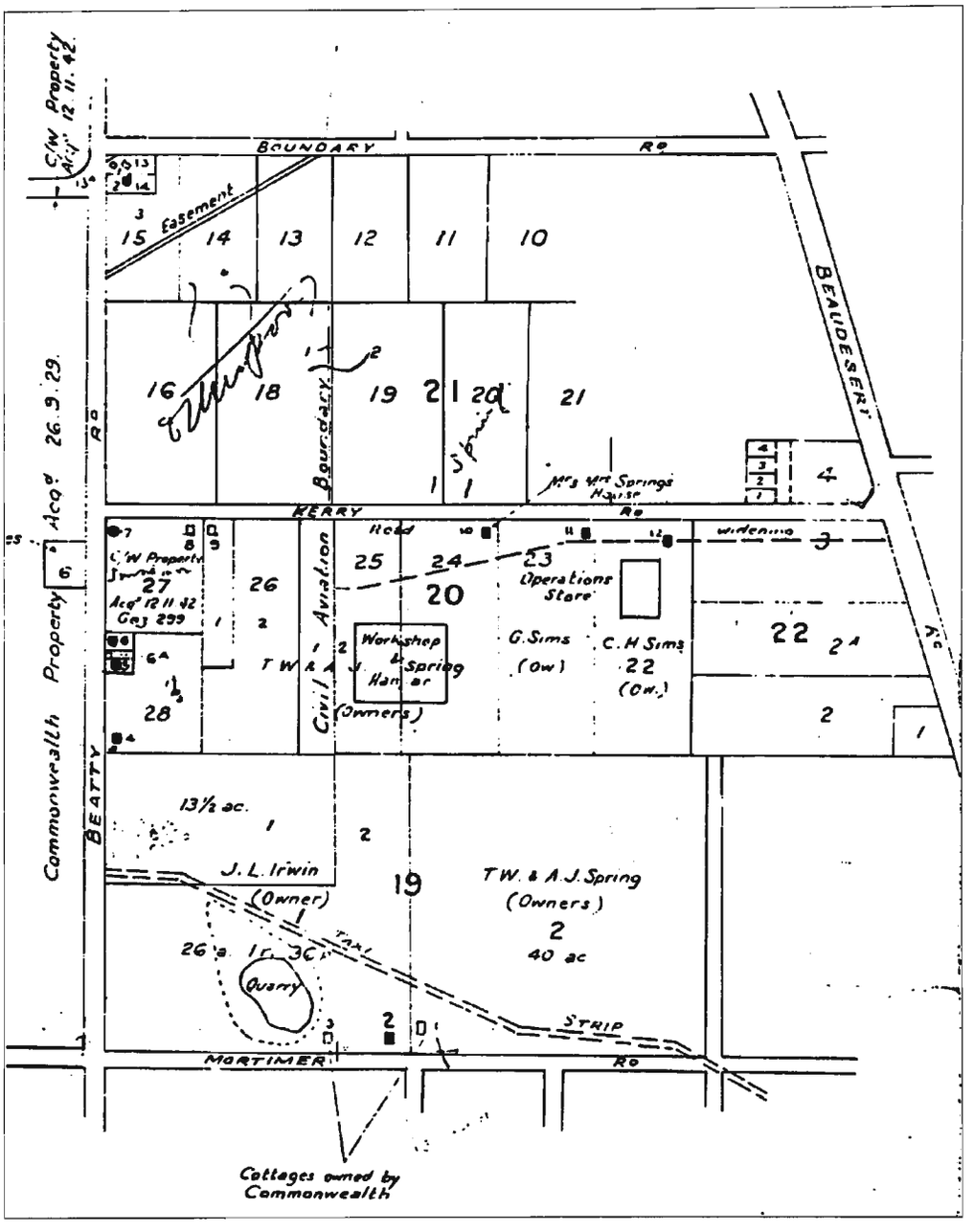

Figure 25: Plan of Archerfield's eastern extensions, dated 5 April 1943
Source: Archerfield – General extension, QL718 Part 2, J56/11, NAA (Qld)

The price of unimproved land close to Archerfield increased only marginally during the decade. Beyond the sale of land close to the aerodrome entrance, there was no general demand for subdivision to anything less than 5 acres (2 ha). Though water and electric power were supplied along Beatty Road when the aerodrome was constructed in 1931, there was still the problem of irregular transport to the tram terminus or railway station.

Table 6: Archerfield Aerodrome land acquisitions prior to the Second World War[58]

	ORIGINAL ACQUISITION	FIRST EXTENSION	SECOND EXTENSION
Previous owner	Elizabeth Beatty	Charles Franklin	Charles Franklin
Date/s acquisition notified in *CGG*	26 September 1929	12 June 1930 and 24 July 1930	22 October 1936
Land description	Subs 4 & 5 of portion 18	Resub. 2 of sub. 3 of portion 18	Resub. 1 of sub. 3 of portion 18
Area acquired	228 acres 2 roods 17.9 perches	68 acres 3 roods 4 perches	45 acres 3 roods 29 perches
Area acquired (in hectares)	92.5 hectares	28 hectares	18.5 hectares
Cost	£5 190	£1 600	£1 150
Cost per acre	£23	£23 5s 0d	£25
Cost per hectare	£56	£57	£62
Aerodrome size at completion of purchase	228 acres 2 roods 17.9 perches	297 acres 1 rood 21.9 perches	343 acres 1 rood 10.9 perches
Aerodrome size (in hectares) at completion of purchase	92.5 hectares	120.3 hectares	138.9 hectares

Because the Commonwealth developed aerodromes for 'defence purposes', its acquisition of land could be made compulsory if necessary and particular restrictions could be placed on activity in the near vicinity.[59] In all instances involving Archerfield in the 1930s however, Commonwealth representatives appear to have negotiated a fair market rate for the land they acquired. In 1936 additional land was required to ensure that Archerfield would be ready for the larger aircraft and night services proposed in the Inter-capital Air Mail service. After complaining that his capacity to operate successfully was reduced, dairyman Charles Franklin sold to the Commonwealth 45 acres 3 roods 29 perches (18.5 ha) of his grazing land for £1 150, or £62 per hectare. It was heavily timbered with light oak. The felling contract of £500 was awarded to Andrew McNeill of Kingston. His work was to be completed by April 1937.[60] Table 6 shows the three stages of Archerfield's prewar growth, and what it cost the Commonwealth to acquire each new extension of land.

While the built fabric of Archerfield expanded during the 1930s, that of Eagle Farm deteriorated. Following the removal of the three hangars and the ancillary structures, all

[58] Plan of Archerfield dated 12 October 1955, Archerfield survey plan, LS3406C, J1018/2, NAA (Qld). Charles Franklin to Sec. DOD, letter dated 14 May 1930, Archerfield Aerodrome – Acquisition additional 68 acres, QL128/2, J56/11, NAA (Qld); A. Percival to Charles Franklin, letter dated 2 October 1936, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld).
[59] *CGG*, 27 August 1931, p. 1,386.
[60] *CGG*, 22 October 1936, p. 1,905; *CGG*, 25 February 1937, p. 420; A. Percival to Charles Franklin, letter dated 2 October 1936, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld).

that remained was the caretaker's house and the former ANA(1) office. A grazing lease over the airfield, which included the house, was granted to the nearby diary owned by the Campbell and Wilson families. Members of the Queensland Gliding Association were permitted to use the site on weekends, a cause of some friction until 1936 when new grazing lease conditions allowed the gliding group 'use of the area on Public Holidays, the erection of hangars, the installation of water supply and other such conveniences as may be desired.'[61] Having moved some of their operations to Camp Mountain (near Samford on the outskirts of Brisbane) the association took little advantage of these conditions.

The changes in land use which occurred during the 1930s on Brisbane's new aerodrome at Archerfield were brought about by the direct and indirect activities of people interested in the future progress of the enterprise of aviation, and of this district on the edge of the city. Large hangars were built by aviation companies to house and maintain their aircraft. The Commonwealth erected small but important structures necessary for the safety of air travel. Outside the aerodrome fence, more subtle changes occurred in the community. People offended by the zoning decisions of local government inadvertently won a change of identity for the pocket of land that became the airfield. Some nearby residents met the demand for goods and services created by the aerodrome's proximity. Though Archerfield played its part in the Australian aerodrome scheme, so too did it become part of the network of activity that was the city of Brisbane.

[61] Sec. DOD to Sec. Dept of Interior, memo dated 13 April 1934, Lease agreements between Commonwealth and Wilson and Campbell, Eagle Farm Aerodrome – Original acquisition, Folder 5, QL805 Part 1B, J56/11, NAA (Qld); Sec. Civil Aviation Board to Sec. Qld Gliding Association (D. Henderson), letter dated 1 June 1936, Gliding bodies in Queensland, 5/108/71, MP115/1/0, NAA (Vic.).

Chapter 13

'The number of applicants demanding joy rides was in some danger of swamping the six Moths operating, when Mr Ron Adair very sportingly came to the rescue and by making trips with six on board his Hawk Moth, enabled all ticket holders to have their ride, although it was almost dark by the time all were satisfied.'[1]

In the 1930s Australian aerodromes were grassy fields bordered on one side by hangars of steel, timber and corrugated iron. Underlying this physical appearance, each aerodrome was a component in the system that, with greater speed than ever before, linked places where people lived. Though viewed as a built environment because of their hangar constructs, aerodromes were also artefacts which, in accordance with the theories of Hughes, were socially constructed and society shaping.[2] As artefacts within an air transport system, these landing facilities were sited in specific places because networks of people made decisions both economic and political as to their development. By consequence, the existence of an aerodrome at a particular location in or near a town or city influenced people and the manner in which they lived.

During this period people visited aerodromes to share in the experience of aviation. Landing grounds such as Archerfield were therefore the one component of the air transport system that linked engineers, executives of air-service companies, pilots, passengers, the general public and those who lived in the immediate vicinity. A consideration of the phenomenon known as airmindedness, a term first used in mid-1920s Britain to explain the positive state of mind about aviation being observed, reveals why some of this interaction occurred. The everyday records of activity on an aerodrome can provide a view of the social aspects of aviation development.[3]

Over and above being just buildings, Archerfield Aerodrome was a socially constructed artefact used by people for two broad reasons. Aircraft engineers, professional pilots, service employees and administrators performed their workday tasks there, occupying the building spaces in specific ways related to the use and maintenance of airframes and engines. Passengers, student pilots and those attending pageants occupied the airline

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[1] *Aircraft*, 2 January 1933, p. 23.
[2] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 51.
[3] Leigh Edmonds, 'How Australians were made airminded', *Australian Journal of Media & Culture*, 7 (1993), pp. 184-5.

waiting rooms, the QAC/RQAC clubhouse and the public enclosures for reasons more socially based.

At the same time the aerodrome can be seen as society shaping. Working aircraft engineers developed the local storehouse of mechanical knowledge needed to solve the problems associated with keeping aircraft flying. The most highly qualified in this group travelled overseas before the introduction of a new type of aircraft so that the latest technology could be transferred on their return to those who had remained behind.

The pilots were the human face of aviation and played a key role in the development of airmindedness and the acceptance of air travel as a legitimate and safe means of travel. Flying was an acquired skill and the 1930s were boom years for training in Queensland. Prior to the Second World War Archerfield's RQAC was the largest provider of flying training in Australia.[4] More than any other civilian training organisation it contributed to the acceptance of flying as a hobby or pastime, especially for women.

Even just to hang over the aerodrome fence on a weekend or the day of a pageant was an inexpensive means of dreaming of what might be possible. As Frank Snars recalled about growing up in nearby Salisbury:

> Do not think that we felt deprived or developmentally backward. On the contrary, we regarded our little world as modern and progressive. It abounded in technological magic. We overlooked Archerfield, then Brisbane's main aerodrome. Planes buzzed around all day.[5]

The social construction of Archerfield Aerodrome began when the first permanent occupants, the members of the QANTAS engineering staff and QAC's aerodrome staff, moved in. In the early 1930s fifteen male members of staff were employed in the QANTAS workshops. By 1934 this had increased to twenty-six men and one woman, Ruth Trickett (later Kydd).[6] By 1936 QEA had established a stable, specialised workforce. Works Manager Arthur Baird occupied an office in the north-west corner of hangar no. 5. From there he controlled the overall quality of QANTAS engineering. Dudley Wright was the works foreman and shared an office with Ruth Trickett, the

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[4]Minute paper dated 18 September 1936, Sec. Civil Aviation Board to Sec. Minister for Defence, minute dated 13 October 1937, Aero Clubs policy after 31 October 1936, 5/101/37, MP115/1, NAA (Vic.).

[5] Coopers Plains Local History Group, *A closer look at Salisbury and Nathan Heights* (Brisbane: CPLHG, 2000), p. 103.

[6] Susan Faulkner, QANTAS hangars Archerfield Aerodrome: Draft conservation plan, May 1995, p. 40. Qantas Empire Airways Ltd was formed on 18 January 1934.

company's typist. Henry Williams was the foreman of the engine shop. Jack Avery, the first QANTAS apprentice, specialised in several areas including welding. Not long after he commenced work with the company in 1936, mechanically minded George Roberts introduced the concept of in-house overhaul of flight instruments and electrical system components. This he achieved by constructing filtering equipment from everyday, readily available items. In so doing Roberts achieved a local solution to the problem of technological accuracy, one which also saved QEA money.[7]

Staff numbers increased dramatically to meet the company's overseas obligations after the formation of QEA early in 1934. When engineer Norm Roberts joined the company that year the total number of employees was thirty. When his brother George was employed in 1936 total staff numbers had increased to fifty. Half were in the company's engineering sections. By late 1939 QEA employed over fifty people on Archerfield, and many more in their Sydney headquarters and along their routes. [8]

Smaller organisations maintained non-commercial and private aircraft. After the conclusion in May 1931 of its initial engineering contract with QANTAS, the Queensland Aero Club created its own workshop. Their first engineer was E. J. (Jim) Brunckhurst, usually to be found in hangar no. 1. Also a qualified pilot, his position involved tackling some interesting problems, including the recovery in early 1932 of one of the club's Moths from the beach at Stradbroke Island, south-east of Brisbane. Before flying the aircraft back to Archerfield he repaired a main spar, rebuilt the rudder and made minor repairs to the engine, all in two days.[9]

Maintenance services were also available after 1935 from F. C. Higginson and Company in the newly constructed hangar no. 3. Toowoomba-born Frank Higginson learnt to fly at Eagle Farm in 1929, gained a commercial licence in June 1931 and authorisation to give instruction in flying in August 1932. In the first half of the 1930s he delivered the *Telegraph* to Toowoomba and the *Courier-Mail* to Cunnamulla. For a short time he was in New Guinea (October 1934) and the following year was designated the pilot for Reliable Air Travel's short-lived Cunnamulla service. After the construction of hangar no. 3 late in 1935 he entered into a partnership with E. B. (Ellie) Jones, daughter of Henry Williams, the owner of hangar no. 3. As well as providing hangarage and instruction, the Higginson company ran a maintenance section until late in 1938

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[7] Bruce Leonard, *A tradition of integrity: The story of QANTAS engineering and maintenance* (Sydney: UNSW Press, 1994), pp. 35-6. Prior to the employment of George Roberts, Elphinstones in Brisbane repaired electrical equipment while a jeweller in Sydney overhauled aircraft instruments.
[8] Paul Byrnes, *Qantas by George! The remarkable story of George Roberts* (Sydney: Watermark Press, 2000), p. 98; Faulkner, QANTAS hangars Archerfield Aerodrome: Draft conservation plan, p. 40.
[9] *Aircraft*, 1 July 1931, p. 30.

when Frank Higginson moved to Albury NSW and Ellie Jones established a new company named Airwork.[10]

Figure 26: Frank Higginson, Eagle Farm circa 1929
Source: John Higginson

Jones was an articled clerk living in Mitchell in western Queensland in the late 1920s when the flights conducted by Bert Hinkler sparked her interest in aviation. Though she undertook some flying training in 1938, records indicate she did not complete a pilot's licence. Along with Ruth Trickett of QEA and Irene Graham of RQAC, Jones was one of the few women who can be identified as having worked in an administrative capacity for prewar Archerfield companies, and the only one who did so as a proprietor.[11]

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[10] John Higginson, photo and newspaper clipping album of F. C. Higginson; James Sinclair, *Wings of gold: How the aeroplane developed New Guinea* (Bathurst, NSW: Robert Brown & Associates, 1978), p. 160.
[11] *CM*, 24 August 1938, n.p.; Newspaper clipping book no. 1, RQAC Archives, p. 232.

Irene Graham commenced employment as the secretary of RQAC on 1 September 1936, having been chosen from a field of 120 applicants.[12] Women, especially local women, were also employed in more traditional roles. In 1932 Jane Shelley, who lived with engineer husband Oliver in Beatty Road, oversaw catering at the RQAC clubhouse. In the latter part of the decade the club's catering manager was a Mrs Freney, a member of the pioneering family which since the 1850s had lived immediately south of Archerfield.[13]

The social construction of the aerodrome changed again late in 1938 when Airlines of Australia (AOA) opened its engineering facility in hangar no. 6. In May 1939 *Aircraft* magazine reported twenty-three engineers were working there at full capacity.[14] Rivalry between the two larger companies, AOA and QEA, was inevitable. AOA welder Trevan Jackson recalled:

> With their DH86s, we regarded QANTAS over the way from our Number 6 hangar as poor relatives...They bought a Lockheed 10 Electra, *The Inlander*, or as we said, 'The Onlander'. It was beset by much undercarriage retraction trouble and seemed to spend more time in front of their hangar on jacks than flying.[15]

Though spending less actual time on the aerodrome than ground staff, Archerfield's key professional pilots of the 1930s had a higher public profile. Since the end of the First World War, publicity designed to encourage people to fly had focused largely on the skills of the pilot. In his 1993 discussion on how airmindedness developed in Australia, historian Leigh Edmonds directly linked the returning aviators' keenness to remain flying with a realisation that the public must be encouraged to pay for aerial services. He concluded three main conditions were required to foster this attitude in Australians—flying had to become safe, it had to serve a useful purpose and people had to know about it.[16]

The first two conditions were partially satisfied during the 1920s and early 1930s as a consequence of improvements in technology and Commonwealth sponsorship of the delivery of airmail through subsidies. The society-shaping task of getting people to understand the potential of aviation in south-east Queensland, as elsewhere in the

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[12] *CM*, 4 August 1936, p. 13; *Aircraft*, 1 September 1936, p. 14.
[13] *BC*, 13 August 1932, p. 13; Jeannetta Harvey, interview with author, 10 January 2001. Florence and Ivor Perkins, also of Beatty Road, ran a boarding house in which many of the AOA engineers lived.
[14] *Aircraft*, 1 May 1939, p. 22.
[15] Trevan Jackson, Random ramblings of an early bird 1934–51, manuscript, 2001, p. 21.
[16] Edmonds, 'How Australians were made airminded', pp. 184-5.

country, was approached in two ways. The general idea of flying was promoted firstly using stories which had some connection to flying. The more specific notion of people participating in the act of flying, by travelling as passengers or even learning to fly, was fostered through publicising the combined activity of pilot and plane.

Almost every edition of any daily newspaper during this period carried at least one story on aviation, even if it was the cabled account of an accident overseas. Every day the idea of flying was promoted in this general fashion. While Brisbane reporters dealt with local incidents and the occasional accident involving injury, columnist Garnsey Potts provided a broader perspective on the possibilities of aviation. In 1929 this former Australian Flying Corps (AFC) pilot was pictorial editor for the *Brisbane Courier* and its aviation correspondent, initially writing under the name Propeller. His topics were as diverse as flying in fog, the uses of aircraft, H-shaped engines and women in aviation. In the mid-1930s Potts was employed by QEA as its publicity officer and by 1939 was one of the senior men in their head office in Sydney.[17]

That the general public had a keen interest in the idea of flying was not lost on newspaper advertisers. Amongst the companies that aligned their product with aviation through advertising in the *Brisbane Courier* were Hearne's Bronchitis Cure (1924), Shell oil (1928), Bulimba Gold Top beer (1931), Kiwi boot polish (1931) and the National Mutual Life Association of Australia (1932). One advertisement from this last company questioned whether a man would send his wife and children up in the illustrated aeroplane by themselves. The suggestion then followed, 'Let the National Mutual pilot them', making an association with the sturdy, safe image of the professional pilot then being cultivated.[18]

When the activities of professional pilots were publicised regularly as a means of encouraging people to travel by air, the public quickly learned to tell the difference between the full-time aviator and the amateur. The roll call of notable professional pilots associated with Archerfield during the 1930s included Lester Brain, Ron Adair, Keith Virtue, Tom Young and Charles Matheson.

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[17] *Aircraft*, 20 April 1929, n.p.; *BC*, 18 May 1931, p. 8; *BC*, 4 April 1931, p. 15; *BC*, 2 December 1932, p. 5; *BC*, 5 November 1931, p. 14; Hudson Fysh, *Qantas at war* (Sydney: Angus & Robertson, 1968), p. 96; Garnsey Potts to Edgar Johnston, letter dated 6 June 1936, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS. Garnsey Potts learned to fly at Richmond, NSW, in 1916 and served with No. 3 Squadron AFC in France. He trained with QAC to renew his 'B' or commercial pilot's licence in 1934.

[18] *BC*, 13 September 1924, p. 21; *BC*, 11 August 1928, p. 21; *BC*, 11 April 1931, p. 14; *BC*, 26 October 1931, p. 7; *BC*, 6 August 1932, p. 15.

Lester Brian learnt to fly in 1923 and subsequently joined QANTAS at Longreach on a first year salary of £400 in 1924. In 1927 he was the company's Eagle Farm manager, opening and running the Brisbane Flying School prior to the move to Archerfield. Two feats of flying skill enhanced his local reputation and brought him to national attention. While involved in the search for the *Southern Cross* during the 'Coffee Royale' affair of April 1929, Brain located the wreck of another lost aircraft, the *Kookaburra*, in the Northern Territory's Tanami Desert. The following month, when QANTAS was again contracted to provide an aerial search, Brain found Jim Moir and Harold Owen, missing on a flight south across the Timor Sea. On the latter flight the QANTAS DH50 *Atalanta* also carried F. W. Roberts of Brisbane radio station 4QG, a promotional bonus for QANTAS.

Lester Brain was appointed QANTAS' chief pilot in 1931, thereafter inaugurating most new routes. A safe and experienced flyer, Brain was the professional most associated with the image of company reliability that QANTAS developed in the 1930s.[19]

Figure 27: Lester Brain, Eagle Farm circa 1927
Source: QANTAS

[19] VH–USG crashed outside Longreach on 15 November 1934. Macarthur Job, *Aircrash: The story of how Australia's airways were made safe 1921–39*, vol. 1 (Weston Creek, ACT: Aerospace Publications, 1991), pp. 64-8.

Maryborough-born Ron Adair gained his wings in 1916 with the Royal Flying Corps. An early identity on Eagle Farm Aerodrome, Adair founded Aircrafts Proprietary Limited (APL) in 1928 to continue operation of a daily service between Brisbane and Toowoomba. Ron Adair also was adept at obtaining publicity for his company. In the late 1920s passenger names were published weekly as a means of encouraging more people to fly, while anything out of the ordinary such as night flying, an emergency rescue or the inauguration of a new aerodrome attended by APL aircraft was promoted. From 1936 APL and Adair were synonymous with breaking down the isolation of regional Queensland communities by providing regular services of only a few hours travel time to Kingaroy, Bundaberg, Rockhampton, Monto, Thangool and Cracow.[20]

Figure 28: Ron Adair, Archerfield, early 1930s
Source: John Oxley Library

Lismore-born Keith Virtue learnt to fly at Eagle Farm with Lester Brain in 1928. In January 1931 he formed New England Airways with G. A. Robinson and flew with monotonous regularity between Brisbane and Sydney for most of his long career. Following the formation of AOA he became chief pilot of that company. When he

[20] *Aircraft*, May 1947, p. 19-21; John Wilson, 'A brief history of Queensland Airlines Pty Ltd', *AHSA Aviation Heritage*, 30 (1999), pp. 19-21.

retired in 1954 he had logged over 23 000 hours of flying and made his own particular contribution to public acceptance of regular public transport by air.[21]

Fellow NEA pilot Tom Young, provided a glimpse of what life was like for the domestic airline pilot of the 1930s:

> Keith Virtue and I flew the Avros as a single pilot operation and we carried no engineers. We flew every day, irrespective of the weather: it didn't matter whether there was fog, rain or hail we flew. For the first two years, Keith and I never saw one another; he was going one way while I was going the other.[22]

Tom Young's aviation career, though more varied, was even longer than Keith Virtue's. After a short RAAF career as an engineer, Young joined QANTAS at Longreach in 1926. The following year he was resident engineer for their Brisbane Flying School. Here Lester Brain taught him to fly. In the late 1920s he worked for Bishop and O'Sullivan's Skytravel Australia Ltd, advertising Wunda Wax polish and conducting joy flights. From late 1931 he flew in turn for NEA, grazier R. S. White and AOA. When he ceased flying in 1966 he had logged 25 500 hours and shown that civil aviation could be a life-long, if varied, career.[23]

Flying instructor Charles Matheson left the RAAF in 1925 after the crash of a Sopwith Pup aircraft and a brush with officialdom. Following a brief stint instructing for QANTAS in Longreach he moved to Eagle Farm where in June 1930 he formed C. C. Matheson Flying School. Amongst others, at this time he taught long-distance pilot Lores Bonney to fly. [24]

Though deemed a good instructor by his students, Matheson appeared to have a problem with authority. In the latter part of the 1930s he instructed under the name Matheson Flying School, gaining occasional publicity through running a flying scholarship. Some of post-Second World War instructor Harold Kenny's training was conducted with Matheson at Toowoomba in the late 1930s. He recalled, 'No one could

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[21] Joan Priest, *Virtue in flying: A biography of pioneer aviator Keith Virtue* (Sydney: Angus & Robertson, 1975), pp. 3-20.
[22] Greg Banfield, 'Transcript of interview with Tom Young', *AHSA Aviation Heritage*, 32 (December 2001), p. 166.
[23] Banfield, 'Transcript of interview with Tom Young', pp. 161-70. Tom Young's early life was spent in foster homes.
[24] *Aircraft*, 11 October 1920, p. 49; *Aircraft*, 30 September 1929, p. 9; C. D. Coultard-Clark, *The third brother: The Royal Australian Air Force 1921–39* (Sydney: Allen & Unwin in association with the RAAF, 1991), p. 330; Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 52.

rubbish Charlie "Matt" on the job. He was firstly a gentleman. He was not out to impress anyone, and like others I was subsequently to meet, could seduce one into making that extra effort. He was a great and very popular instructor.'[25]

Engineer George Roberts was also a student of Matheson's. He recalled that on one departure from a small paddock to the west of the nearby Rocklea Hotel, Matheson needed to bounce his aircraft over a fence to become airborne.[26] A *Brisbane Courier* reporter described a similar, if not the same incident, though differently:

> After a brief stay [at the hotel] an attempt was made to take off again, and after a run of about 200 yards, the 'plane struck a wire fence. The under-carriage became entangled, and the propeller struck the ground, causing the 'plane to turn completely around.[27]

Less experienced pilots on the other hand were expected to crash, though in the first half of the decade accidents in Queensland involving serious injury were uncommon. When Clive Jones and his Moth made abrupt contact with the Archerfield turf at the 1931 pageant the *Brisbane Courier* reported:

> For those who went in quest of sensation there were not wanting birdmen who seemingly whisked a flippant wing in the face of death. The intrepid pilot, Clive Jones, enthralled the vast gathering in his remarkable display of aerobatics. It was while he was at a low altitude that he was overtaken by a mishap...The crash was not considered a bad one, and the incident in no way spoiled the onlooker's enjoyment of the remainder of the programme.[28]

Jack Barry crashed the same aircraft west of the clubhouse during a balloon bursting competition the following year. The *Brisbane Courier* reported it as a 'Pilot's Wonderful Escape'.[29]

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[25] *CM*, 8 July 1938 p. 2; Register, commercial pilots, Box 1, MP467/1, NAA, (Vic.); Register of companies formed between 24 September 1934 and 9 January 1937, Register of Companies Office, Brisbane, A/18952, QSA; Harold Kenny, 'Living to fly' might well become 'flying to live', Part 1, manuscript, 1994, p. 23.
[26] George Roberts, interview with author, 10 May 2000.
[27] *BC*, 10 April 1933, p. 13. Neither Matheson nor the passenger Morry Little was injured. Matheson's licence was suspended for breaches of Regulations 74, 77 and 79.
[28] *BC*, 25 May 1931, p. 6.
[29] *BC*, 5 September 1932, p. 11.

The more-experienced pilots developed higher levels of professionalism, in part because they held a wider, global view of the possibilities of aviation technology. For a fortunate few, this professionalism was enhanced by journeys to England and the USA preceding the introduction of new aircraft. On their return the latest technology could be transferred to those who had not travelled. The overseas trips made by QANTAS staff in the interwar years are by far the best documented. Lester Brain visited England in 1929 and again in 1934. This last trip was to gain an endorsement on the DH86 to be used on the airmail service to Singapore. On his return to Archerfield on 13 October 1934 in the first DH86 to be ferried to Australia, Brain and the crew of three were met by a large crowd of spectators, an indication of just how interested people were at the time. (See Figure 29.)

Figure 29: Aerial view of VH-USU on Archerfield shortly after its arrival from England on 13 October 1934. Most spectators are confined to the public enclosure. The house across Beatty Road in the left background was the home of the Shell representative. The house in the right middle distance belonged to Robert Wood.
Source: QANTAS

QEA Engineer Arthur Baird left for England in August 1935 to study the maintenance side of the Imperial Airways operation from London to Singapore. He was in Europe again in the latter months of 1937 with three other engineers, Dudley Wright, Eric Kydd and Henry Williams, prior to the introduction of flying boats. Before March 1938 seven QEA pilots also made the journey to England for their introduction to flying boats.[30]

At the end of 1935 engineer and pilot Tom Young travelled to Europe and the USA looking for an aircraft for his then employer, grazier R. S. (Scamp) White. The Stinson Reliant which he chose was equipped with a manually operated, variable-pitch propeller, the only one of its type at the time imported into Australia. To maintain and overhaul it, Young needed a special extension on his ground engineer's licence. Given the pace at which aircraft technology was developing, it was not uncommon for those involved in commercial aviation to be more qualified than those public servants who administered the industry.

Some government aviation officials also travelled overseas in the course of their employment. Controller Brinsmead visited the United States in 1929. Edgar Johnston travelled abroad in 1935.[31] Controller of ground organisation Roley McComb, who 'studied modern airport developments in other countries' for six months late in 1937, later shared his impressions with readers of *Aircraft* as 'Overseas Airport Developments: Jottings from a tour abroad'.[32] Most CAB employees though remained at home. On Archerfield their longest-serving representative was Andy Lauchland. With his family, Lauchland lived in the refurbished former home of Elizabeth Beatty on the southern edge of the aerodrome, the house originally named *Franklin Vale*.

Andy Lauchland became synonymous with early Archerfield. When a stolen car created havoc on the aerodrome in August 1932 he is reported as having raced after it, albeit unsuccessfully, in the aerodrome's tender vehicle. He interviewed witnesses after any air crash and is credited with seeking public assistance via a radio broadcast when in June 1936 bad weather stopped the AOA Monospar *Captain Cook* from landing at Archerfield. Jean Philp (later Haughton-James) saw him as the aerodrome's welcoming

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[30] Hudson Fysh, *Qantas rising* (Adelaide: Rigby, 1965), p. 226; Leonard, *A tradition of integrity*, pp. 40-1; Fysh, *Qantas at war*, pp. 59-63.

[31] Parliamentary Standing Committee on Public Works, 'Report together with minutes of evidence and plan relating to the proposed development of the civil aerodrome at Mascot, NSW', *CPP*, 3 (1929–30–31), p. 868; Commonwealth of Australia, *Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW* (Canberra: Govt Printer, 1938), p. 6.

[32] *Bulletin*, 8 September 1937, p. 18; *Aircraft*, 1 June 1938, pp. 9-11; Banfield, 'Transcript of interview with Tom Young', p. 166.

face. Convivial breakfasts on his verandah were common after an early morning flight in from her family's property *Wyaralong*, near Boonah.[33]

As a Civil Aviation Board's representative in Brisbane during a decade of increased aerial activity and technological change, the duties Lauchland undertook changed, as did his title. After training as a pilot, he in turn tested students for their 'A' or private licence. This involved assessing certain control and landing skills from a position on the ground. From the aerodrome's first timber control tower Lauchland flashed control lights to approaching and taxying aircraft. Thereafter he was referred to as the control officer. Promotion took him after 1937 to Parafield Aerodrome then Mascot Airport. He retired from his last position as manager of Brisbane's postwar Eagle Farm Airport in May 1955.[34]

Airline executives and their clerical staff generally remained in offices in the city. The more astute actively promoted aviation from there, a not too difficult task when the editors of Brisbane's newspapers were genuinely supportive. The positive approach to aviation adopted by the *Brisbane Courier* had carried over from the 1920s when the company was linked financially to the early Courier Aircraft Co. The newspaper's then editor, John J. Knight, also was the first president and a life member of the Australian Aero Club (Qld Section).[35]

Two incidents from the late 1920s indicate how interested both of Brisbane's newspapers were in creating a positive attitude towards flying. Local QANTAS pilot C. W. A. (Charles) Scott crashed outside Adelaide when ferrying an aircraft back from a charter. His engineer was killed in the subsequent fire. In Brisbane Lester Brain endeavoured to counter any negative publicity:

> On receiving the news of the crash at Adelaide I dropped in and saw the *Courier* and *Mail* with the result that the news was not splashed across the posters, nor was it largely featured in the press. You will probably notice that both papers

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[33] *BC*, 13 August 1932, p. 13; *BC*, 12 June 1936, p. 15; Jean Haughton-James, interview with author, 21 March 2001; Dept of Works to CCA, letter dated 1 October 1930, Brisbane Aerodrome letters 1–678, 7/16, A2408/0, NAA (Vic.).

[34] *CM*, 9 March 1961, p. 13; *AIR*, April 1961, p. 3; Estimate for cost of repairs circa June 1937, Archerfield Aerodrome Groundsman's Cottage, 217/102/403 Part 1, MT399/1/0, NAA (Vic.); Inspector Deakin to AVIAT, telegram dated 21 January 1931, (Royal) Queensland Aero Club – policy file, 5/102, 119 Part 4, MP115/1, NAA (Vic.); Andrew V. Lauchland, 'Commercial aviation in Queensland', *Queensland Manufactures Year Book*, (Brisbane), p. 179. The other CA Board representative on Archerfield in the late 1930s was the aircraft inspector-in-charge, Tom Amos.

[35] Minutes of 18 November 1921 and minutes of 21 July 1927, General Meeting Minutes Book, RQAC.

> were very reasonable in the matter and the name of QANTAS was kept out of the headlines.[36]

The same C. W. A. Scott, when an instructor at Eagle Farm, reported to Hudson Fysh after a training accident in 1929:

> That it was a stall was so obvious that I decided to clear away the machine before the arrival of the press and photographers, and during the morning, due to the courtesy of Mr Maughan of the *Daily Mail*, may have succeeded in quieting most of the hurrah from the other newspapers.[37]

Harold R. Maughan, manager of the *Daily Mail* after 1925, was also a committee member of the then AAC (Qld). When serving with No. 1 Squadron AFC during the First World War he had won a Distinguished Flying Cross and was mentioned in despatches.[38]

Within what was a small technical community, the aviation executive most adept at promoting the idea of flying and the services his company provided was QANTAS' Hudson Fysh. Throughout his managerial career Fysh addressed groups, published promotional booklets, corresponded with government officials and actively sought positive publicity in newspapers and magazines, all to an extent far greater than any other contemporary Australian airline executive. He also travelled regularly to Europe and the USA to update his knowledge on the latest in airline and aerodrome operations.[39] On a late 1933 return to Australia his impatience with the slow pace of development here was revealed in private correspondence with the controller of civil aviation. Fysh wrote, 'Here I am back in the land of Aviation upheavals—it is just like coming back to a battle ground.'[40]

On Archerfield Aerodrome, the scene of some of the battles fought by Fysh, the number of people reporting for work each day by late 1939 had increased to 250. These people

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[36] Lester Brain to Hudson Fysh, letter dated 10 September 1928, Qantas Ltd 1927 to 8 September 1930, Brisbane Branch, K21809, ML.

[37] C. W. A. Scott to Hudson Fysh, letter dated 18 October 1929, Qantas Ltd – Queensland Aero Club, Flying schools, K21809, ML. This accident occurred at 6:15 a.m. on 18 October 1929. The uninjured A. C. H. Dehle was the pilot and sole occupant of VH–UFR.

[38] Annual report for the year ending 1933, (Royal) Queensland Aero Club – policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.); Errol G. Knox, *Who's who in Australia* (Melbourne: Herald Press, 1934), p. 223. Yet another link was the friendship between Frank Higginson and *Telegraph* photographer W. (Bill) Jones.

[39] Copies of speeches given, Hudson Fysh file, Qantas Historical Collection, Sydney.

[40] Hudson Fysh to Edgar Johnston, letter dated 8 November 1933, E. C. Johnston – 1932 onwards – correspondence with Wilmot Hudson Fysh, CAHS.

had direct contact with aviation, though more important to the shaping of society in general was the unknown number who over the previous decade had visited the aerodrome for social rather than employment reasons.[41]

Figure 30: Models posing as passengers disembarking from overseas at Archerfield. This publicity image is similar to many press photographs of arriving or departing passengers taken during the 1930s. The same female model appears in Figure 9.
Source: QANTAS

The smallest group of visitors to the airfield were those who were arriving or departing by aircraft. A local press photographer captured the departure of the high-profile Lady Mountbatten on the first international passenger-carrying flight from Archerfield on 17 April 1935, a moment most likely orchestrated by recently employed QANTAS publicity officer Garnsey Potts. Subsequent articles reported the sophistication of

[41] O. Rogerson, memo dated 27 October 1939, Archerfield Aerodrome – RAAF Post Office, A1944/529, BP13/1, NAA (Qld). The number of visitors and passengers to Archerfield per week was conservatively estimated at the time at 1 000.

travelling by air and the social stature this entailed. When Brisbane teacher Hilda Green was photographed on the steps of a DH86 about to depart for London, it was in much the same way as were the attractive models QEA used in its publicity. Her faith in the reliability of the QEA service was evident in booking to arrive back at Archerfield the day before the start of the new school year.[42]

Of the records kept by passengers describing what in reality could be an uncomfortable journey, one of the most detailed is the diary of glass company executive W. H. Pilkington, written to cover a return journey from England to Australia between September and December 1935. Of his departure from Archerfield on 27 November he wrote:

> Lovely clear morning. Lay on the grass in the sun waiting for the plane to be loaded. Several learners were flying when we arrived at the aerodrome; one man was up in a very small red machine; he landed some little way away and taxied across the field in our direction. Suddenly we all noticed him, apparently quite unable to change his course, coming steadily but very slowly straight for our machine, broadside on; just in time two men rushed out and caught his wings and succeeded in diverting him, so that all the damage down was that he scraped the paint of the edge of our wing. No one seemed greatly disturbed—the language used was scarcely even ordinary Australian![43]

The pilot of the small machine may have been a member of the Queensland Aero Club, one of the largest socially constructed organisations based on Archerfield in the 1930s. This club had re-formed after the First World War to provide flying training and access to aircraft for its members. Without the finances to employ the necessary specialists, the then AAC (Qld) initially contracted the QANTAS Brisbane Flying School to conduct its training. A series of aerial pageants between 1927 and 1930 increased the profiles and profits of both organisations. In May 1931 the AAC (Qld), now on Archerfield and officially the Queensland Aero Club, employed its own instructor, W. E. (Bill) Gardner. His salary was a considerable £700 per annum.[44]

QAC rules reflected the social mores of the time. Candidates for membership had to be nominated and accepted by the committee to become ordinary members. Later they could progress to pupil or pilot member status. In 1933 the QAC entrance fee was

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[42] *CM*, 3 January 1936, p. 14; *CM*, 17 December 1936, p. 19.
[43] W. H. Pilkington, 'Leaves from Mr W. H. Pilkinton's diary of his return trip by air from Australia to England', *Man and Aerial Machines*, 65 (November–December 1997), p. 49.
[44] *BC*, 9 May 1931, p. 16.

£1 1s 0d. The annual subscription was the same amount. The average cost of qualifying for an 'A' licence was £40 to £50, beyond the reach of those who lacked solid financial backing.[45] One other discouraging factor may have been the training agreement clause. This required the pupil to 'pay the Club in full for any loss suffered by the Club or any damage done to the Club's aircraft, stores or equipment' if they did not obey the rules and regulations of the club, or the directions of one of its officials.[46]

Through efficient management, a greater number of people wishing to learn to fly and good flying weather the RQAC was by 1937 the largest aero club in the country. (See Table 7.)

Table 7: Flying hours recorded by QAC/RQAC, 1929–36.[47]

YEAR	PUPILS' AND PILOTS DUAL (HRS)	FLYING TIME SOLO (HRS)	TOTAL (HRS)	PUPILS TRAINED
1929 (7.5 months)	237	239.10	530.10	12
1930	532.20	948.25	1480.45	26
1931	382.05	1069.15	1451.20	24
1932	624.30	1236.15	1860.45	22
1933	557.15	1054.40	1611.55	28
1934	1052.55	1811.20	2864.15	27
1935	1392.40	3238.25	4631.05	72
1936	1758.18	4002.30	5760.48	54

Students who did not reside in Brisbane logged some of these hours. From 1933 the club employed a country instructor who taught in chosen centres which had a licensed aerodrome. Starting with towns on the Darling Downs, the club gradually expanded operations into coastal centres as far north as Cairns, spreading airmindedness and making the idea of learning to fly a reality for people who lived in different parts of the State. Pageants and fly-ins helped promote aviation in regional areas. Arrangements could break down though, as Harold Kenny recalled of his training in 1937 when, 'after

[45] QAC Learn to fly brochure circa 1933, (Royal) Queensland Aero Club – policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.). No other Australian aero clubs charged an entrance fee. Annual subscription at the Aero Club of NSW was £3 3s 0d while at the Aero Club of SA subscriptions were £4 4s 0d per annum. According to John Higginson, his father Frank's family was not wealthy. He believes his father's strong desire to become a pilot helped him overcome the financial obstacle. Frank Higginson was twenty-one years of age before he commenced his training.

[46] Copy of QAC Agreement of Pupil and /or Pilot member, (Royal) Queensland Aero Club, 5/102/43 Part 3, MP115/1, NAA (Vic.).

[47] Annual report for the year ending 31 December 1936, (Royal) Queensland Aero Club – policy file, 5/102/119 Part 4, MP115/1/0, NAA (Vic.).

visiting us twice in a fortnight, we never sighted a Royal Queensland Moth for training in Toowoomba for a whole seven months.'[48]

Central to aero club social activity for city members was the clubhouse on Archerfield. At the commencement of a day's flying, aircraft would be taxied from the hangar and parked outside the semicircular enclosure. Members and their friends could watch flying activity from the verandah while enjoying the refreshments available. Within the QAC enclosure on Archerfield a tennis court was built in 1933. A swimming pool was planned.

Figure 31: Afternoon tea on the verandah of the Queensland Aero Club clubhouse, circa 1934
Source: Learn to fly brochure, (Royal) Queensland Aero Club – Policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.)

The annual pageants so popular with the public at Eagle Farm had by 1932 lost their novelty value. Although 5 000 spectators and thirty aircraft attended the August 1932 event on Archerfield, it was dogged by bad weather and considered a financial failure. In fostering airmindedness and people's ready acceptance of aviation as normal, the club relied on such basic acts as aerobatics in a DH60 Moth and formation flying. Ironically, QAC lost its capacity to draw a crowd when the public accepted such acts as normal, everyday aerial activity. With pageants no longer profitable, the club's committee

[48] Sec. RQAC to CCA, letter dated 22 December 1933, (Royal) Queensland Aero Club – policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.); Kenny, Living to fly, Part 1, p. 28.

members, all of whom were volunteers, reduced their involvement with public displays to a more manageable annual President's at home and quarterly competition flying days.[49]

Always enthusiastically attended were the club's annual balls. The first was held on 7 June 1929 at the Trocadero Dansant in South Brisbane. Aviation paraphernalia abounded, and according to the social correspondent of the *Brisbane Courier*, 'The dances on the programme were renamed in accordance with the aerial scheme, and were disguised under such names as "The Aeroplane Amble", "Tiger Moth Mooch", "Tail Skid Trot" and "Sky Stall Blues".'

During the interval a ballet was performed where 'a solo 'plane, with illuminated propeller, was led in by a ballet of six girl mechanics, in harlequin costumes and leather helmets, and a comedian having mounted the 'plane it ascended to the ceiling, while he "crashed" to the floor, and afterwards executed an eccentric dance.'[50]

In connection with aviation week in April 1931, a special dance was held in the newly constructed hangar no. 5. The large building was decorated with flags, pennants and eastern lanterns while 'much interest was centred on a model Ryan monoplane fitted with an electric motor and propeller which flew in circles around the hangar,' presumably inside.[51] After 11:00 p.m. Lester Brain provided a real-life performance of night flying outside.

The presence of members of uniformed RAAF officers made 'an effective foil for the frocking of the fair sex' at the 1932 pageant dance, while at the sixth annual ball, on 19 July 1934, airmen and members 'exchanged the thrills of flying and stunting for the serene rhythm of dancing.'[52]

The annual ball was also the venue for presentation of trophies won at various competitions during the year. The club's first trophies were awarded for an aerial derby or race around a designated circuit. From 1927 the Perdriau Trophy was awarded to the fastest competitor over a three-lap course from Eagle Farm to Pinkenba, Nudgee College and back to the aerodrome. The Eagle Cup and fifty guineas went to the winner on handicap. Most early competitors were men with a background of military training.

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[49] *BC*, 8 August 1932, p. 10; *CM*, 28 August 1933, p. 27; *CM*, 30 September 1935, p. 18; *CM*, 16 August 1937, p. 24; Minutes of AGM held 22 March 1932, General Meeting Minutes Book, RQAC. QAC Learn to fly brochure circa 1933, (Royal) Queensland Aero Club – policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.).
[50] *BC*, 8 June 1929, p. 27.
[51] *BC*, 11 April 1931, p. 16.
[52] *BC*, 8 August 1932, p. 19; *CM*, 20 July 1934, p. 21.

The introduction of new trophies for skilled competition rather than aerial racing reflected the club's desire to foster airmindedness in a new generation of pilots. Judges deciding on the winner of the QANTAS trophy took into consideration hours flown, absence of breakages and the example set to other pilots. In 1932 it was awarded to Lores Bonney after her flight around Australia. The Wakefield Castrol cup was won on an aggregate number of points obtained in a series of competitions, while the Courier Cup was presented to the best formation team.[53]

Figure 32: Cover of a learn to fly brochure, early 1930s. This line drawing depicts the Government hangar used by the Aero Club, as well as the QANTAS hangar (no. 4) on the right edge of the illustration.
Source: (Royal) Queensland Aero Club – Policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.)

[53] QAC Learn to fly brochure circa 1933, (Royal) Queensland Aero Club – policy file, 5/102/43 Part 3, MP115/1, NAA (Vic.).

Club membership in the early 1930s reflected the social composition of the time. Executive members were well connected. Early president Dr Archibald Hope Michod was a Wickham Terrace medical specialist who had been the chairman of directors of QANTAS.[54] Long-standing committee member Wyndham Pike, a former RFC pilot, was a director of Pike Bros. Ltd, clothing retailers in the city. Another prewar committee member was Leslie W. R. Nissen of the jewellery company that bore his family name.

Figure 33: RQAC students and friends at the clubhouse enclosure fence, May 1938. Photographer Ellen Chellingworth indicated that they were, left to right, 'Miss Connor [possibly M. E. O'Connor who gained her licence in March 1937], Betty Molphy [later Usher], Mr Nissen [possibly committee member Leslie W. Nissen], Jimmy Hucker, Mr Henderson [possibly committee member Charles G. Henderson], Eddie Walsh, Miss Chamberlain, Heck White, Ethel Rowe [later Macaulay], Jimmy Brunckhurst, Alan Steen and unknown.'
Source: Ellen Chellingworth album, Cecilie Benjamin Collection

The general social and financial stature of RQAC members is evident in a sampling of women pilots of the 1930s. Notable woman pilot Lores Bonney was married to Harry B. Bonney whose company manufactured leather goods. Peggy Doyle's father owned a sawmill in the Gympie district. Ivy Pearce (later Hassard) came from a family that owned a number of hotels. Engineer William M. E. L'Estrange of the City Electric Light Co. and the Ipswich Electric Supply Co. was the father of aerobatic pilot Esther

[54] Edward P. Wixted, *Thomas Q. Back and Dr Archibald Michod* (Brisbane: Qld Museum, 1979).

L'Estrange (later Mather). Ellen Chellingworth had inherited property in Western Queensland from her parents.[55]

Nevertheless, as the decade progressed it was possible for working women (and men) to take up flying as a hobby. Of the twenty-eight women who obtained pilot's licences in Queensland between the beginning of 1931 and the Second World War, an increasing number depended on ordinary wages to fund their hobby. Freda Redman, licensed in 1936, was a teacher at St Margaret's School at Albion. During 1937 Betty Molphy (later Usher) could only learn to fly on her vacations away from teaching at a school in Warwick. Ethel Rowe (later Macaulay) was a sugar chemist who worked at mills in the Mackay district. In 1937 she won the first RQAC scholarship awarded to a woman, a financial bonus which allowed her to fly until the Second World War.[56]

Tragically, one of RQAC's women pilots was killed in a 1937 mid-air collision with another pilot. That particular year three serious accidents involving RQAC aircraft reduced its capacity to purchase the additional aircraft it needed to train pilots in Queensland.[57] The club had only just recovered a healthy financial position by September 1939 when, by wartime restrictions placed on aerial activity, virtually all civil training ceased.

Though it was located on the fringes of the lesser capital city of Brisbane, the Archerfield Aerodrome of the 1930s with its healthy airline and engineering companies and buoyant aero club provides an excellent case study for the social development surrounding aviation.

Because the technology required it of them, local engineers and pilots grew into roles and travelled to places that they might not ever have imagined at the start of their careers. Greater numbers of workers on the aerodrome altered the social composition of nearby areas. With public transportation being so poor, some chose to live in suburbs close by.

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[55] *Gold Coast Bulletin*, 28 April 1998, p. 7; Christopher de Vere, *The showgrounds: Gympie's first aerodrome* (Gympie: National Trust of Australia, Gympie Branch, 1999), p. 55; Ray L. Whitmore, ed., *Eminent Queensland engineers*, vol. 1 (Brisbane: The Institute of Engineers, Aust., Qld Division, 1984), pp. 48-9.

[56] *CM*, 1 June 1938, p. 8; *Alumni News*, February 1997, p. 8; Ethel Macaulay, interview with author, 5 May 1999.

[57] On 16 May 1937 Ray D. O'Loan was killed in a training accident at Bundamba. Esther Tully and John Barrett died after their aircraft collided mid-air to the south of the airfield on 19 June 1937. During the running of a heat of the President's Cup Race on 8 August 1937, Duncan B. Ferguson was killed after he lost control when his and another racing aircraft momentarily touched above the Rocklea Showgrounds.

Even residents of those suburbs who were not involved directly with flying appeared enthusiastic, especially the younger ones.

The establishment of a base for pilots at the aero club meant increased flying, socialising and a greater public acceptance of flying as either a hobby or a career. For many of the participants, especially the women, it developed into an enjoyable pastime which they regretted having to curtail with the onset of war.

The activity on the Archerfield Aerodrome of the 1930s is evidence that a technological artefact can consist of socially constructed components which, as they develop, are also shapers of society.

* * *

Development dominated the air transport and aerodrome systems during the 1930s. In Australia the introduction of much technological initiative from overseas was slowed by the economic restraint the Commonwealth placed on precisely when new, technologically more advanced aircraft might be introduced. Behind this slowing of development was the fact that the nation's first generation aerodromes could not cater for the faster, heavier aircraft. Loud and insistent were the complaints from some company executives, especially those who lacked subsidies and wished to maximise profits by flying at night and in all weather conditions using the technologically superior models becoming available. Unfortunately a number of accidents and incidents proved that air services, even when allowed to import the superior type of aircraft, could not operate with guaranteed safety in advance of ground infrastructure.

By the end of the decade the growth of airmindedness had created a public expectation of safe air travel, whether an individual could afford to use it or not. This support for the new form of transport focused Commonwealth attention and funding on the introduction of the necessary ground-support technology.

Some of the key 'actors' responsible for holding the system together—either as government administrators, air-service company executives or aircraft engineers—also played a direct role in the process of technology transfer by travelling overseas and advocating the introduction of the latest advances upon their return. The most successful of these actors in many cases grew with the roles they were playing, developing the skills required to enter the next phase, one of consolidating the achievements of the

1930s and, in the case of commercial operations, continuing to grow despite direct route competition. In Part 3 these men will have the stature of senior figures in the industry.

At capital cities, aerodromes expanded to accommodate the runway length and surface, meteorological service and control tower needs of aircraft. More lease sites were provided for the increased number of companies involved in aviation. A study of contemporary photographs conducted alongside what remains of the built fabric at sites such as Archerfield, Essendon and Parafield reveals how specific groups and key actors who kept the system on its steady trajectory of development used particular buildings. In the case of Archerfield these artefacts which represent the stabilised form of aerodrome buildings of the 1930s are used still for the essential purposes behind their construction, the housing and maintenance of aircraft.

Chapter 14

'The little points of red light which once marked the boundaries of the circumscribed landing areas by night are now but a memory; the modern aerodrome seems to have no boundaries.'[1]

In the model developed by Thomas Hughes, a technological system has an environment consisting of factors not under the control of its managers. At times these factors exert influences which create problems that the system managers must solve before development can continue. The environment that existed during the Second World War created not only a new series of problems for the managers of the Australian civil air transport system; it also brought forth some of the solutions.[2]

By 1939 the Australian civil air transport system had developed a momentum that reflected both the geography of the country and the policies of its interwar governments. That steady pace changed abruptly in September 1939. For the six years which followed, civil air transport worked as a tool of war. Major components of the civil aerodrome system were militarised. The number of landing facilities increased dramatically, especially in the country's northern regions. Until the war no longer posed a threat to the Australian people, the country's political leaders, supported by key civil aviation and air force administrators, focused on the problem of defeating the enemy. Some also considered how solutions to the problems of war might be useful in a postwar environment.

So much change occurred during those six years that a different trajectory for the development of the postwar civil air transport system, one unimaginable in the 1930s, was inevitable. As the 1940s drew to a close the new direction could be identified in a number of ways. A new government airline, Trans-Australia Airlines (TAA), was competing aggressively against the second ANA, the country's largest commercial airline. As TAA won more customers, ANA lost more money. At the same time and in the international sphere of operations, QEA Lockheed Constellation land planes, which were wholly owned by the Commonwealth and flown by Australian crews, operated the entire 'Kangaroo Route' to London. Having made that leap, the country's only international airline, now effectively nationalised, was on its way to becoming a global

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[1] Frederick Handley-Page, 'Airports and the aircraft designer', *The Aeroplane*, 12 May 1944, p. 525.
[2] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 52.

air transport company. To a certain extent, nationalisation of industry was a postwar trend. In aviation it was as well a measure of the greater level of control sought by system managers. Aerodromes in capital cities were being prepared for the reciprocal arrival of other international airliners. Quite discernibly, the Commonwealth government wanted an even greater involvement in, and control of, the most important components of the civil air transport system.

These few examples are only external indicators of the complex mix of social, technological, political and economic changes at work. In the six years of war many people witnessed or personally experienced aspects of military aviation which influenced their ready acceptance of civil aviation postwar. The technological development of aircraft for military purposes later indirectly increased safety and improved communication, making flying even more attractive.

The Second World War provided politicians with a better understanding of the value of air transport and a commensurate desire to retain control of it after the war. To ensure it was the entity managing the system, the Commonwealth invested in airlines and aerodromes, the components Thomas P. Hughes would classify as system artefacts. This policy of government ownership of significant sectors of the civil air transport system translated into an increase in the regulation and administration of airlines, aerodromes and the entire industry. Not surprisingly, DCA staff numbers increased nearly ten fold over an eight-year period, from 251 in 1939 to 2 030 in 1947.[3]

The genesis of all the important social, technological, political and economic changes on the air transport and aerodrome systems during this period can be traced back to the Commonwealth's declaration of war on Germany in September 1939. Within days, administrative tightening commanded almost total control over the three key sectors that comprised the aviation industry—aircraft, aerodromes and aviation-related personnel.

Aircraft were turned quickly to wartime purposes under the National Security (General) Regulations. Short on resources, between 1939 and late 1941 the Commonwealth chartered or impressed those sectors of the civil air transport system that it needed. Until the arrival of Hudson aircraft ordered from the USA, the RAAF requirements for coastal surveillance aircraft were met temporarily by chartering four ANA Douglas DC3s.[4] By

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[3] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 68; R. Williams, *These are facts: The autobiography of Air Marshal Sir Richard Williams KBE, CB, DSO* (Canberra: AWM & AGPS, 1977), p. 355.
[4] Douglas Gillison, *Royal Australian Air Force 1939–42* (Canberra: AWM, 1962), p. 71. Macarthur Job, *Aircrash: The story of how Australia's airways were made safe*, vol. 2 (Weston Creek, ACT: Aerospace Publications, 1992), p. 10.

1942 half the country's registered private and airline aircraft had served or were serving in the RAAF, including the flying boats operated by QEA.[5]

Increased military flying placed pressures on existing aerodrome infrastructure and the surrounding airspace, which in turn forced a range of restrictions on where civil flying was allowed. At dual-purpose civil and military aerodromes such as Mascot, Parafield and Archerfield, the rapid construction of military camps by the Department of the Interior altered the built environment. Hastily erected huts of GCI, weatherboard timber and asbestos-cement sheeting accommodated the hundreds of military personnel posted to squadrons based on these civil aerodromes, and the hundreds en route to other destinations. Where needed, maintenance and storage hangars were constructed or extended with equal haste.

The patterns of people's lives altered. In a situation quite different from prewar contact with aviation, thousands of civilians reported for work in the engine and airframe workshops which these new or extended hangars housed. The training of new pilots for the RAAF commenced at flying schools established at the civil aerodromes of Parafield, Archerfield, Essendon and Mascot, in that order, before the end of January 1940.[6] Initially RAAF pilots were taught to fly by local aero club instructors in Moths formerly owned by the clubs. Civil airline pilots who were reserve officers in the RAAF changed their uniforms, though not always their roles. Lester Brian of QEA stepped into his reserve rank of flight lieutenant but went about his usual duties as a flying boat captain and company executive.

In many ways the country was ill prepared for a war which might reach its shores. Singapore, upon which much of country's arms-length defence depended, was not the bastion of military strength that the Australian government and public were led to believe. Nor were this country's ground transport networks easily adapted for defence purposes. Because ordinary transportation between the populated southern states and the threatened northern towns traditionally was conducted by sea and later air, roads from Queensland to the Northern Territory were not maintained to all-weather standards. The other transport network, the nation's rail system, suffered the multiple delays caused by changing to a new gauge of rolling stock at each state border. In any

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[5] Butler, *Flying start*, p. 56. In 1941 there were 244 aircraft on the Australian register of aircraft. By June 1942, the Department of Air had impressed 117 of these for use by the RAAF.

[6] Gillison, *RAAF 1939–42*, p. 72; Damien Lataan, *Parafield, from paddock to airport: The story of the place, the people and the planes* (Hahndorf, S. A.: D & S Publications, 1992), p. 45; David Webb, ed., *Perth Airport 1944–94: Fifty years of civil aviation* (Mascot, NSW: FAC, 1994), p. 6; Jennifer Gall, *From bullocks to Boeings: An illustrated history of Sydney Airport* (Canberra: AGPS, 1986), p. 46.

case, the railways failed to connect Darwin, gateway to Asia by air, directly to the southern states.

At this desperate time, with three AIF divisions in the Middle East and one in Singapore, the Labor party's John Curtin became Prime Minister of Australia. On 7 December 1941, Japanese aerial forces attacked the US Navy base at Pearl Harbor and other significant targets such as Singapore and Hong Kong. Suddenly the theatre of war was closer to Australian shores. Prime Minister Curtin on 27 December 1941 stated Australia would 'look to America' for support. Coincidentally, the first American convoy, diverted to Australia after 7 December 1941 from its original destination of the Philippines, had arrived in Brisbane on Christmas Eve.[7]

The presence of US forces on Australian soil thereafter radically altered the form of the air transport system. Aerodromes were upgraded or expanded to accommodate the now increased number of allied military aircraft using Australian airspace and ground facilities. These included the United States Army Air Forces (USAAF) fighters, bombers and transport aircraft unloaded at Australian docks, assembled at nearby airfields and flown north into battle.[8] Also heading for front-line battlefields were the aircraft of Australian, American and British design constructed in the Commonwealth Aircraft Corporation in Melbourne, or by the de Havilland aircraft company at Mascot.

At the edges of graded landing strips spaced at average refuelling distances across Australia's north, rapidly constructed hangars appeared like mushrooms. At Mareeba behind Cairns, an airstrip of 7 400 feet (2 255 metres) in length was constructed in eight days.[9] On and near aerodromes safely to the rear, thousands of unskilled workers, a considerable number women, learnt the basics of fabric work, airframe welding and engine tear-down and reassembly. The slow growth that characterised the 1930s was replaced by rapid, almost exponential change as the nation's physical resources in the form of its workers and their tools were focused towards winning battles in the nearby Pacific.

In 1939 the political managers of the Australian air transport system reacted to the direct threat of war by diverting civil resources to a military application. In the process the

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[7] Made up of eight freighters and the US Navy cruiser *Pensacola*, this convoy transported an artillery regiment and ground personnel of a bombardment group as well as a fighter group with their P40 (Kittyhawk) aircraft.

[8] The air arm of the US Army, the Army Air Corps (AAC), was formed in July 1926. The name was changed to Army Air Forces (AAF) on 20 June 1941. The AAF still was referred to in documents as the AAC for some years afterwards.

aerodrome system clearly benefited. Existing aerodromes were extended and many new sites created. Some of the latter only ever would be temporary. The physical world was re-ordered in ways which allowed the system to be maintained, albeit in a military rather than a civil fashion, during a time of war. The advantage in this was that a basis for even greater postwar expansion of the aerodrome system was established during a period when financial expenditure in the cause of defence could be justified.

Part of the cost of meeting this rapid expansion in the aerodrome system came through funding arrangements made between the Australian and American governments, referred to in Australian archival documents as Reverse Lend-Lease but more commonly as Lend-Lease. So that it had a base from which to reclaim the Philippines, America was willing to fund improvements needed on Australian airfield facilities, especially in the north of the country. In terms of accounting procedure, the Commonwealth paid regional bodies that possessed the expertise and equipment to complete this work. In Queensland the state's Main Roads Commission, or its subcontractors such as the Thiess Brothers and M. R. Hornibrook, relocated houses or engineered roads and runways, performing the actual labour of construction.[10]

In return, the USA provided the Commonwealth with material goods for wartime use, an arrangement they referred to as Lend-Lease. Items supplied were examples of direct transfer of technology. They included modern radio transmitters to assist in aerial navigation and up-to-date aircraft for the RAAF.[11] In a proper bureaucratic manner, maximum expenditures were agreed upon for particular projects and approvals granted as required. Given the closeness of battle in 1942 and 1943, hasty construction usually followed.

Understandably, the Second World War dramatically altered the economics of civil aviation. Privately owned Moth biplanes were impressed into the RAAF, becoming training planes for the Empire Air Training Scheme (EATS). The introduction of petrol rationing in October 1940 reduced private flying hours yet again. Because passenger aircraft were undertaking military tasks, airline seats were in short supply and a system

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[9] Clem Lack, *Three decades of Queensland political history 1929–60* (Brisbane: Qld Govt Printer, 1962), p. 379.

[10] QMRC, *The history of the Queensland Main Roads Commission during World War Two* (Brisbane: Qld Govt Printer, 1949), pp. 17-18; Joan Priest, *The Thiess story* (Brisbane: Boolarong Publications, 1981), pp. 37-40.

[11] Roger Meyer, *Aeradio in Australia* (Canberra: AGPS, 1985), p. 20; Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 193. According to Parnell and Broughton, 1 880 aircraft were supplied in this manner.

of priorities applied. In the particular case of Ansett Airways Ltd, the majority of its aircraft were chartered to the USAAF from June 1942. [12]

From the beginning of the war, airline and air-service companies undertook contracts to maintain RAAF aircraft. For engineer Trevan Jackson this meant working again on ANA's *Pengana*, then RAAF A30-12, after it suffered a fire in the forward radio locker.[13] With RAAF Wirraways already stored there, the problem of lack of space in hangar no. 6 was solved by removal of part of the rear wall. Jackson noted this protrusion was one of the local sights for some time. (See Figure 34.)

The large-scale physical alteration of the built environment of Archerfield Aerodrome because of the Second World War occurred in the two distinct periods before the reconstruction that occurred from 1945 onwards. The first stretched between August 1939 and December 1941. As well as dispersal areas for aircraft, camps to house the RAAF squadrons occupying the airfield or transiting through it were constructed. Archerfield's first huts of timber and GCI were situated south of the cemetery established by the Grenier family. These huts were destined to house the 118 personnel expected in the initial establishment of an Empire Flying Training School (No. 2 EFTS).[14] Two hangars of the design referred to as Bellman temporary hangars (no. 71 and no. 72) were erected nearby to keep the school's eighteen training planes out of the weather.

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[12] Parnell and Boughton, *Flypast*, p. 194; Stewart Wilson, *Ansett: The story of the rise and fall of Ansett 1936–2002* (Fyshwick, ACT: Aerospace Publications, 2002), pp. 45-53. The company's interstate operations did not recommence until February 1945, but did so from an improved financial position.

[13] Trevan Jackson, Random ramblings of an early bird 1934–51, manuscript, 2001, p. 21.

[14] No. 2 EFTS was known initially as No. 3 FTS (Flying Training School).

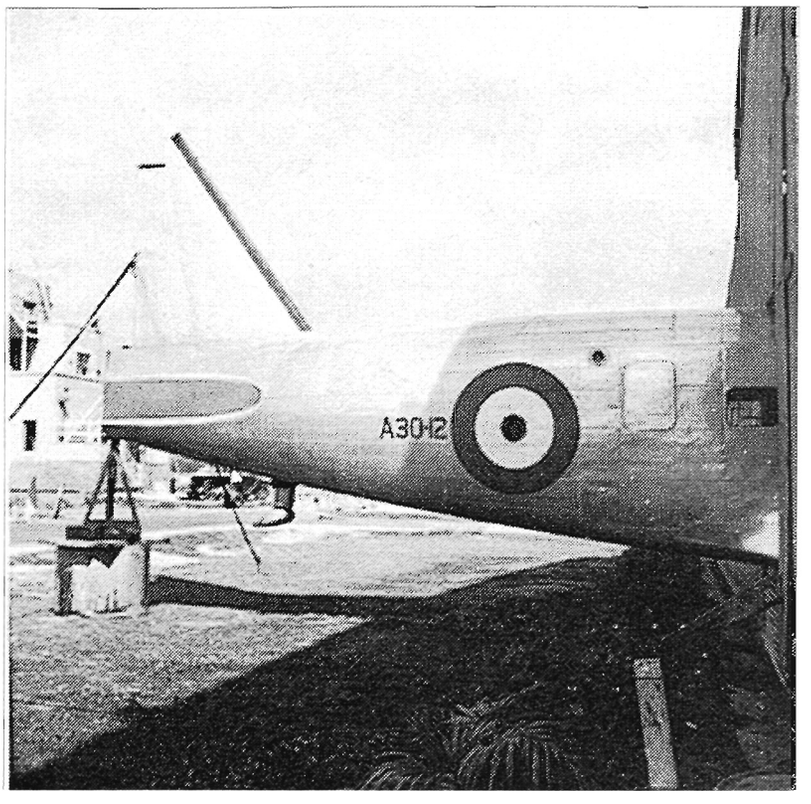

Figure 34: The former ANA aircraft *Pengana* undergoing repairs in hangar no. 6, circa 1941. The newly constructed Control Building is at the left, rearward of the disassembled tailplane.
Source: Trevan Jackson Collection

In the middle of 1941, still within the first period of expansion, construction commenced on forty-nine buildings in the south-east corner of the aerodrome, not very originally referred to as the 'South Camp'. Placed in a regimented pattern around the former DCA caretaker's house, previously Elizabeth Beatty's house, these huts were designed to provide the bulk of the accommodation needed to house an enlarged RAAF contingent. By mid-June 1941 approximately twenty-five officers and 319 airmen of Station Archerfield, fourteen officers and 127 airmen of No. 23 Squadron, and twenty-two officers and 358 airmen of No. 2 EFTS were stationed there.[15] (See Figure 35.)

[15] Entry dated 29 August 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT); Summary of personnel of No. 2 EFTS as at 1 August 1941, RAAF HQ – AMOE – Establishment No. 2 EFTS Archerfield, 231/9/234 Part 1, A705/1, NAA (ACT).

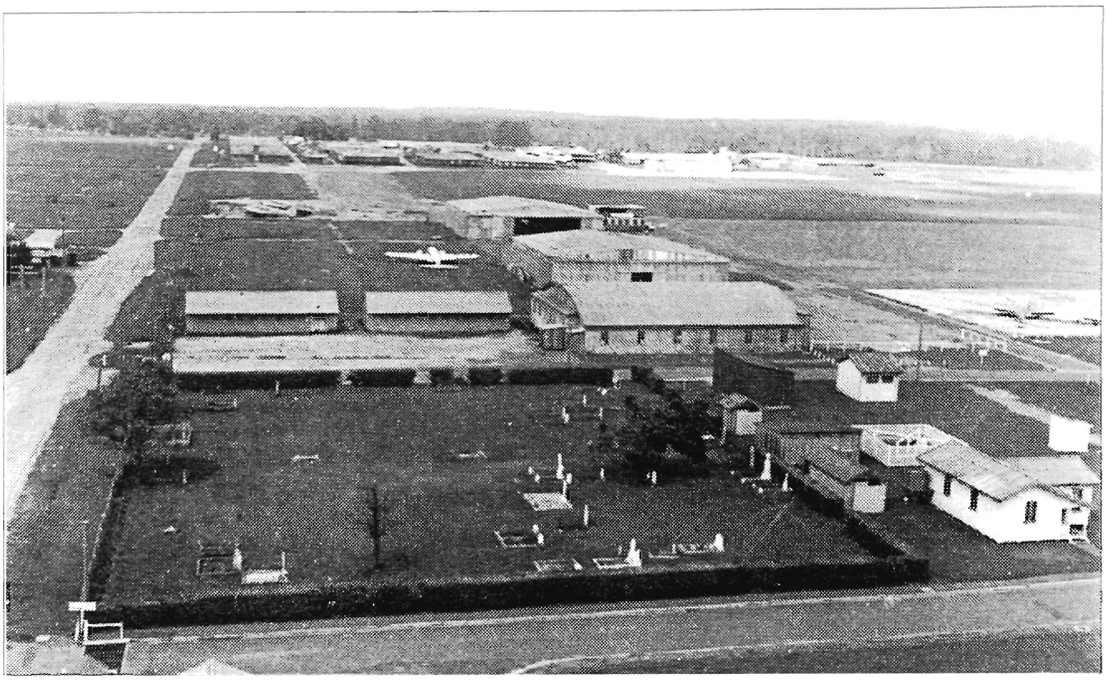

Figure 35: View in 1949 from the Lorenz tower looking south over the God's Acre cemetery, the remains of the 1939 No. 23 Squadron hut area and the South Camp in the distance. The diagonal cross inside the square fence at lower right is the Archerfield marker beacon.
Source: A. R. (Ray) White

From early 1942 those civil aviation companies with the technical expertise to maintain and engineer aircraft engines and airframes were awarded contracts to repair USAAF aircraft. This marked the commencement of the second period of growth, prompted by the need for larger, wider hangars so that maintenance could be conducted on the aircraft of increasing technical complexity and size which were arriving on Archerfield. (See Table 8.)

Table 8: Data on US bomber aircraft known to have been on Archerfield in March 1942.[16]

DESIGNATION	MANUFACTURER	AIRCRAFT TYPE	WINGSPAN	MTOW*
B17	Boeing	Flying Fortress	31.62 metres	29 170 kg
B24	Consolidated	Liberator	33.53 metres	29 257 kg
B25	North American	Mitchell	20.6 metres	18 960 kg
B26	Martin	Marauder	21.64 metres	17 327 kg

*MTOW is maximum take-off weight

[16] Roger R. Marks, 'The Second World War years', Australia Remembers Air Show, Archerfield, 2–3 September 1995, pp. 22-3; Michael J. H. Taylor, ed., *Jane's encyclopedia of aviation*, vol. 3 (Danbury, Conn.: Grolier Educational, 1980).

Until the problem was solved by the construction of five large igloo workshops in nearby Kerry Road, aircraft repair operations were scattered around the aerodrome in separate hangars. In early 1943, in order to create more workshops, the Allied Works Council (AWC) extended three of Archerfield's prewar buildings (hangars number 1, 3 and 4) in the civil part of the airfield. (See Figure 36.) South of the prewar hangars the AWC later that year constructed a large three-storey hangar for ANA (no. 25) in a position south-east of the DCA control building. Three temporary Bellman hangars (buildings number 70, 73 and 136) also were erected adjacent to the South Camp near the airfield's southern (Mortimer Road) boundary. Two served as workshops.

Figure 36: USAAC Liberator aircraft undergoing maintenance and adjustments to forward armament in front of hangars no. 4 and 5 in July 1943. At the time working space was at a premium.
Source: QANTAS Historical Collection via Roger Marks

The most significant change during this second period of building was the extension of the aerodrome to the west and north, essentially because the arrival of heavier American military aircraft more suited to operating from long runways had created problems. Not only did they require a longer take off roll and more stopping distance, surface conditions deteriorated quicker when usage was high or the ground wet. On 25 March 1942 clear evidence of the problem was provided when four trans-Pacific B26 Martin Marauder bombers arrived in the airspace over a rain-soaked Archerfield. A combination of Archerfield's marginal landing length for the aircraft type, the high landing speed required and slippery ground resulted in one of the three which attempted to land demolishing the bathroom of a house on the eastern side of Beatty Road belonging to Servanus Otterspoor.[17]

[17] Marks, 'The Second World War years', p. 23; Chas Schaedel, 'Bill Maddocks–aviator', *AHSA Aviation Heritage*, 32, (2001), p. 141: Jeannetta Harvey, interview with author, 31 January 2001. According to Schaedel each of the three with attempted to land was damaged in some way. The fourth Marauder was escorted to Amberley where it landed safely.

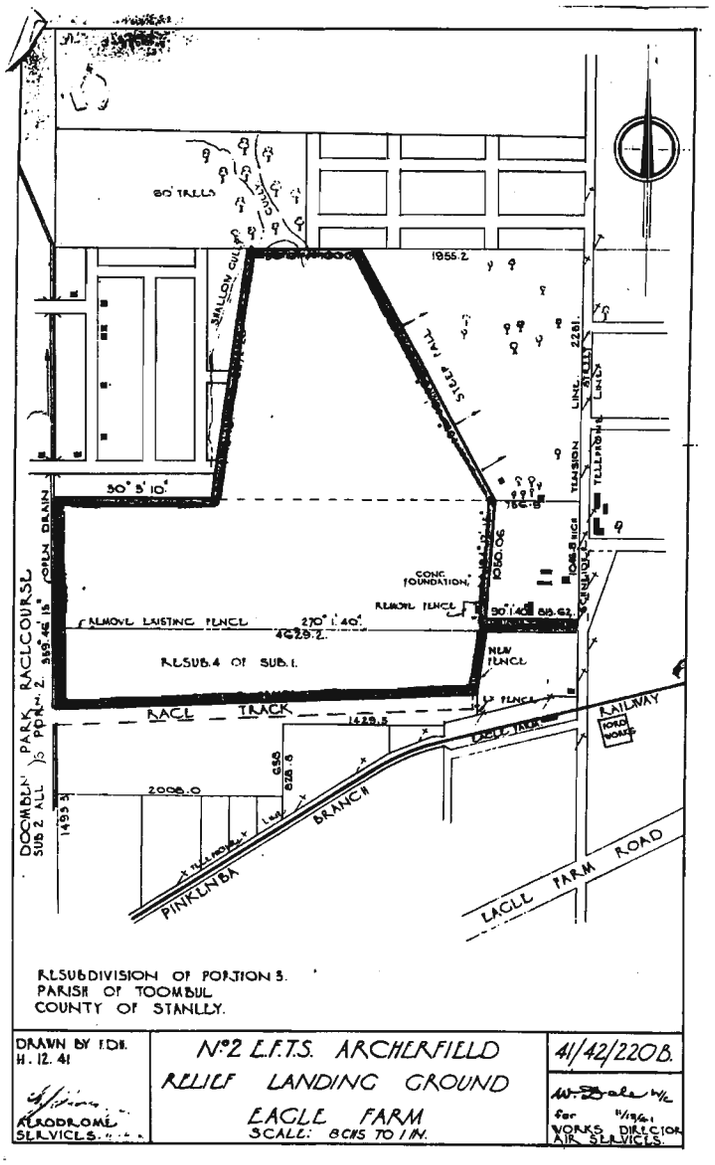

Figure 37: Late 1941 plan of No. 2 EFTS relief landing ground at Eagle Farm
Source: AAC Eagle Farm – Hangars erection, K253, BP243/1, NAA (Qld)

According to Hughes the problems associated with technological systems are solved using whatever means are available and appropriate.[18]

One of Brisbane's problems prior to December 1941 was a shortage of practice landing ground which could be used by the trainee pilots progressing through No. 2 EFTS at Archerfield. The militarily oriented system solved this problem by converting to a relief landing ground (RLG) the Eagle Farm aerodrome site which had been closed to

[18] Hughes, 'The evolution of large technological systems', p. 53.

powered aircraft since 1931.[19] By early December the RAAF had plans to enlarge the site by extending it to the edge of the straight six section of the Doomben Park Racecourse.[20] (See Figure 37.)

On 24 December 1941 the nine-vessel *Pensacola* convoy arrived in Moreton Bay carrying a greater problem—187 aircraft needing to be assembled.[21] Within weeks the Eagle Farm RLG was being converted into an aircraft erection depot with runways. The problem of where to assemble these aircraft was solved by the three-year redevelopment of Eagle Farm to a far greater extent than on any Australian capital-city aerodrome. The Department of the Interior compulsorily acquired 250 parcels of land, on some of which were houses that had to be relocated quickly. The straight six track of the adjoining Doomben Park Racecourse was sacrificed, becoming the taxiway along which four hangars (numbers 3, 4, 5 and 6) were built.[22] By mid-February 1942 the first runway running 045°M/225°M at 3 900 feet (1 188 metres) in length and 150 feet (46 metres) wide was nearing completion. A second runway of 4 500 feet (1 372 metres) set at 310°M/130°M was finished soon after.[23] By 1945, Eagle Farm encompassed nine sizeable hangars, numerous ancillary buildings and a third runway. (See Figure 38.)

As well as changes to the built fabric of aerodromes, the war wrought changes of a cultural nature to society. With no previous experience in aviation, women were employed from the early 1940s in engine overhaul, repair of precision instruments or making munitions. In the long term this contributed to the female challenge of male dominance of the workforce during the 1970s.

One cultural change was in the public's attitude to air transport. The Second World War introduced more individual people to aviation, either through travelling by air on military duties, being a member of the RAAF or the WAAAF, or as a civilian involved in aircraft repair and maintenance. This direct involvement with aviation built on the growth in airmindedness of the 1930s.

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[19] Entries dated 1 May and 29 May 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT).
[20] Roger R. Marks, *Queensland airfields WW2 – Fifty years on* (Mansfield, Qld: R. & J. Marks, 1994), p. 163; Plan of relief landing ground, Archerfield RAAF – Extension of relief landing ground at Eagle Farm, K353, BP243/1, NAA (Qld).
[21] Plan of relief landing ground, Archerfield RAAF – Extension of relief landing ground at Eagle Farm, K353, BP243/1, NAA (Qld); Richard Casey to H. V. Evatt, cablegram 126 dated 22 January 1942, Box 535, A5954, NAA (ACT).
[22] Valuations by P. A. Edwards dated 22 May 1942, Eagle Farm Aerodrome, QL805 Part 1, J56/11, NAA (Qld).
[23] Marks, *Queensland airfields WW2*, p. 145; WD Air Services to WD Dept of Interior, memo dated 24 January 1942, F/Lt James, memo dated 31 January 1942, Eagle Farm Queensland Project USA Depot, 42/501/54, A1196/6, NAA (Qld).

Figure 38: Aerial view of Eagle Farm Aerodrome, 9 August 1944. All three intersecting runways have been constructed.
Source: Hopton Collection

A sense of social separation, between those who flew and those who did not, existed on prewar airfields such as Archerfield. After 1939 people from all walks of life claimed an affinity with the place. In one wartime poem which jestingly complains of the noise made by the aircraft repairers, armourers and wireless operators based there, the anonymous RAAF author began:

> I'm a quiet sort of joker,
> And I live to work in peace;
> But since I've come to Archerfield,
> My whingeing doesn't cease.
> For the Photographic Section—
> The station's busiest spot,
> Is bounded on all sides by noise—
> My nerves are badly shot.[24]

[24] A. J. McIntyre, *Putting over a burst* (Brisbane: John Mills, 1942), p. 9.

Adjustments also had to be made by people close to Brisbane's airfields. Anti-aircraft emplacements were sited in nearby paddocks and slit trenches dug in back yards. Throughout the day and night reconditioned engines were test run. Long-term relief from that particular noise only came with the construction of a bank of brick engine test cells in an old quarry in the present day suburb of Nathan. Some unfortunate nearby residents of Brisbane's aerodromes had their homes demolished or removed with undue haste. In one instance at Eagle Farm, a Department of Interior employee waited at an empty block to explain to the owner on his return from work where his house had been shifted to during the day.[25]

The rhythm of life changed for those who lived near airfields occupied by military forces. For some there was a new opportunity to make money. Around Archerfield local women took in laundry and two shops were established. A young Allan Hodge earned extra income for his family by selling newspapers to the hundreds working in the hangars or based in the camps. Most afternoons he carried home a hefty bag full of pennies for his mother to count.[26]

As the front line of war in the Pacific region moved further north, the threat driving the alteration or expansion of Australian aerodromes eased. With the problem of direct threat removed, the system's managers turned their attention to estimating how useful the built fabric of wartime Australian aerodromes might be as the system returned to its civil form. Arthur B. Corbett, the director-general of the DCA and one of the key system managers, prepared a broad plans for the future entitled 'Post war reorganisation. Outline of a plan for civil aviation'.[27] An interdepartmental committee presented a more detailed report to cabinet in December 1943. From these beginnings, the 277 million passenger-kilometres flown in 1944–45 increased eleven fold to 2 637 million passenger-kilometres in 1964–65.[28]

What marked the postwar growth and consolidation of the air transport system as different from the 1930s was the increased Commonwealth investment and involvement. Historian Leigh Edmonds concluded that the prewar practical interest by politicians in what the industry might cost was replaced by a 'more philosophical interest' after the

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[25] Ray Spring, interview with author, 17 January 2001; *CM*, 19 August 1958, n.p.
[26] Allan Hodge, interview with author, 6 January 2001.
[27] Submission by the DG of DCA – Postwar reorganisation: Outline of a plan for civil aviation, January 1943, Reports of Inter-Departmental Committees, Exhibit 3, MP183/16, NAA (Vic.).
[28] Leigh Edmonds, 'The policy of profit: The creation of the Two Airline Policy', *AHSA Aviation Heritage*, 32 (2001), p. 144; Howard G. Quinlan, 'Air services in Australia: Growth and corporate change, 1921–96', *Australian Geographical Studies*, 36 (1998), p. 159.

war.[29] The system-based interpretation is that politicians and administrators, those who were its managers, wished to bring the whole industry under tighter control to ensure stability in the necessary period of system growth and consolidation after the war. Politically the Commonwealth also sought financial independence from overseas economic influences in Australian aviation. Pursued as complementary aims, the need for control and the desire for independence resulted in Commonwealth ownership of one international airline, one domestic airline and a legislative device for controlling domestic development later to be referred to as the Two Airline policy. At a regulatory level, the major consequence was growth of the postwar DCA into a larger bureaucracy possessed of a strong military ethos.

In pursuit of these aims the *Australian National Airlines Act (1945)* was assented to on 16 August 1945. ANA immediately and successfully challenged this act in the High Court. The Commonwealth then formed Trans-Australia Airlines (TAA) to counter the monopoly ANA held on routes between Cape York and Perth, including the route to Hobart.[30] Managed efficiently by the same Lester Brain who had been such a pilot of note on Archerfield in the 1930s, TAA by 1949 was nibbling away at ANA's monopoly.

Control of the airlines was ineffective without a comparable aerodrome policy. In December 1946 the Chifley government decided that all aerodromes in capital cities, and those necessary for international services, would be owned, developed, maintained and controlled by the Commonwealth.[31] At the war's conclusion, significant aerodrome resources in various states were in the hands of either the Department of Air or the Department of Civil Aviation. As defence needs were reassessed, the DCA acquired more airfields for which the military had no further use. In the 1945–46 financial year alone, the Department of Air handed over twenty RAAF aerodromes to the DCA. With the availability of so many aerodromes, the policy of separating training and private flying from airline traffic which had been envisaged as early as 1938 could now be adopted.

Those primary aerodromes that required it were upgraded. Melbourne's Essendon was extended in 1946. Runways, taxiways and aprons were concreted to cater for the increased weight of aircraft such as the DC4.[32] Far-reaching decisions were made as to the location of Sydney's primary aerodrome. After some consideration of a new site on

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[29] Edmonds, 'The policy of profit', p. 144.
[30] *Aircraft*, March 1946, pp. 18-19.
[31] *SMH*, 20 December 1946, p. 4; *CM*, 20 December 1946, p. 3.
[32] Job, *Aircrash: The story of how Australia's airways were made safe*, p. 120.

the south of Botany Bay, it was decided to retain and expand Mascot Aerodrome. Dr K. N. E. (Bill) Bradfield, an aerodrome engineer who had joined the DCA in 1939, oversaw the planning. Two and a half kilometres of the Cooks River was diverted to allow land reclamation, upon which was to be built an arrangement of four runways, the longest at 7 800 feet (2 377 metres).[33]

The 1946 decision to establish secondary aerodromes in capital-cities was an indication of how distant was the separation that had occurred between airline operations and training or charter flying. The former Royal Australian Navy base at Bankstown in western Sydney became that city's civil light aircraft (secondary) aerodrome catering for training and private flying. Land for a secondary aerodrome at Mentone, south-east of Melbourne, was purchased in 1946. Named Moorabbin Aerodrome, this airfield became the home of the Royal Victorian Aero Club and Melbourne's light aircraft flying activity from December 1949.[34]

Because runways capable of handling postwar aircraft were established at Eagle Farm in 1942, the DCA elected to classify the grassy expanses of Archerfield as Brisbane's secondary aerodrome and designate Eagle Farm as its primary. In the late 1930s few would have imagined it possible.

No generalisations can be made about the postwar built fabric of aerodromes. Though no one site is typical, certain common procedures were followed. As airfields were handed over from the Department of Air to the Department of Civil Aviation, temporary camp facilities were dismantled and auctioned. In the process the DCA chose to keep control over as much hangar space as possible so that the expected growth in postwar civil aviation would not be stalled by lack of room for expansion.

This expectation of an immediate bright future for aviation was widespread after the Second World War. A British airline pilot writing in 1944 acknowledged that the war had 'caused such tremendous developments in all forms of flying' but when peace came there needed to be 'a firm stand in demanding from the country what is needed for the sure progress of air transport.'[35] American John B. Rae identified more specifically the significant long-range implications of war that augured well for the future. Because war had accustomed people to flying, Rae saw air transport as well established and holding great promise for substantial growth. With the new technologies of the jet

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[33] *A.M.*, 28 September 1954, p. 37; Gall, *From bullocks to Boeings*, pp. 53-6. Only two of Bradfield's planned four runways were constructed.
[34] Parnell and Boughton, *Flypast*, p. 215.
[35] *The Aeroplane*, 18 August 1944, p. 187.

engine and helicopter not realised in 1945, he judged people could believe in the possibilities of aviation, even of an expansion in private flying.[36] In Australia the same expectations can be identified but in proportions more suited to its population.

Initially the nation's postwar airlines operated using converted war surplus equipment. Later they invested in more up-to-date technology. QEA chose the four-engine Lockheed Constellation for its international routes. Both ANA and TAA operated DC4 Skymaster aircraft. Neither was a major leap forward in technology, although the extended range of the Skymaster allowed non-stop flights between Perth and Adelaide for the first time. From 1948 TAA introduced the country's first pressurised airliner, the Convair 240, improving passenger comfort and attracting a further portion of clientele away from ANA.[37]

Improved technology contributed to better economics. On this plateau of aircraft development between the propeller-driven 1930s and the introduction of jet airliners, the average speed of airliners doubled. Speed was not the only measure of improvement. The range (distance) able to be flown between refuelling stops increased eight-fold. With the extended range of the DC4 used by the major domestic airlines, fewer refuelling stops were necessary. Timetables changed accordingly. Given the overall combination of improvements, operating costs fell 50%, gradually reducing the price of air travel.[38]

The Commonwealth continued its political control over how the major airlines operated through regulation by the DCA. Following the retirement of Arthur Corbett in 1944, former Director of Aircraft Production Daniel McVey was appointed director-general of the DCA. Enticed from public service into the corporate world in 1946, McVey was replaced by Richard Williams, a former head of the RAAF and in 1914 the first pilot to graduate from Australia's Central Flying School. According to retired aircraft accident investigator and author Macarthur Job, this new manager of the system brought with him much of the tone and thinking of the RAAF he had just left.[39] Until his retirement in 1955 Williams oversaw the improvement of aerodrome facilities, changes to radio navigation and air traffic control and Australia's involvement in the International Civil Aviation Organisation (ICAO), as well as the operational requirements of the

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[36] John B. Rae, *Climb to greatness: The American aircraft industry, 1920–60* (Cambridge, Mass.: MIT Press, 1968), p. 174.
[37] Ronald Miller and David Sawers, *The technical development of modern aviation* (London: Routledge & Kegan Paul, 1968), pp. 128-32; Job, *Aircrash: The story of how Australia's airways were made safe*, p. 64.
[38] Miller and Sawers, *The technical development of modern aviation*, p. 128.
[39] Job, *Aircrash: The story of how Australia's airways were made safe*, p. 64.

introduction of the Two Airline policy from 1952. As had happened in the 1930s, a number of airline accidents hastened the introduction of improvements to safety.

The Second World War had a tremendous impact on the Australian air transport system and the aerodromes within it, not the least of which was a large bureaucracy dedicated to the regulation of aircraft, aerodromes and pilots. By the 1970s the wisdom and expense of this level of control was doubted. In that decade the Whitlam government commenced dismantling both the Two Airline policy and the Department of Civil Aviation.

As a case study site, Archerfield Aerodrome represents an area of middle ground. Being closer to the actual fighting than Mascot or Essendon, it felt the increased pace needed to countermand the actual threat of war. Being far enough away it did not suffer the direct physical damage received in Darwin or Townsville.

While the unfolding of events in the war created problems within the air transport system, the solutions that evolved created an atmosphere in which the postwar return to civil flying could develop, albeit in a more controlled manner. For Australia at that time no other way seemed possible.

Chapter 15

'We went through a Lockheed Lodestar belonging to the Dutch Air Force...damaged a wing on a Fortress and poked the wing of the DC3 into the side of it. The Americans weren't happy...'[1]

According the Thomas P. Hughes, a technological system usually has an environment consisting of intractable factors not under the control of the system managers.[2] From September 1939, when the nation's leaders chose to involve Australia in the Second World War, Australia's aviation managers confronted a new series of difficult to manage factors, ones which for them created problems of uncertainty and lack of control. Throughout the ensuing six years, aviation system managers fought the problems caused by war using a range of resources. Their subsequent reordering of the material structure of air transport and aerodromes resulted in a more expansive and controlled postwar development of both.

Improving communication had been the driving force in air transport prior to 1939. After that the major influence on Australian aviation was defence against armed aggression in Europe, then the Pacific. When the pressure of wartime events did not allow lengthy deliberation, the Commonwealth was prepared to adopt whatever means were available to ensure national survival. In that regard, American General Douglas Macarthur was accepted as supreme commander of allied forces in the Pacific on 17 March 1943. The establishment of his headquarters in Brisbane, along with the presence of up to 120 000 US service personnel in the country, resulted in major alterations to air transport structure and on aerodromes, as well as the acceleration of many cultural changes.[3]

When circumstances did allow, Australian diplomats and public servants negotiated assiduously to ensure agreements were appropriate to what were then viewed as this country's best long-term interests. Where it coincides with aviation development is

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[1] Joan Priest, *Virtue in flying: A biography of pioneer aviator Keith Virtue* (Sydney: Angus & Robertson, 1975), p. 122. ANA pilot Keith Virtue was describing the last moments of a return flight from Sydney to Archerfield on 17 February 1942. After landing, ground conditions were slippery. For reasons of military secrecy he was not warned that newly arrived Dutch and American aircraft had been parked beside the landing area while he was away.

[2] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), pp. 52-3.

[3] Paul Hasluck, *The Government and the people* (Canberra: AWM, 1970), p. 225; Roger J. Bell, *Unequal allies: Australian-American relations and the Pacific war* (Carlton, Vic.: MUP, 1977), p. 79.

evident in two areas—in negotiations with Dominion countries regarding the Empire Air Training Scheme (EATS) and with the United States over Lend-Lease agreements. By these and other such arrangements, Australia's civilian air transport and airport systems were subsumed temporarily into its military network so that the more important goal of national survival could be guaranteed.

Commonwealth leaders since Federation acknowledged that with its small population and a greater reliance on primary rather than secondary production, Australia had to depend in part upon the fighting forces and tools of war of larger nations. The Second World War was the pivotal point between a dependency for strategic defence on Great Britain and a new reliance on views and equipment provided by the United States. What occurred was reconsideration of old relationships, in the light of what was offered by the new. The years around which this change evolved can be divided into three periods. During each, the profiles presented by the air transport and airport systems were quite distinct and quite different. Once again, the evidence of change can be analysed through the built fabric of Archerfield Aerodrome.[4]

During the first period, from the declaration of war in September 1939 to the last quarter of 1941, political and bureaucratic decisions regarding air transport and aerodrome construction reflected RAAF priorities. The arrival of US forces in December 1941 introduced the second period, one marked by an urgency that lasted almost to 1945. The Commonwealth's legislative moves to control aviation at all levels, apparent in the reorganisation of civil air transport companies and a reconstruction of the airport system between 1945 and 1949, dominate the third period.

The first period was in essence a continuation of Empire politics. A doctrine, later termed 'forward defence', formed the basis of national security.[5] When all battlefields were in Europe, Australia's territorial integrity depended on Britain, with the assistance of her Dominions, emerging the victor. Robert Gordon Menzies, having been the nation's Prime Minister for only four months, declared war on Germany within hours of the British declaration on 3 September 1939. Australia's fighting forces moved forward in defence of the nation.

As a consequence of earlier strategic discussions, the HMAS *Hobart* and five Royal Australian Navy (RAN) destroyers departed for service under British command in the

[4] Until the early 1990s, the changes made on Eagle Farm during the Second World War also could be seen. The 1988 closure of the old Brisbane International Airport and subsequent industrial redevelopment of some of that property have left few reminders.

Mediterranean Sea in mid-October 1939.[6] A month earlier the formation of an Australian division for service at home or abroad, the Second AIF, had been announced. Its Sixth Division sailed for the Middle East on 10 January 1940.[7] Assistance in the form of trained aircrew personnel for Europe was provided by the EATS. The agreement for its formation was signed at Ottawa on 27 November 1939.

Should the threat of Japanese aggression in South-East Asia become a reality, the local defence of Australia depended heavily on the garrisons of British and Australian troops in Singapore, as well as the promised relocation of British naval forces to the area. Australia's keenness to support Britain with aircrew, naval forces and expeditionary troops, coupled with the belief that arrangements concerning Singapore would be adequate to halt any territorial encroachment by Japan, resulted in a dangerous shortage of fighting equipment and experienced local defence units within Australia.

The effect of the declaration of war on the air transport system was evident immediately. Within days the Government solved the RAAF's shortage of transport and surveillance aircraft by chartering ANA aircraft. This reduced ANA's fleet of technologically advanced aircraft available for civilian passenger transport by 50%. The first of these aircraft was ferried to Canberra on 11 September 1939 for use by the newly formed No. 8 Squadron. Five captains and five first officers from ANA accompanied the four machines. The airline amended its schedules to allow for a reduced fleet. Adjustments continued at ANA and elsewhere as civilian pilots who were on the RAAF reserve list took up service duty.[8]

During this first period QEA continued its flying boat service to Singapore, though changes were made to the overall route structure. When Italy entered the war, Imperial Airways (IA) ceased its flying boat operations across the Mediterranean and reverted to a 'horseshoe route' between Durban in South Africa, through Cairo to Singapore.[9] Because IA was short of experienced aircrew, QEA extended its route sector from Singapore to Karachi in October 1941.[10]

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[5] John McCarthy, *A last call to Empire: Australian aircrew, Britain and the Empire Air Training Scheme* (Canberra: AWM, 1988), p. 2.
[6] John Robertson, *Australia at war 1939–45* (Melbourne: William Heinemann, 1981), p. 29. HMAS *Perth* was stationed in the Caribbean Sea at the outbreak of war.
[7] Joan Beaumont, ed., *Australia's war 1939–45* (St Leonards, NSW: Allen & Unwin, 1996), p. xiii.
[8] *Man and Aerial Machines*, November–December 1993, pp. 85-9; *Canberra Times*, 5 October 1939, p. 1.
[9] Because mail between London and Cairo then took eleven weeks to arrive, microphotography of mail was introduced. Lightweight photographic negatives of letters produced under the Airgraph system could be carried on military aircraft.

The nation's major aerodromes quickly took on a military atmosphere. Under a National Security (General) Regulation dated 14 September 1939, de Havilland Moth aircraft belonging to most aero clubs and some private individuals were impressed into service in the RAAF.[11] These became the nucleus of equipment available at the RAAF flying training schools formed in the first few months of war. On capital-city aerodromes the temporary military huts and mess halls needed were constructed quickly. A 1940 aerial photograph of Mascot reveals eight new huts between the existing rows of civil aviation hangars. Huts were likewise constructed at Parafield to accommodate the first intake of twenty-two trainees of the RAAF flying training school based there.[12]

As well as the RAAF facilities constructed on the five capital-city aerodromes, over the next two years the training units for different musters of RAAF aircrew were initiated on thirty-nine regional civil aerodromes.[13] At these schools the appropriate courses were conducted for the observers, navigators, wireless operators and air gunners needed in an EATS aircrew.

This significant number of training units was required because as part of the concept of 'forward defence' the Commonwealth elected to contribute to the war effort in Europe through the EATS. In negotiations overseen by Minister for Air James Fairbairn, Australia agreed to supply 36% of the total of 28 000 aircrew which the Dominion nations were committed to provide to Britain over a period of three years. According to Australian Defence Force Academy historian John McCarthy, this necessitated training 432 pilots, 226 observers and 392 wireless operator/air gunners (WAG) every four weeks.[14] EATS trainees undertook a series of courses which focused on the skills required by their designated aircrew position, then embarked for advanced training in Canada. After further operational training in Britain, most were posted to units of Bomber Command.

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[10] Hudson Fysh, *Qantas at war* (Sydney: Angus & Robertson, 1968), pp. 117-24.
[11] *CGG*, 23 October 1939, pp. 2,203-6.
[12]Chas Schaedel, 'Bill Maddocks – aviator', *AHSA Aviation Heritage*, 32 (2001), p. 140; Jennifer Gall, *From bullocks to Boeings: An illustrated history of Sydney Airport* (Canberra: AGPS, 1986), p. 46; Damien Lataan, *Parafield, from paddock to airport: The story of the place, the people and the planes* (Hahndorf, S. A.: D & S Publications, 1992), p. 45. Three courses were conducted at Parafield before the EATS courses began.
[13] Douglas Gillison, *Royal Australian Air Force 1939–42* (Canberra: AWM, 1962), p. 482. Nationwide there were 188 aerodromes controlled by the DCA and 206 licensed public aerodromes owned by local authorities in April 1942.
[14] McCarthy, *A last call to Empire*, p. 21. Australia promised to produce 10 400 pilots over the three-year period.

What happened on the former DCA aerodrome at Cootamundra was typical of many training venues. Its prewar site on the edge of the town was enlarged by a further 145 acres (59 hectares). Sleeping quarters, classrooms and mess facilities for 500 personnel, including seven huts for WAAAFs of all ranks, were constructed. No. 1 Air Observer's School commenced training courses in buildings at the local showground on 27 May 1940 while the rushed construction program was completed at the aerodrome.[15]

A number of the thirty-nine RAAF training units established on aerodromes nationwide were situated in south-east Queensland. Bundaberg became the home to No. 12 Elementary Flying Training School (EFTS) from November 1941. Further south the prewar civil airfield on Maryborough's northern outskirts was expanded to accommodate schools for wireless air gunners and air navigators (No. 3 WAGS and No. 3 ANS). After October 1940, Taabinga Village landing ground outside Kingaroy was converted to accommodate a service flying training school, No. 3 SFTS.[16]

Closer to Brisbane work continued through 1940 and 1941 on the permanent RAAF base at Amberley near Ipswich, funding for which had been allocated in 1938. When completed, this was to become the base for No. 23 Squadron, at the time flying coastal reconnaissance using Hudson aircraft. From August 1939 and until Amberley was available to them in May 1942, this squadron was accommodated on Archerfield in the RAAF camp constructed south of the Grenier family cemetery.

Archerfield's first EFTS course commenced in August 1940, though former Royal Queensland Aero Club instructors flying impressed club aircraft were teaching fledgling RAAF pilots on the field from 8 January 1940. (See Table 9.) Within that eight-month period the school was renamed No. 2 EFTS and the pace of activity increased. On 27 May 1941 a passing-out parade for the eleventh course at No. 2 EFTS was conducted. The following day the thirteenth course commenced.[17] The August 1941 passing-out parade involved 24 trainees. A new intake of thirty commenced the same day.[18] At this stage No. 2 EFTS shared Archerfield Aerodrome with civilian traffic, as well as the Hudsons and Wirraways of No. 23 Squadron. Given that the airspace over Brisbane

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[15] Ben Dannecker, *Cootamundra aerodrome* (Essendon, Vic.: B. Dannecker, 1976), pp. 22-9.
[16] Roger R. Marks, *Queensland airfields WW2 – Fifty years on* (Mansfield, Qld: R. & J. Marks, 1994), pp. 121-34. Flight tuition at an EFTS lasted eight weeks and was conducted in DH60 (Gipsy Moth) or DH82 (Tiger Moth) aircraft. After this the trainee moved to a service flying training school (SFTS) where he was introduced to more advanced types such as the Wirraway or the twin-engine Avro Anson. Here emphasis was placed on cross-country and instrument flying.
[17] Entries dated 27 May 1941 and 28 May 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT).
[18] Entry dated 20 August 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT).

now was more crowded than in prewar years, accidents were not uncommon. As early as January 1940 searches were undertaken for relief landing grounds (RLGs). Sites at Lytton, Meeandah, Strathpine and Eagle Farm were considered.[19]

Table 9: Sample monthly flying hours undertaken by Royal Queensland Aero Club on Archerfield between June 1939 and March 1940.[20]

MONTH/YEAR	ARCHERFIELD CIVIL TRAINING			ARCHERFIELD RAAF TRAINING		
June 1939	Dual 100:30	Solo 259:55	Total 360:25			
July 1939	Dual 132:55	Solo 238:50	Total 371:45			
September 1939	Dual 105:55	Solo 303:55	Total 409:50			
January 1940	Dual 76:05	Solo 196:35	Total 272:40			
February 1940	Dual 40:00	Solo 107:45	Total 147:45	Dual 173:15	Solo 152:20	Total 325:35
March 1940	Dual 68:35	Solo 168:50	Total 237:25	Dual 127:45	Solo 128:15	Total 256:00

Airspace was not the only place which suffered from overcrowding. A need for more accommodation for No. 2 EFTS led to the construction of South Camp in the north-west corner of the Beatty and Mortimer Roads intersection. Herbert Trelour of Booval won the contract for the construction of forty-nine buildings with a quote of £17 533. The completed camp, including tarmac, services and hangars, cost £61 702. Work commenced on 25 May 1941 and was completed in November that year.[21]

The pace of alterations on airfields between 1939 and 1941, though speedy by comparison to prewar work, still suffered from a bureaucratic delay and indecision which reflected the instability of leadership at the parliamentary level. The situation improved with a change of government on 7 October 1941 when Labor's John Curtin became Prime Minister.[22]

This change signalled the beginning of the second period. What soon followed was a realisation that Singapore was not the cornerstone of defence that Australia at one time

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[19] Entries dated 31 December 1940 and 3 January 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT).
[20] *Aircraft*, 1 August 1939, p. 23; *Aircraft*, 1 September 1939, p. 26; *Aircraft*, 2 October 1939, p. 18; *Aircraft*, 1 December 1939, p. 18; *Aircraft*, 1 April 1940, p. 32; *Aircraft*, 1 May 1940, p. 16.
[21] Sec. Dept of Air to Sec. Dept of Interior, memo dated 22 March 1941, H. W. Barker to WD Dept of Air, memo dated 20 May 1941, Report on application for extension circa September 1941, Handwritten memo dated 12 October 1942, Archerfield No. 2 EFTS – Extensions, K169, BP243/1, NAA (Qld).
[22] Robertson, *Australia at war*, pp. 33-4.

had believed it to be. This second period is marked by compromises made to meet the exigencies of war. Notable too were arrangements made hastily, only to be disbanded when the causal threat diminished. Aviation system managers learned much about the benefits of government control from the short-lived directorates and councils which administered what happened in air transport and on the aerodromes in wartime.

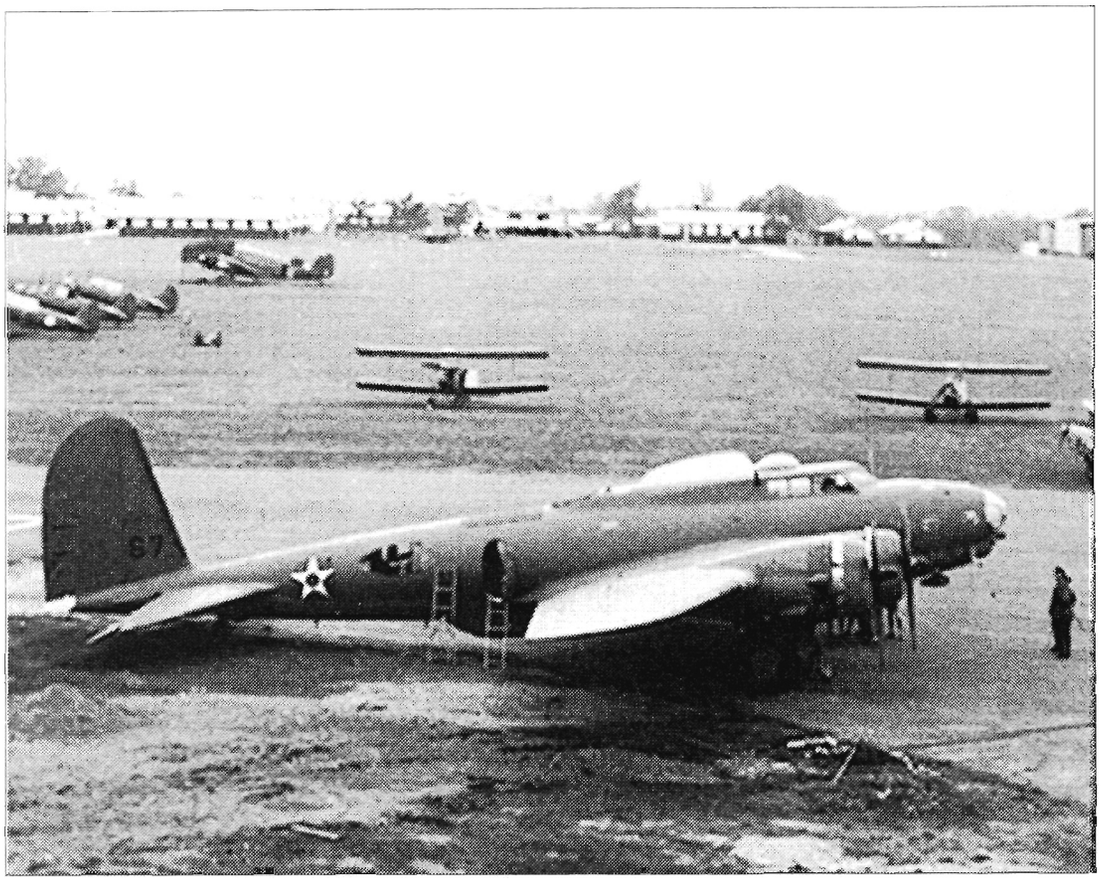

Figure 39: View south from control building, November 1941. In the distance can be seen the pyramid roof line of the former caretaker's house. Photograph taken between 20–25 November
Source: Trevan Jackson Collection

Politically the years between 1942 and 1945 are significant because they signal a new and growing relationship with the United States. That beginning can be read in the photograph of a B17 Flying Fortress taken late in November 1941 from an upstairs window in the unfinished administration building on Archerfield. (See Figure 39.) Historians regularly quote John Curtin's New Year message published in the *Melbourne Herald* on 27 December 1941 as its point of conception. On that occasion Curtin advised that, without inhibitions, 'Australia looks to America, free of any pangs as to our traditional links or kinship with the United Kingdom.'[23] Yet the mutually beneficial relationship that developed between Australia and the United States during the

[23] *Herald*, 27 December 1941, p. 1.

Second World War, especially as it related to air transport and aerodromes, had an earlier, military genesis.

Under instructions from US General Douglas MacArthur in the Philippines, General Lewis H. Brereton and members of his staff flew to Australia in November 1941 for three days of conferences in Melbourne with Australian military leaders. By 1941 Japanese expansion had forced the US trans-Pacific ferry route to the Philippines south towards Australia, coincidentally the only viable landmass on which US air bases possibly might be established. Routes varied, but between September and November 1941 US bombers sent to support their army in the Philippines generally landed for refuelling at Port Moresby and Darwin.[24]

Jackson's photograph is of one of the two US Far East Air Force (FEAF) aircraft which arrived on Archerfield on 20 November carrying Brereton and his staff. The smaller B18 proceeded to Laverton RAAF Base. Brereton travelled south in mufti on a civilian airliner while the Flying Fortress (B17) remained parked on Archerfield. The B18 returned from Laverton and departed for Townsville on 22 November. Brereton departed for Manilla via Darwin on 25 November, satisfied at having met the three objectives of his trip.[25]

One of the objectives was the establishment of an understanding on future use of Australian airfields by US forces.[26] Discussion at the Melbourne conferences encompassed the need for adequate assembly and test-flight facilities at Townsville and Brisbane, where it was envisaged crated aircraft would be unloaded from ships and re-assembled at local aerodromes. Without expansion, Archerfield Aerodrome could not have fulfilled this role. Conditions on airfields along a proposed inland ferry route from Melbourne to Cloncurry also were reviewed.[27] The conference members then considered what aerodromes might cater for repair and maintenance of aircraft, or provide temporary bases where tactical training for US pilots could be carried out. The

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[24] Gillison, *RAAF 1939–42*, p. 175.

[25] Entries dated 20–25 November 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT); James Rorrison, *Nor the years contemn: Air war on the Australian front 1941-1942* (Brisbane: Palomar Publications, 1992), p. 10. Rorrison claimed the four-engine B17 remained on Amberley because the Americans were unsure of the length of airstrips in southern cities. The caution evidenced by Brereton's crew in not taking the B17 south surely extended to their choosing the 6 000 feet (1 829) runs available at Archerfield over the then maximum of 4 800 feet (1 463 metres) at Amberley.

[26] General Brereton's first objective was to establish aerodromes on a ferry route between the Philippines and Darwin. His other objective envisaged US training and operating bases being constructed in Australia by labour and material from the United States.

estimated cost for the work needed to upgrade the airport system in the country's north to meet US requirements was placed at £5 227 845.[28]

Events moved quickly after 7 December 1941. Among the seven places attacked that day by Japanese aircraft were the US Naval Base at Pearl Harbor and the British and Australian garrison of Singapore. The Royal Navy vessels sent to protect the island colony, the *Repulse* and the *Prince of Wales*, were destroyed at sea on 10 December 1941, largely because they lacked adequate modern air cover. Singapore fell on 15 February 1942.

Between the December attacks and the escape of US General MacArthur from the Philippines in March 1942, the level of activity on a number of Australian aerodromes increased dramatically. A convoy led by the US destroyer *Pensacola* arrived in Brisbane on 24 December 1941. It carried 4 600 troops, fifty-two A24 bombers, 130 P40 (Kittyhawk) fighters and five CA (C53) transports. Assembling the aircraft placed pressure on facilities at Archerfield and Amberley. Within weeks the joint decision was made to drain the land and construct runways at Eagle Farm.

Arriving in Melbourne early in February 1942, the *Phoenix* convoy carried a further 7 000 troops, 162 P40 fighters and 10 observation aircraft. [29] Until their defensive positions were no longer tenable, reassembled US aircraft, flown often by inexperienced pilots, made their way north along the various ferry routes to try to stem the Japanese expansion south from Singapore.

The allied goal of the defeat of Japan was achieved by finding solutions to a number of individual problems, one of which was the transportation of an immense amount of material and personnel to forward areas from a country with comparatively underdeveloped air transport and airport systems. In early 1942 Australia's domestic air transport industry operated on a system of priority travel using a limited fleet. Internationally the QEA route to Singapore had been severed after a number of close calls for their unarmed flying boats and the deaths of three crew and ten passengers when *Corio* was shot down on 30 December 1941.[30]

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[27] The inland ferry route when planned in June 1942 was to consist of five main aerodromes and a number of emergency landing grounds. These included Roto, Cobar, Bourke, Cunnamulla, Quilpie, Blackall, Longreach, Winton and Cloncurry.
[28] Gillison, *RAAF 1939–42*, pp. 185-6.
[29] Richard Casey to H. V. Evatt, cablegram 126 dated 22 January 1942, Box 535, A5954, NAA (ACT).

The problem of lack of air transport was solved by an ad hoc process involving the United States Army Forces in Australia (USAFIA), the US Army Air Services of Supply, South-west Pacific Area (USASOS SWPA) and the Allied Directorate of Air Transport (ADAT). While the first two organisations dealt with the availability of and need for supplies, ADAT was the management tool for both the military and civil elements of aerial support for the Allied Air Forces, which included the delivery of supplies.

The Allied Directorate of Air Transport was formed under the command of Harold Gatty at Amberley in January 1942.[31] Born in Tasmania, Gatty had spent most of the previous decade in America where his exceptional talent as a navigator led to his being employed by Pan American Airways. On 4 February ADAT moved to Archerfield and continued operations, using any aircraft it could find and chartering machines where necessary.

ADAT had both USAFIA and RAAF sections. In April 1942 the USAFIA section was separated into two transport (later troop carrier) squadrons.[32] The first RAAF transport squadron formed under the direction of ADAT was No. 36 Squadron. The aircraft they flew were originally on loan from the US Army, though the Commonwealth later purchased suitable aircraft from the United States as part of the Lend-Lease arrangements. As the war moved north, so too did some of the squadrons. By December 1942 only 27.8% of ADAT payload was carried within Australia. By 1944, the year in which it was disbanded, ADAT's various units operated a daily average of 141 aircraft supplying the allied forces under US General MacArthur.[33]

Australian historians have debated the wisdom of allowing a military leader from another nation to control, with certain restrictions, the movements of Australian service personnel. Percy Spender, opposition spokesperson on foreign affairs, alluded to it as the temporary allocation of sovereignty to another nation almost without parallel in modern history.[34] Others have argued that Prime Minister Curtin was wrong to compromise and reduce Australia to a secondary role.

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[30] Fysh, *Qantas at war*, p. 230. Later, while carrying out rescue operations, one flying boat went missing, presumably to enemy action, and two others were destroyed in a Japanese raid on Broome.
[31] In the initial group of eight ADAT aircraft were five new C53s which were included in the *Pensacola* convoy. Later additions included Douglas B18s that had escaped from the Philippines and aircraft which were flyable but unfit for combat.
[32] History of the Directorate of Air Transport, Allied Air Forces SWPA and the 322D Troop Carrier Wing, Bob Wills Collection, Australian Museum of Flight, Nowra.
[33] History of the Directorate of Air Transport, Allied Air Forces SWPA and the 322D Troop Carrier Wing, Bob Wills Collection, Australian Museum of Flight, Nowra.
[34] Bell, *Unequal allies*, p. 103.

Australia's geographic location and plentiful primary resources were behind the threat of aggression from Japan. Those same assets were what made Australia such a convenient base from which America could reclaim the Philippines. Curtin had few options at the time and Australia had much to gain from the new relationship. Both governments accepted the fact that the situation as it stood late in 1941 could be mutually beneficial. With regard to the effect of the US Lend-Lease scheme on Australia's air transport system and its northern aerodromes, this was especially so.

Lend-Lease arrangements were negotiated between Australian and American representatives from February to September 1942, though ad hoc operations had applied from the previous November when US President Roosevelt paved the way for Lend-Lease to apply by acknowledging that the defence of Australia was vital to the defence of America. As a consequence of the subsequent negotiations, Australia received munitions, including planes, tanks, motor vehicles and ordinance to the value of approximately US$900 million, as well as petrol and industrial goods to the value of $483 million.[35]

In return, in what was known as reverse or reciprocal aid, Australia provided food and equipment supplies and service facilities to American troops valued at approximately US $920 million, based on an exchange rate of US $3.20 for £1 in Australian currency. Food comprised 30% of this Reverse Lend-Lease. Included in the remainder were aerodrome facilities costing £8.4 million, industrial equipment valued at £13 million and capital works at an estimated £36 million.[36] Analyst Roger Bell concluded the scheme was not without its controversy because 'Australia attempted to employ Lend-Lease assistance to help diversify and expand its secondary industry. On the other hand, the US attempted to promote an increased permanent penetration of the Dominion market.'[37]

US Lend-Lease aid on aerodromes and airstrips is very evident, especially in Queensland during the first half of 1942. Existing well-sited aerodromes were enlarged and new airstrips built to serve USAFIA squadrons. Major sites such as Garbutt Aerodrome in Townsville became the centre of an area that contained a number of dispersal strips. That aerodrome, today Townsville's joint facility airport for both civil and RAAF operations, was constructed in 1940 by the Townsville City Council. Late in 1941 it was upgraded by the construction of runways. Dispersal airstrips were created at

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[35] Bell, *Unequal allies*, p. 119.
[36] Bell, *Unequal allies*, pp. 108-21.
[37] Bell, *Unequal allies*, p. 117.

Stockroute, Bohle River, Aitkenvale and by regrading the original Ross River civil aerodrome.[38] In such a way Queensland gained generally improved aerodrome facilities, some near towns which had previously lacked an adequate landing area. These proved useful to the airport system in postwar years, especially at Mareeba, Charters Towers, Blackall and Miles.

The actual work of airfield construction was overseen from 26 February 1942 by the Allied Works Council (AWC) under Director-General Edward G. Theodore. This council coordinated the skills of all existing bodies capable of carrying out construction. A 1944 report on defence construction recorded:

> All State organizations were readily made available by their respective State governments; all available contractors, both large and small, co-operated very fully; and the Allied Works Council itself set up a day-labour organizations which it directly operated.[39]

In the construction of Queensland wartime aerodromes the Queensland Main Roads Commission played a significant role, assisted by private companies such as M. R. Hornibrook Ltd and Thiess Brothers. The Civil Construction Corps, formed in April 1942, was the means by which the AWC utilised unskilled labour on a day-to-day basis.[40] Not all new work was funded through the AWC. In what would involve its greatest annual expenditure on aerodrome facilities, the DCA spent £480 000 in 1942 on runways and enlarging aerodromes.[41]

During the third period into which this decade has been divided the Commonwealth sought to establish the same high level of control over the civil air transport industry that it held over the system of major aerodromes. This period commenced in 1945, the year when Ben Chifley was selected as the new Prime Minister after the death of John Curtin. Chifley held the position until his defeat in an election late in 1949, the same

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[38] Marks, *Queensland airfields WW2*, pp. 61-79.
[39] 'Defence construction in Queensland and Northern Territory', *CPP*, 2, (1943–44 & 1944–45), p. 1,642.
[40] Clem Lack, *Three decades of Queensland political history 1929–60* (Brisbane: Qld Govt Printer, 1962), p. 254.; Ross Fitzgerald, *'Red Ted': The life of E. G. Theodore* (St Lucia, Qld: UQ Press, 1994), pp. 387-405. The Queensland Main Roads Commissioner became the deputy director-general (Qld) of the Allied Works Council. Edward G. Theodore, the former Queensland Premier, was the AWC director-general.
[41] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 56.

year in which airline operations moved from Archerfield back to Eagle Farm and the overall period ended.[42]

While Curtin had kept a promise that his wartime government would not socialise industry, Chifley was keen to convert the wartime controls which already existed, particularly in the airline industry, into the stated Labor Party policy of nationalisation through public ownership.

Bureaucratic moves in this direction commenced as early as 1943 with the 'Outline for a plan for postwar reorganisation' presented by Arthur Corbett, the director-general of the DCA. An interdepartmental committee which he headed expanded his initial ideas later that year.[43] According to aviation commentator Stanley Brogden, the Corbett Committee's unpublished report advocated that:

> Any large airline should be compelled to offset the losses incurred on developmental and outback services by the potentially massive profits on inter-city and overseas operations. Subsidies should be reduced or abolished, fares on the main routes being assessed at a level to carry losses on other routes.[44]

In effect, the profits that were to be made on flights between populous centres would be redistributed for the benefit of a greater number of citizens. The best means of achieving this result was through nationalisation of the major airlines, a process well and truly in line with Labor policy.

In his 1968 overview of the Two Airline Policy, Brogden stated his belief that another driving force was the Commonwealth's fear of the financially stable ANA, backed by British shipping interests, continuing to dominate the domestic airline system through its monopoly on air travel between major centres. Wartime activity certainly had boosted the company's profits and market share. In 1940 ANA accounted for 53.5% of passenger-miles. By 1945 it carried 80% of all traffic nationwide.[45]

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[42] Francis Forde, the member for Capricornia, was Prime Minister for one week in July 1945.
[43] Submission by the DG of DCA – Postwar reorganisation: Outline of a plan for civil aviation, January 1943, Reports of Inter-Departmental Committees, Exhibit 3, MP183/16, NAA (Vic.). As well as Corbett, the committee consisted of Air Commodore J. P. J. McCauley, Secretary of the Department of Aircraft Production (and later DG of the DCA) Daniel McVey and Dr. H. C. Coombs, DG of the Department of Post-war Reconstruction. The PMG was represented by M. B. Harry, Treasury by W. E. Dunk and External Affairs by Paul Hasluck.
[44] Stanley Brogden, *Australia's two-airline policy* (Carlton, Vic.: MUP, 1968), p. 42.
[45] Brogden, *Australia's two-airline policy*, pp. 47-50.

Economists D. M. Hocking and C. P. Haddon-Cave analysed the Commonwealth's attempt to nationalise ANA against a background of wider influences. While acknowledging that the government wished to avoid an ANA monopoly, these authors indicated that the Commonwealth also justified nationalisation because it was airline policy in other Commonwealth countries. They identified in addition a number of secondary reasons. Nationalisation was viewed as a way of removing the subsidy scheme, which since the 1920s had been viewed in Labor circles as a crutch for inefficient private industry. A government-owned airline also would be able to cross-subsidise its routes to new developmental areas from the profits of services between capital cities. Even the long-held argument of the need for a strong civil network as a means of national defence was aired as justification.[46]

An August 1944 referendum over Commonwealth powers with regard to aviation, and thirteen other postwar reconstruction items, failed to provide a mandate for constitutional change. In response the Commonwealth passed the *Australian National Airlines Act (1945)* which 'aimed at creating a public corporation which would have a monopoly of air transport between the States and within the Territories.'[47] Three privately owned airlines challenged the validity of this Act in the High Court. In a 14 December 1945 decision which echoed the 1936 constitutional difficulties over aviation, the Commonwealth's right to enter the field of interstate transport was upheld, though the sections of the Act which placed restrictions on interstate airline activity by non-government airline operations were declared invalid. Undeterred, the Commonwealth formed an entirely new airline, Trans-Australia Airways (TAA), in January 1946.[48]

TAA's first flight was on 9 September 1946. Initially the company operated eleven DC3 aircraft.[49] Most government business was directed towards TAA. At the same time the airline aggressively sought passengers through the use of advertising based on its high level of service and lower prices. Gradually TAA moved from the early years of inevitable loss-making to the point where, in the 1949–50 fiscal year, it returned a profit of £214 818 to the Commonwealth.[50]

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[46] D. M. Hocking and C. P. Haddon-Cave, *Air transport in Australia* (Sydney: Angus & Robertson, 1951), pp. 101-2.
[47] Hocking and Haddon-Cave, *Air transport in Australia*, pp. 79-80.
[48] Hocking and Haddon-Cave, *Air transport in Australia*, p. 61. TAA was the trading name used by the Australian National Airlines Commission, formed by *Australian National Airlines Act (1945)* as the corporate body which was to have taken over ANA.
[49] According to Stanley Brogden, five of these aircraft had been on loan to ANA, four with QEA, two with Guinea Airways and one with MacRobertson-Miller Airways.
[50] Brogden, *Australia's two-airline policy*, p. 83. The loss for the previous financial year was £78 286.

Nationalisation of the machinery of international aviation proved easier. The Commonwealth's purchase of QEA commenced with the *Qantas Empire Airways Agreement Act (1946).* This allowed the government to obtain those shares held by the British Overseas Airways Corporation (BOAC), the British corporation which was a government-owned amalgamation of Imperial Airways and the prewar British Airways.[51] Just prior to 1 July 1947 the Commonwealth paid £455 000 for QEA's remaining 261 500 shares. According to Labor's Senator Cameron:

> This purchase has been in the best interests of Australia and that in Qantas Empire Airways Limited we possess an instrument which is serving, and will continue to serve, to maintain our rightful place in International air transport, with consequential benefit to Australian trade and industry, and the reduction of our geographic isolation. This must benefit the Commonwealth as a whole.[52]

The Second World War provided a glimpse of the increasingly possible global nature of air travel. Australian air-transport system managers participated in the first meeting of the permanent International Civil Aviation Organisation at Montreal on 6 May 1947.[53] This committed Australia to international standards in many areas, including that of major aerodromes, now more often being referred to by the term 'airport'.[54] So began a period of record expansion, particularly at capital cities. In 1947 a total of £3 034 569 was authorised for the development of airports and the erection of new buildings. A further £2 643 000 was to be spent in upgrading Kingsford Smith Aerodrome (KSA) according to the plan present by aerodrome engineer Dr. K. N. E. (Bill) Bradfield.[55]

The general expectation that the Commonwealth should provide the major sites in the airport system was well established in prewar years. As more money needed to be spent on a system that all accepted was a Commonwealth responsibility, a range of charges for Australian aircraft was introduced, effective from 10 August 1947. Known as air route or air navigation charges, in the late 1940s these were estimated at recouping 34% of the operating costs of providing airways infrastructure (including aerodromes) from the

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[51] B. K. Humphrey, 'Nationalization and the independent airlines in the United Kingdom, 1945–51', *Journal of Transport History*, 3 (1976), pp. 265-9.
[52] *CPD*, 18 June 1948, p. 2,348.
[53] Butler, *Flying start*, p. 78. Australia's representatives included Minister for Civil Aviation, Arthur S. Drakeford, A/DG of the DCA, Edgar Johnston, David Ross and A. R. (Roley) McComb.
[54] The term originated in the 1920s with the development of Croydon Aerodrome as the 'Air Port' for London.
[55] Butler, *Flying start*, p. 81.

users of the system.[56] According to some commentators they also provided the Commonwealth with another measure of control on the activities of airline operations.

In the two years prior to 30 June 1949, over £15 million was authorised on aerodrome expenditure. Essendon airport was extended. International facilities were established at KSA. Brisbane received a new flying boat base at Hamilton. A new airport was constructed at Adelaide and improvements made at Perth's Guildford Aerodrome.[57] All were under the control of system managers employed by the steadily growing Department of Civil Aviation.

This decade was divided into three periods when different policies applied to air transport and aerodromes. That the political background to the development of aviation systems during the decade is so complex has much to do with the influence of external factors that threatened the systems, creating problems which in their resolution only enhanced the level of control. On Archerfield Aerodrome evidence of the solutions to those problems can be viewed through contemporary photographs or by looking at its built fabric. In air transport, the downstream effects are apparent still in the industry today.

[56] Hocking and Haddon-Cave, *Air transport in Australia*, p. 132. Airlines were to pay on a unit basis on actual legs flown. They rejected the scheme. Operators of small aircraft paid an annual fee.
[57] Butler, *Flying start*, p. 90.

Chapter 16

'We were given the idea that it was a Lend-Lease hangar...They couldn't make money out of it, you know. We all bemoaned the fact that it was a damned shame because it was a good building, the best building on the aerodrome, and they dismantled it, whatever they did with it.'[1]

During the Second World War those who controlled the Australian civil aviation airport system subsumed it to the task of winning the war, taking advantage where possible of the opportunities for expansion provided by military escalation and the presence of allied forces. Through the efficient transportation of personnel and supply of equipment, the importance of a national network of government-owned aerodrome facilities won formal recognition.

Through the economic devices used to ensure that Australia would be on the winning side at the end of the Second World War, the air transport and airport systems received the massive capital funding needed for expansion of ground facilities and purchase of modern commercial airlines. Either provided by the Commonwealth or guaranteed by it, this funding required a matching increase in system management as growth and consolidation occurred postwar.

Control of both the air transport and airport systems rested almost completely in the hands of the Commonwealth during the Second World War. While previous chapters have coupled the progress of airlines and air-service operations to that of the airport system, in this chapter primary focus will be placed on the economic forces which contributed to the expansion of the latter. In turn, how that contributed to the postwar expansion of civil aviation will be considered.

Six years of war so much altered the landscape of aerodromes and attitudes towards air travel that a new style of airport system emerged. Because of their relative proximity to the theatres of battle and importance within the civil system, Brisbane's aerodromes were in the forefront of those changes. In that they are a well-suited means through which to explore the system's capital expansion, and the sources of its funding.

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[1] Ray Denning, interview with author, 18 December 2000. The hangar he refers to is building no. 25, erected on Archerfield in 1943 and removed to Eagle Farm in the late 1940s.

The economic background to the airport system between 1940 and 1949 can be divided into the same three distinct periods as were the political influences. From the declaration of war to the last quarter of 1941, Australia enjoyed a two-year period of grace when her security was not threatened directly. Most expenditure on aerodromes during these years was related to the task of providing aircrew for the Empire Air Training Scheme (EATS) and the RAAF, as well as upgrading strategically important aerodromes in the country's north.

From the change of government in October 1941 to the surrender of Japan in August 1945, Australia's economy converted to the war footing necessary to counter the close military aggression the country then faced. To pay for and produce the material resources needed, more restrictive regulations on labour movement (usually referred to as manpower), finance and living conditions were introduced. After the arrival of US forces on Australian soil at the beginning of the second period, Lend-Lease and Reverse (or Reciprocal) Lend-Lease arrangements funded the explosion in aerodrome development that followed, notably in the country's northern regions.[2]

The financial and other restrictions placed on the population by the Commonwealth during the war were relaxed gradually during the third period, one of economic reconstruction. Further capital-intensive improvements to the airport system and to air transport were proceeding when the election on 10 December1949 removed the Labor government of Ben Chifley from office, returning Robert Gordon Menzies, now head of the Liberal Party, to the position of Prime Minister.

During the first period between 1939 and late 1941 the Australian economy was attuned to the requirements of a distant, European war and adopted a business-as-usual attitude.[3] Annual defence spending had increased moderately in the previous decade, reaching an estimated £33.137 million in 1938–39 from a 1934–35 figure of £5.5 million. Given that defence had been the stated reason behind providing subsidies to civil aviation since the 1920s, it was hardly surprising that the Commonwealth commenced altering the built fabric of government-owned aerodromes to cater for additional military use even prior to September 1939.[4]

The primary economic problem facing the wartime UAP government from September 1939 was how funding for such defence priorities might be obtained. Its first war

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[2] Though both terms were used in correspondence of the period, the term reciprocal Lend-Lease will be adopted hereafter.
[3] *Argus*, 5 September 1939, n.p.
[4] S. J Butlin, *War economy 1939–42* (Canberra: AWM, 1961), pp. 195-6.

budget that month proposed increases in personal income tax, company tax, sales tax and customs and excise. A revised budget two months later advocated 'a balanced programme of taxation, borrowing from the public and borrowing from the banking system.'[5] Moves to divert people's savings towards government loan issues were instituted in mid-1940.[6] Regulations were established to control private investment in commercial enterprises. To ensure that the funds which were raised were not wasted, control of defence expenditure was pursued through a Board of Business Administration.[7]

The country's major civil aerodromes required little alteration to their surface conditions to make them capable of receiving the generally outmoded aircraft then used by the RAAF. What were needed were the facilities to house the military personnel to be stationed on civil aerodromes. First evidence of this new military role for Archerfield appeared in the form of twelve prefabricated huts from the Sidney Williams Company, valued at £8 280, erected along with two Bellman hangars in mid-1939 by No. 23 Squadron personnel.[8]

Prefabricated supplies were harder to obtain in November 1939 when contractors Turner and Sons extended the camp to accommodate the training of EATS trainees for a contract price of £8 637 10s 0d.[9] The company was warned it would lose £10 of its security deposit of £430 for every week over their specified completion time. Because of a delay in the arrival of some material, Turner and Sons could not complete the contract until two weeks and two days after the due date. The company was penalised £21.[10]

By July 1941 the Air Board had approved over £75 000 for additional buildings, services and the provision of furniture and fittings for No. 2 EFTS on Archerfield. Over £21 000 was spent on constructing the forty-nine buildings and three additional hangars needed to accommodate the school's service personnel and their aircraft in what was termed South Camp, the area just inside the airfield's Mortimer Road boundary.[11]

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[5] *CPD*, 30 November 1939, pp. 1,851-2.
[6] Butlin, *War economy 1939–42*, pp. 218-23.
[7] Butlin, *War economy 1939–42*, pp. 195-212.
[8] Air Board Agenda no. 2505, 7 June 1939; Air Board Agenda no. 8001, 6 March 1947.
[9] Sidney Williams & Co. to WD BNE, letter dated 16 November 1939, Archerfield FTS – Erection of buildings, D55, BP243/1, NAA (Qld).
[10] Sec. Dept of Air to Sec. Dept of Interior, memo dated 9 October 1939, H. W. Barker to Turner & Sons, letter dated 28 October 1939, Archerfield FTS – Erection of buildings, D55, BP243/1, NAA (Qld). Turner & Sons were allowed a remission of overtime payments because of the delay in the arrival of supplies.
[11] Air Board Minute No. 3368 /1941 dated 18 July 1941, DWB – RAAF No. 2 EFTS – Archerfield Qld – Buildings & services, 171/16/136 Part 2, A705/1, NAA (ACT); Handwritten memo dated 12 October 1942 (folio 92), Archerfield No. 2 EFTS, K169, BP243/1, NAA (Qld).

The lengthy prewar tender and contract process was an early casualty of war. From 1939 the majority of construction jobs were of a high priority. The process of inviting tenders, accepting of one and formalising the contract wasted too much time. Delays then occurred when orders for the materials needed, especially steel, could not be filled quickly enough. Because defence contracts were plentiful, most local contractors were busy.

The solution was to have contracts set out on a cost-plus basis. These assured the contractor that the Commonwealth would pay the eventual total cost, ascertained at the contract's conclusion, plus an agreed level of profit. This might take the form of a percentage, ranging from 4% to 10%. In other instances the profit might be a fixed fee or a percentage up to a maximum figure. While sometimes regarded as open-ended and subject to abuse, according to a 1944 report on the activities of the Allied Works Council (AWC) the cost-plus system solved the problem of urgency by ensuring 'the utmost possible speed in completing contracts.'[12]

Contracts involving the construction of buildings were not the only Commonwealth agreements negotiated on Archerfield during this first period. The RAAF, then lacking adequate numbers of aircraft engineers, could not operate without the assistance of civilian companies. Airlines of Australia (AOA), Australian National Airways (ANA), Aircrafts Pty Ltd (APL), Qantas Empire Airways (QEA) and the Royal Queensland Aero Club (RQAC) all undertook maintenance or repair of aircraft RAAF engines and airframes.

While most established air-service operators and airlines took advantage of the financial bounty provided by these military contracts, not all were to prosper by the experience. As well as being involved initially in the training of RAAF pilots, from 8 July 1940 the RQAC conducted regular servicing of the aircraft used by No. 2 EFTS. On average this RAAF school on Archerfield operated thirty training planes. Conditions were difficult for the club's engineering staff as these aircraft were housed wherever there was space in hangars situated in different parts of the airfield.[13]

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[12] 'Defence construction in Queensland and Northern Territory', *CPP*, 2, (1943–44 & 1944–45), p. 1,642.

[13] Extracts from letter from Area Technical Officer, Sydney, dated 3 October 1941, Sec. RQAC to Arthur Fadden, letter dated 25 October 1940, RQAC – Contract to maintain EFTS Half School at Archerfield, 208/33/81, A705/1, NAA (ACT). Another twelve were allocated to the school after September 1941.

RQAC had negotiated its contract on a cost-plus-zero basis, a patriotic gesture perhaps, but one which set aside no surplus with which to re-establish their usual activities after the war. That precaution was being taken by other capital-city clubs providing maintenance for the RAAF through cost-plus-5% contracts. Over the twenty-one month period to 18 April 1942 the RQAC undertook general maintenance to the value of £800 to £900 per month. With the removal of No. 2 EFTS from Archerfield, however, the club's maintenance contract was terminated abruptly. The committee expressed its disappointment through political channels. The club's secretary and chief engineer even travelled to Canberra to lobby for more contracts.[14]

A June 1941 comparison of similar work conducted by the Royal Victorian Aero Club (RVAC) at Essendon and the Aero Club of New South Wales and Airflite Co. at Kingsford Smith Aerodrome (KSA) revealed that RQAC were servicing more aircraft. Aircraft serviced by the Queensland club flew a greater number of hours and were maintained at a comparable cost and with a higher level of serviceability. A subsequent enquiry granted them 5% profit over cost, calculated retrospectively.[15] Unfortunately, RQAC was unable of obtain any further contracts. Its team of administrators and forty-two workshop staff dispersed to other places of employment. Having relinquished all civil flying early in the war, the club went into suspended animation until prospects improved.[16]

Correspondence files suggest RQAC was a casualty of the administrative re-arrangement of aircraft production and repair facilities which occurred after mid-1941 when the war cabinet divided the responsibility for maintenance contracts between two bodies. The RAAF retained responsibility for home defence aircraft matters. The Aircraft Production Commission (APC), created in March 1940 for the task of bringing into accord the various sections of wartime aircraft production and repair, took control of all aircraft matters relating to the EATS. While the local RAAF commanding officer on Archerfield was satisfied with the work conducted by RQAC, this conflicted with the policy of the APC to reduce the involvement of small engineering organisations.[17]

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[14] Air Board Agenda 4260 dated 25 September 1942, Sec. Dept of Air to Sec. RQAC dated 6 November 1942, RQAC – Contract to maintain EFTS Half School at Archerfield, 208/33/81, A705/1, NAA (ACT). On 6 May 1942 No. 23 Squadron moved to Amberley as planned. No. 2 EFTS was disbanded at Archerfield on 24 April 1942. The only other RAAF units based there for any significant duration during the war were No. 4 Communication Unit (7 September 1942 to 28 March 1946), No. 2 Air Ambulance Unit (7 September 1944 to 7 January 1946) and No. 38 Transport Squadron (27 December 1944 to 15 August 1946).

[15] RAAF Minute paper re: impressments dated 27 June 1941, RQAC – Contract to maintain EFTS Half School at Archerfield, 208/33/81, A705/1, NAA (ACT).

[16] Pres. RQAC to DG DCA, letter dated 22 May 1942, DG DCA to Pres. RQAC, letter dated 26 May 1942, RQAC – policy file, 5/102/119 Part 4, MP115/1, NAA (Vic.).

[17] Statutory Rule no. 55, 21 March 1940; Butlin, *War economy 1939–42*, p. 444n.

By contrast, Aircrafts Pty Ltd in hangar no. 3 was considered one of the larger operations. In a three-month period to August 1942 the APL paid this company £1 109 14s 7d for engines £1 531 7s 4 d for aircraft repairs, £312 8s 9d for metal provided and £394 12s 9d for salaries. Accounting for this expenditure was a complicated procedure. Banks of typists prepared invoices that were subject to a fortnightly examination by an APC cost investigator.[18]

Another large operator was QEA, which in 1941 conducted engine overhauls for the RAAF in hangar no. 5. The national sense that the war was an as-yet-distant series of battles may have been the reason QEA General Manager Hudson Fysh later described his staff then 'more like a family organisation lacking adequate leadership.'[19] Though his workers were not overly busy, he was most reluctant to allow RQAC to use hangar no. 4 when they needed additional space in July 1940. Fysh argued that he had been repeatedly informed by higher authorities that the QEA organisation at Archerfield was essential for carrying out urgent repairs and overhauls, and would be so utilised. QEA's direct involvement with the changing conditions in South-East Asia may have been behind Fysh's heightened desire to protect the resources of his company.[20]

Less than 100 metres along the taxiway in hangar no. 6, ANA's engineering staff also repaired aircraft for the RAAF. Along with reconstruction of the fire damaged DC3 *Pengana* (then RAAF A30-12) in 1941, the unpublished memoirs of ANA welder Trevan Jackson particularly noted the rebuild of a crashed Wirraway (RAAF A20-139). Other contracts involved modifications to increase the size of radiator air scoops of the British designed Fairey Battle aircraft to make them more suited to the Australian climate.[21] During this first period, maintenance for the RAAF continued alongside regular civil maintenance operations in at least three of Archerfield's prewar hangars.

Though the expenditure on aerodromes increased from late 1939 to late 1941, the attitude that the war was being fought elsewhere meant the pace remained relatively steady. No better contrast between this period and what was to come is provided than at Eagle Farm. In mid-1941 the RAAF decided to use the old 1920s aerodrome site as a relief landing ground (RLG) for trainee pilots from Archerfield. Instructions for its refurbishment were to:

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[18] Allan Hodge, interview with author, 6 January 2001; Gross wages paid June–July–August 1942, letter dated 24 August 1942, Aircrafts Pty Ltd – Payment of claims, 2406, MP287/1, NAA (Vic.).
[19] Hudson Fysh, *Qantas at war* (Sydney: Angus & Robertson, 1968), p. 196.
[20] Hudson Fysh to CO No. 2 EFTS, letter dated 20 July 1940, RQAC – Contract to maintain EFTS Half School at Archerfield, 208/33/81, NAA (ACT).
[21] Trevan Jackson, Random ramblings of an early bird 1934–51, manuscript, 2001, p. 22.

> Collect all old tins and rubbish and remove from the whole area; fill all holes with approved gravel filling; grade off all minor bumps but avoid any major disturbance of grass sod...Roll area with medium weight roller (5-6 tons) and then re-roll with heavy roller (8-10 tons) until thoroughly consolidated.[22]

The value of improvements there in the months leading up to the entry of Japan into the war were estimated to cost a moderate £1 727 7s 6d.[23] Less than three months later £500 000 was allocated to the aerodrome for the provision of hangars and three bitumen runways, ground facilities far in excess of conditions on any Australian capital-city aerodrome.[24]

It was fortunate many of the financial and administrative structures were set in place in the two years prior to the last quarter of 1941. Upon their basis developed the tighter war economy that evolved after John Curtin become Prime Minister, US forces arrived in Australia and Singapore fell to the Japanese. These three key events mark the beginning of the second period.

All Australia's capital-city aerodromes felt the impact of increased military traffic, but by a series of circumstances which could not have been predicted, Brisbane was provided with better aerodrome facilities than any other capital city. Not surprisingly, little of the allocation made by the Department of Civil Aviation in 1942 for the construction of runways and enlarging grounds to cater for service requirements was spent in Brisbane. Improvements at Archerfield and Eagle Farm during this second period were as a direct consequence of the presence of US forces, and funded through the high-level Lend-Lease arrangements made to ensure Australia could remain a supply base for the USAAF.[25]

Exactly which country paid for what particular segments of this modernisation is not easy to establish. Various Commonwealth councils or other bodies may have organised the earthworks and construction but other groups and circumstances were involved.

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[22] Schedule no. 287, sheet 1, RAAF DWB dated 28 October 1941, Archerfield RAAF – Extension of relief landing ground at Eagle Farm, K353, BP243/1, NAA (Qld).
[23] V. G. Crawford to the Civil Engineer, Works & Services Branch, Dept of Interior BNE, handwritten memo dated 29 August 1941, Archerfield RAAF – Extension of relief landing ground at Eagle Farm, K353, BP243/1, NAA (Qld).
[24] Sec. Air Board to Min. for CA, memo dated 12 January 1942, Eagle Farm (Qld) Project USA Depot, 42/501/54, A1196/6, NAA (ACT).
[25] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 56. In 1943–44 the DCA allocated £700 000 to aerodrome development.

Diplomatic bureaucracy, delayed cost accounting and the tendency of US forces to use their service personnel as day labour when pressed for time confuse the paper trail. At times the administrative paperwork only reflected urgent decisions made on site weeks earlier. Documentation indicates the choice of directions for Eagle Farm's first two runways were made following January 1942 discussions between F/Lt James of the RAAF's Directorate of Works and Buildings and Captain Pell of the USAAF. Unfortunately both were killed in separate aircraft crashes in February.[26]

To provide the necessary funding for this and other works, the Commonwealth throughout 1942 refined the nature of the directorates and councils through which as much of the efforts and finances of the population as was possible could be channelled towards winning the war. From an earlier Manpower Priorities Board came the Manpower Directorate, a central executive authority responsible for coordinating the demands of labour from a range of industries.[27]

The Allied Works Council first met in Melbourne on 28 February 1942. It was responsible for works programs needed to provide the ground infrastructure for Australian and US forces. The Civil Construction Corps (CCC) was formed within the AWC to provide the pool of labour needed for these programs. The Aircraft Advisory Committee for the Coordination of Aircraft Production, formed in January 1942, smoothed relations between the divergent interests in the production and repair of aircraft.[28]

Commonwealth control over what the individual did with his or her money was strengthened by pegging wages, restricting private spending, tightening price control on goods and through income tax uniformity. The introduction of a uniform Commonwealth income tax involved four separate bills introduced to the House of Representatives on 18 May 1942.[29] These replaced the previous situation, when the six states imposed eleven separate taxes on income at varying rates. In 1944 pay-as-you-earn (PAYE) deductions were introduced.[30] By these and other measures the Curtin government hoped that the money which the public could not spend would be invested

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[26] H. W. Barker to WD Air Services, memo dated 23 February 1942, Eagle Farm Aerodrome – Extensions, QL805 Part 1C, J56/11, NAA (Qld); F/Lt James, handwritten memo dated 31 January 1942, Eagle Farm (Qld) Project USA Depot, 42/501/54, A1196/6, NAA (ACT). Captain Pell was killed in the first Japanese raid on Darwin on 19 February 1942. F/Lt James was killed the following day in the crash of the QEA DH86, VH–USE, at Belmont (Qld).

[27] S. J Butlin and C. B. Schedvin, *War economy 1942–45* (Canberra: AWM, 1977), p. 7.

[28] 'Defence construction in Queensland and Northern Territory', *CPP*, 2, (1943–44 & 1944–45), p. 1,642; Butlin and Schedvin, *War economy 1942–45*, p. 146; Stewart Wilson, *Beaufort, Beaufighter and Mosquito in Australian Service* (Weston Creek, ACT: Aerospace Publications, 1990), pp. 29-30.

[29] In June 1942 these were challenged unsuccessfully in the High Court by four of the States.

in a new series of loans. The first, the Liberty Loan for £35 million, opened in February 1942.[31] The need to borrow overseas to fund defence spending was by these means avoided.

In February 1942 the Commonwealth announced that in the three weeks up to 31 January £1 million in contracts had been let to speed up and improve Australia's air defences. Half the amount was spent in Queensland. Though censorship rules over newspaper publications obscured the locations, the money was earmarked for 'storage tanks and new runways, and erection of new buildings at operational stations and training schools.'[32] The biggest single allocation of over £168 500 was at an 'advanced base', possibly Townsville. The new runways referred to could have been for the USAAF aircraft 'erection and repair depot' at Eagle Farm.[33]

While contemporary documents refer to many thousands of pounds provided by the US to construct or improve specific facilities, in reality the funding originated in allocations made by the Commonwealth. These were balanced through Reverse Lend-Lease arrangements against the purchase, though not specifically, of aircraft, radio navigation equipment and other goods obtained from the US. The increased activity in the primary and manufacturing industries which was required to supply US forces with over 4 000 different items, such as clothing, camping equipment and food, also generated a healthy economy with little unemployment. This busy economy was better able to afford the development that was occurring nationally, especially on aerodromes.

Nearly all of the expenditure on the construction of Eagle Farm Aerodrome from January 1942 can be attributed to reciprocal Lend-Lease, as can a proportion of the costs for the 1942 expansion of Archerfield. In particular, the cost of extensions to hangars no. 1, 3 and 4 on Archerfield were deducted from a specific amount of £250 000 set up under Reverse Lend-Lease to establish facilities in which USAAF aircraft could be overhauled.[34]

How these financial arrangements were made depended on when and where they occurred. As a consequence of not being able to sell the land during the Depression, the Commonwealth still owned the 91 acres (37 ha) Eagle Farm aerodrome site. Situated

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[30] Butlin and Schedvin, *War economy 1942–45*, pp. 310-11.
[31] Butlin and Schedvin, *War economy 1942–45*, p. 580.
[32] *CM*, 25 February 1941, p. 1.
[33] Sec. Air Board to Min. for CA, memo dated 12 January 1942, Eagle Farm (Qld) Project USA Depot, 42/501/54, A1196/6, NAA (ACT).

just to the west of Schneider Road and north of the Brisbane River wharves, the land had been used for little other than gliding and grazing cattle since the early 1930s. In early 1942 the additional acreage needed urgently to construct a three-way system of runways for use by the USAAF was obtained through an administrative format known as 'hiring', then common and overseen by the Australian Army Line of Communication (L of C) Area at Victoria Barracks in Brisbane.[35]

The first extension to the old aerodrome site was a hiring over the property belonging to the Campbell and Wilson families, whose dairy at the time milked sixty-four cows. (See Figure 40.) Once they and their buildings were removed, the families were paid a fee of £23 16s 8d per month for the hire of their land, pending formal acquisition. Others hirings followed in the area east of Nudgee Road to accommodate the 310°M/130°M runway.[36]

[34] Roger J. Bell, *Unequal allies: Australian-American relations and the Pacific war* (Carlton, Vic.: MUP, 1977), p. 121; Sec DAP to DG DAP, memo dated 1 April 1942, Australian National Airways – Alterations to No. 1 hangar Archerfield, 2608, MP287/1/0, NAA (Vic.).

[35] Agreement between Commonwealth and Queensland Gliding Association dated 1 July 1935, Gliding bodies in Queensland, 5/108/71, MP115/1/0, NAA (Vic.).

[36] *CGG*, 29 June 1922, p. 1,086; Area Finance Officer, Dept of Air, BNE to Sec. Air Board, memo dated 31 July 1943, DWB Eagle Farm Qld – First extension to aerodrome – Hiring of property in Schneider Road, 7/1/1398, A705/1, NAA (ACT); P. A. Edwards, valuation dated 9 March 1942, Eagle Farm Aerodrome Hirings, QL805 Part 4, J56/11, NAA (Qld). Before it was extended after February 1942, the 045°M/225°M runway ran between the Doomben Straight Six and Schneider Road.

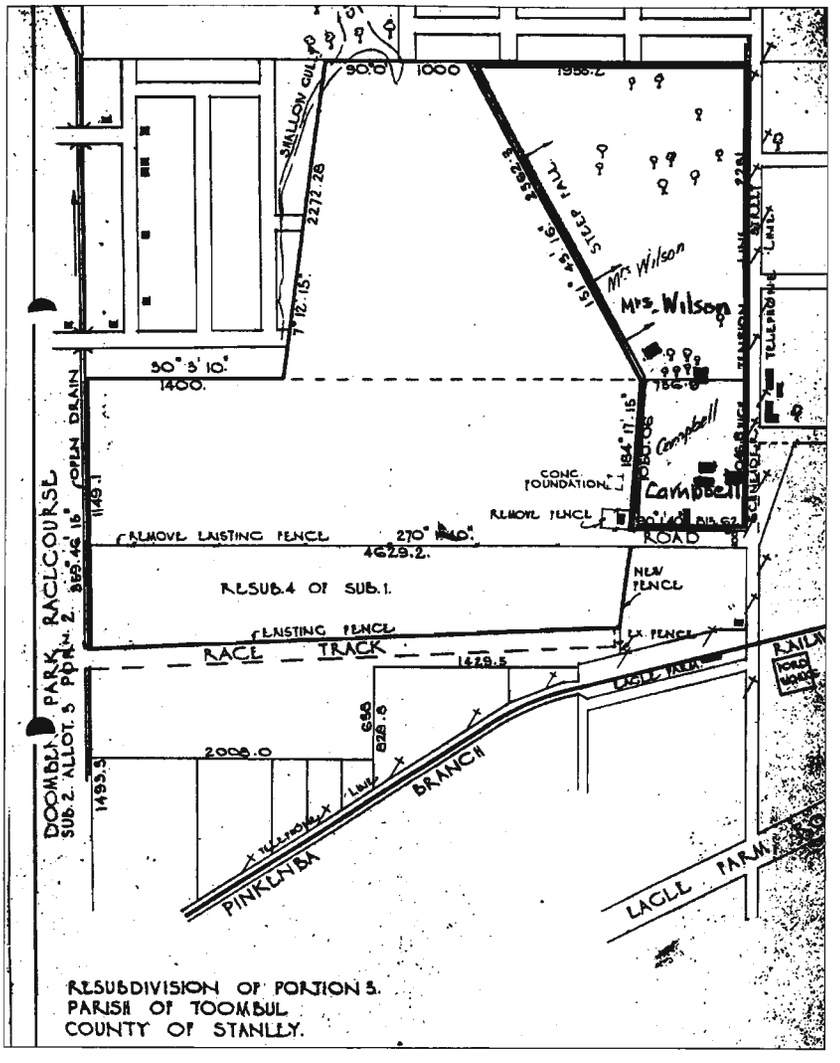

Figure 40: Amended plan of No. 2 EFTS Eagle Farm showing the land belonging to the Campbell and Wilson families.
Source: RAAF Aerodrome – Eagle Farm Qld – Marginal area control of sites, 7/1/1263, A705/1, NAA (ACT)

In time the Commonwealth instituted proceedings through the National Security (General) Regulations for compulsory acquisition of the land originally hired. This was in line with a general direction by the War Cabinet not to erect buildings on other than Commonwealth land. According to then DCA aerodrome inspector Dr K. N. E. (Bill) Bradfield, Treasury regulations also stated that 'Commonwealth monies could only be spent on Commonwealth-owned land.'[37]

Urgency also affected the financial arrangements made at Townsville. In 1940 the Townsville City Council constructed a new aerodrome with two runways at Garbutt to replace the smaller Ross River Aerodrome. In October 1941, just weeks prior to the

[37] Dr K. N. E. Bradfield, interview with author, 4 April 2001; DDG of Allied Works to SG and CPO, memo dated 9 February 1943, Eagle Farm Aerodrome, QL805 Part 1, J56/11, NAA (Qld).

Japanese entry into the war, the US approached the Commonwealth requesting upgrading of those runways, a job undertaken subsequently in six weeks by the Queensland Main Roads Commission (QMRC). In 1942 the council-owned aerodrome was taken over by the Department of Air. RAAF squadrons are still based at Townsville's Garbutt Airport today.[38]

At Rockhampton the requirements of defence again overrode the rigidity of Treasury regulations. This prewar civil aerodrome owned by the Rockhampton City Council was an important refuelling site on the coastal route. Rockhampton's aerodrome was constructed originally on land leased by Harold Fraser of Rockhampton Aerial Services (RAS) from a private owner. The Rockhampton City Council became the aerodrome owner in 1934 when it resumed the land. From 1939 to 1944 the Commonwealth spent £180 000 upgrading this aerodrome it did not own. According to Dr Bradfield, who was involved in the negotiations, the Council did not want to sell the aerodrome.'[39] At the end of the war, Rockhampton Aerodrome was acquired for what the Rockhampton City Council calculated it had spent in resumptions and legal costs since becoming owner, a figure of £7 445 8s 11d.[40]

On Brisbane's aerodromes, 1942 was the peak year for expansion. The Queensland Main Roads Commission (QMRC) working in conjunction with the AWC oversaw the construction of the first runway built on Eagle Farm Aerodrome (045°M/225°M). Construction required over 100 trucks carrying in total 33 000 cubic yards (25 230 cubic metres) of fill from other parts of the city. In addition 12 000 cubic yards (9 174 cubic metres) of gravel and 1 250 cubic yards (995.7 cubic metres) of screenings for bitumen were needed to consolidate the 'plastic delta material' which had so plagued the aviators of the 1920s. Housing an assortment of allied and enemy aircraft, eight hangars of various construction types were built. USAAF personnel erected some. By the end of 1944 the QMRC has spent £559 687 on the construction of runways, site preparation and the relocation of houses in conjunction with the aerodrome at Eagle Farm.[41] (See Figure 41.)

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[38] *Townsville Daily Bulletin*, 15 July 1969, p. 11.; Roger R. Marks, *Queensland airfields WW2 – Fifty years on* (Mansfield, Qld: R. & J. Marks, 1994), pp. 61-8.

[39] Dr K. N. E. Bradfield, interview with author, 4 April 2001.

[40] A. C. Tulloch to DDG for Allied Works, memo dated 13 October 1943, A. R. McComb to Sec. Dept of Interior, memo dated 11 January 1944, Town Clerk RCC to Hirings Officer AMF, letter dated 22 April 1944, Rockhampton Aerodrome, QL422 Part 1, J56/11, NAA (Qld).

[41] QMRC, *The history of the Queensland Main Roads Commission during World War Two* (Brisbane: Qld Govt Printer, 1949), p. 17. Until June 1944 hangar no. 7 on Eagle Farm housed the Allied Technical Air Intelligence Unit that assessed the flying attributes of captured Japanese aircraft.

Figure 41: Aerial view of Eagle Farm Aerodrome showing three runways, circa late 1943
Source: Author's collection

The landing runs of 1 500 metres on Archerfield Aerodrome were considered marginal for the US bombers which began arriving by sea and air from late in 1941. Given that it was an established, government-owned aerodrome, acquisitions rather than hirings were made over the privately owned land needed for extensions to the north and west of the existing field. Charles Franklin, parts of whose dairying property had been purchased already by the Commonwealth in 1930 and 1936, was paid £7 000 for his remaining 162 acres 2 roods 19 perches (65.95 ha.). Early in 1942 QMRC workers removed or relocated the houses involved and cleared the stands of trees which had formerly provided shade for livestock. (See Figure 42.)

Figure 42: RAAF A20-139 rebuilt by ANA. Trees in the right distance were removed when Archerfield was extended to the north and west early in 1942
Source: Trevan Jackson Collection

In July 1942 the estimated cost of this extension was placed at £34 282. Table 10 shows how the proportions for funding were distributed between the user groups involved. It has yet to be established which group paid the shortfall amount of £8 425.

Table 10: Provision of funding for extensions to Archerfield, 8 July 1942.[42]

CONTRIBUTOR OF FUNDS	FUNDING DETAILS	AMOUNT
RAAF	Directorate of Works & Buildings requisition 41/42-1025	£10 000
DCA	Requisition 1941/1942:277	£2 170
DCA	Requisition 1941/1942:278	£1 300
USAAF		£11 000
RAAF	Directorate of Works & Buildings requisition 41/42-1025	£1 387
	Total	£25 857

[42] W. H. Mehaffey to H. W. Barker, memo dated 17 February 1943, Archerfield RAAF – Extension of landing area N and W sides, K293, BP243/1, NAA (Qld).

To allow contractors APL, ANA and QEA greater covered space in which to repair aircraft for the USAAF, hangars were extended through the Aircraft Production Commission. In the original civil part of the aerodrome, the Allied Works Committee spent £19 273 enlarging hangars no. 1, 3 and 4. (See Figure 43.) This amount was debited against the quarter of a million pounds allocated to the establishment of facilities for US Army Air Corps under Reverse Lend Lease.[43]

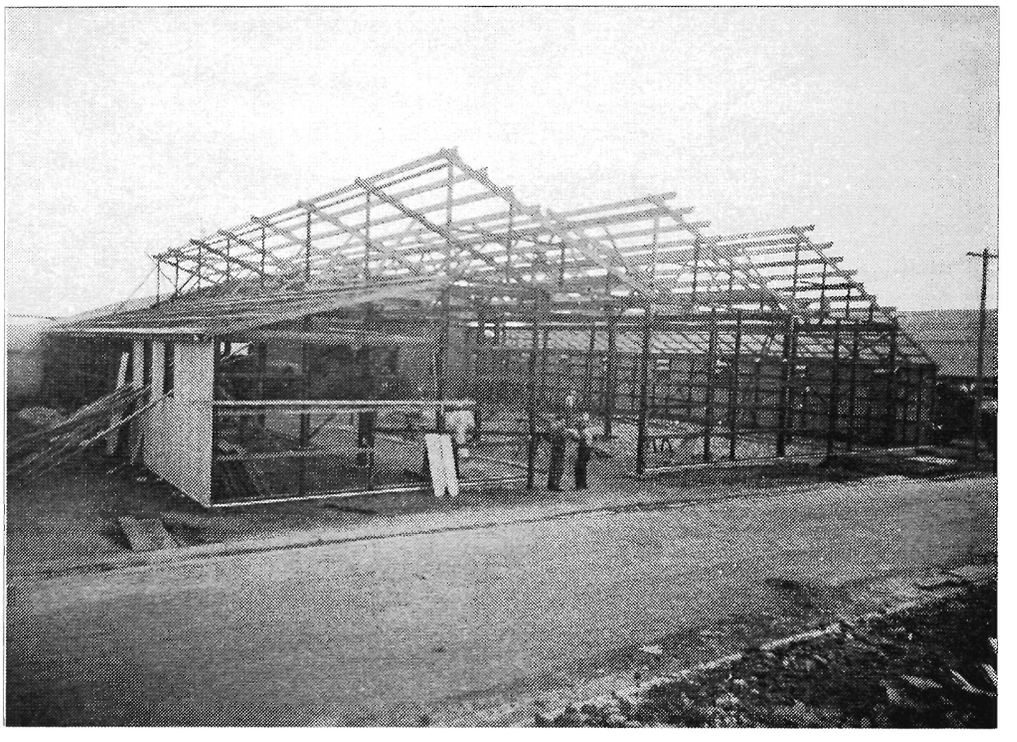

Figure 43: Extension to hangar no. 3 at Archerfield under construction in 1943
Source: Photo no. 2114, NN, BP34/1, NAA (Qld)

In 1943 two lean-to extensions were constructed along the southern wall of ANA's hangar no. 6. The company also was allocated the use of two of the three Bellman hangars in the South Camp area. Another large new repair facility (building no. 25) was erected south-east of the DCA control building, likewise for use by ANA. Its estimated cost in 1942 was £50 910. Three levels of offices, stores and workshops were situated in annexes on either side of a central servicing area with an opening to the tarmac of 150 feet (46 metres).[44]

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[43] Sec. DAP to DG DAP, memo no. 6602 dated April 1943, Servicing of aircraft – Alterations to No. 3 Hangar, Archerfield, 1819, MP287/1, NAA (Vic.).
[44] A. R. McComb to Sec. Dept of Interior, memo dated 14 July 1943, Archerfield Aerodrome – Lease ANA hangar no. 6, QL278, J56/11, NAA (Qld); H. M. Rolland to DDG of Allied Works Brisbane, memo dated 10 June 1942, Archerfield Aerodrome – Extension of hangar and workshop for ANA Ltd,

The largest single repair facility was the Aircraft Repair Unit (ARU) built to the east of the aerodrome. In March 1943 CCC workers commenced construction of the first of five igloo buildings, the largest structures in the ARU. By November 1944 this enclosed facility housed a total of thirty-five buildings and was connected by formed taxiways across Beatty Road, then closed to civil traffic, to the airfield proper. The Kerry Road ARU was constructed on 142 acres 1 rood 1 perch (57.5 ha) of land acquired for £10 590 1s 7d by the Commonwealth formally in February 1944.[45] Actual building construction costs have yet to be located, though some of the ground preparation would be included in the QMRC's total wartime expenditure on Archerfield of £207 429.[46] (See Figure 44.)

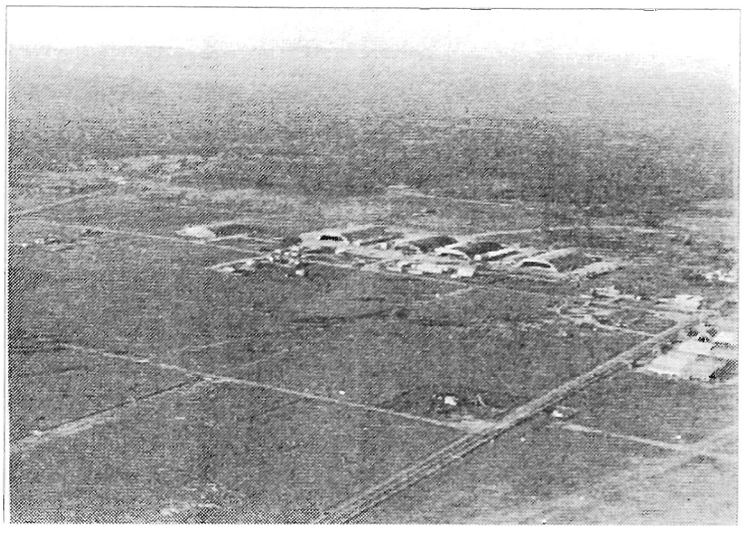

Figure 44: Aerial view of the igloo hangars built to house the ARU, Archerfield, July 1945
Source: Enclosure 82A, RNNAA – Kerry Road, Archerfield Qld, Buildings and services, 171/16/240 Part 1, A705/1, NAA (ACT)

The Commonwealth took most of the third period between 1945 and 1949 to establish those policies regarding airlines and aerodromes that were altered little until the 1980s. The systems thus established entered an era of growth, competition and consolidation, one marked by heavy government investment in facilities to ensure air transport as a growing industry was not hindered by lack of ground infrastructure. This was in essence the message given by Prime Minister Chifley in December 1946 when he announced:

S7, BP243/1/0, NAA (Qld); Hangar no. 25, blueprints, proposed hangar and workshop at Archerfield Aerodrome Qld for ANA, W11943, J2774/1, NAA (Qld).

[45] 'Defence construction in Queensland and Northern Territory', *CPP*, 2, (1943–44 & 1944–45), p. 1,653; Form 335 dated 20 February 1951, Archerfield – General extension, QL718 Part 2, J56/11, NAA (Qld).

> Capital cities' airfields necessary for international air services and airports on regularly operated domestic air services, which involve expenditure in runways, buildings and other airways' facilities, will be owned, developed, maintained and controlled by the Commonwealth.[47]

In 1945 the DCA controlled 216 government-owned aerodromes and five flying-boat bases. To this existing number, another twenty ex-RAAF sites were added in the financial year to 30 June 1946.[48] Some were like the base aerodromes at Bundaberg and Maryborough, established as EATS training venues and no longer required. Each would be an asset to the local community. According to the editor of the *Sydney Morning Herald* these aerodromes, while not on the civil air routes, might serve a town or approved route in the future. The *SMH* also indicated the Commonwealth would be unwise not to continue the maintenance and upkeep of the majority of its components, having paid for the urgent development of the system in the first place.[49]

Compared to the prewar years, the budget allocated to the DCA from 1942 acknowledged its growing importance. The first priorities were to upgrade the capital-city aerodromes so that the heavier DC4, DC6 and Convair aircraft being purchased by ANA and the new TAA could be landed safely and with minimum wear and tear to both aircraft and runway. Nationally in 1947 the DCA authorised £3.034 million for the development of airports and the erection of associated buildings.[50] Work had been proceeding at Essendon Aerodrome since July 1946. The first stage there involved a concrete runway costing £300 000. Two additional bitumen runways brought the total cost for this project to £900 000.[51]

In 1947 an additional £2.643 million was authorised for the upgrade of Sydney's KSA, as elaborated on the master plan developed by Dr Bradfield. KSA's two main runways in 1940 had been extended to approximately 3 000 feet (914 metres) and sealed with bitumen. They were extended again in 1943–44. Within three years of this latter extension, as Sydney's role as an aerodrome for international air traffic grew more important, work commenced on the first part of Bradfield's three-stage plan. Modified

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[46] QMRC, *The history of the QMRC*, p. 17.
[47] *CM*, 20 December 1946, p. 3.
[48] Stanley Brogden, *Australia's Two-airline policy* (Carlton, Vic.: MUP, 1968), p. 57; Butler, *Flying start*, p. 73.
[49] *SMH*, 20 December 1946, p. 4.
[50] Butler, *Flying start*, p. 81.
[51] Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 201; *Essendon – Melbourne's airport* (Melbourne: Education and Information Branch, Department of Civil Aviation, 1950), p. 3.

at a later date to two major runways instead of four, it was completed in 1954, by which time costs had escalated to £8.5 million.[52]

The costs of such massive work on airfields, as well as the burden of extending air traffic control and radio navigation facilities across the continent, were to be balanced in part by the introduction of charges for the use of airways facilities. Director-general of Civil Aviation Richard Williams issued the first schedule of fees and charges, effective from 10 August 1947. Aircraft were divided into four classes, depending on their level of usage. Airline companies challenged the charges in the High Court. The matter was resolved through the *Airlines Agreement Act (1952)*, as a consequence of which their charges were reduced. A 10.5% tax on the fuel used in aircraft also existed, though revenue from this was not directed towards the cost of providing aviation services and facilities.[53]

Between 1945 and 1949, on government-owned aerodromes away from the capital cities, RAAF facilities were dismantled, relocated or auctioned off to help assuage the postwar housing shortage. From the former RAAF base on the DCA-owned Cootamundra Aerodrome, dismantled buildings were transported to Laverton in Victoria and Richmond, Bourke and Bankstown in New South Wales, as well as to sites in the local area to serve as accommodation for community groups. Some buildings were retained for use by civil aviation companies.[54]

Similar arrangements were made regarding some of Archerfield's RAAF buildings. Twenty of the Sidney Williams prefabricated huts which made up No. 23 Squadron's accommodation on Archerfield were removed in 1947 to No. 2 Replenishing Centre at Helidon. The Commonwealth Disposals Commission sold smaller huts, measuring 16 feet (4.8 metres) by 20 feet (6 metres), for £10 each.[55]

In line with the policy of owning aerodrome resources, the DCA elected to purchase those structures built prewar by private individuals or companies on leased sites at government-owned aerodromes. In the case of hangar no. 6 on Archerfield, this was complicated by the fact that two extensions to the original 1939 hangar had been made

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[52] Jennifer Gall, *From bullocks to Boeings: An illustrated history of Sydney Airport* (Canberra: AGPS, 1986), pp. 50-7; Parnell and Boughton, *Flypast*, p. 250.
[53] D. M. Hocking and C. P. Haddon-Cave, *Air transport in Australia* (Sydney: Angus & Robertson, 1951), pp. 126-34.
[54] Ben Dannecker, *Cootamundra aerodrome* (Essendon, Vic.: B. Dannecker, 1976), pp. 30-1.
[55] Div. Property Officer RAAF Brisbane to DWB, memo dated 21 March 1947, Sales advice no. 2204 dated 20 August 1947, DWB – Property – Archerfield Qld – Dispersal areas – Camp site – Sewerage works – Disposal of assets, 171/106/727 Part 1, A705/1, NAA (ACT).

by the Department of Aircraft Production in 1943. In resolution of the matter, DCA eventually bought out ANA's interests for £9 074 12s 11d in May 1952.[56]

The years 1946–49 were a transitory period when both Eagle Farm and Archerfield aerodromes were used by civil aviation traffic. By September 1946 though, plans of the former showed how it would be occupied in future as Brisbane's primary aerodrome. One hangar each had been allocated to the DCA, QEA, APL, SWA and ANA. TAA had been given two igloo hangars (nos. 6 and 7) and the Butler hangar (no. 8). Two additional igloo hangars (nos. 9 and 10) from New South Wales were re-erected on Eagle Farm in 1948 at an estimated cost of £59 752.[57] The transition period ended when the last ANA DC3 departed from Archerfield on the afternoon of 29 May 1949.

The financial and administrative control that the Commonwealth exerted over air transport until 1939 had grown tighter during the Second World War. Those six years of conflict provided both the impetus and the massive funding necessary for the modernisation of sections of the Australian airport system. By 1949 the maturity of both the aerodrome and airline systems, evident in greater capital expenditure on technologically advanced components, was a matter over which the Commonwealth would not easily relinquish control.

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[56] Plan Z43 dated 14 May 1943, General expenses, Dept of Interior dated May 1952, Archerfield Aerodrome – Lease ANA hangar no. 6, QL278, J56/11, NAA (Qld).

[57] Eagle Farm, Site plan of buildings, W19141, J2774/1, NAA (Qld); Eagle Farm – Site plan for additional hangars, W20679, J2774/1, NAA (Qld); T. R. Henderson to DG Dept of Works and Housing, memo dated 29 November 1949, Eagle Farm DCA erection of igloo hangars, CA195 Part 2, BP881/1, NAA (Qld).

Chapter 17

'So important is the question of airport design at this moment that its problems cannot be solved lightly.'[1]

Decisions dictated by political and economic constraint or largesse, while important in an overall sense, did not have as direct a day-to-day influence on the Australian airport system between 1940 and 1949 as two key areas of technology—aircraft development and the engineering of aerodromes. Fortunately the wartime realisation that future aircraft would be faster and heavier, while requiring more exacting standards where they landed, established a growing awareness by the system's managers of the need for the Australian airport system to meet those new standards.

During the 1930s and 1940s aircraft evolved into sophisticated air transport vehicles more suited to sites with long runways and advanced ground support for radio navigation and communication. As a consequence of the increased capacity of these aircraft, pressure was placed on the providers of aerodrome facilities to ensure the safety and comfort of greater numbers of passengers. Both these threads contributed to the immediate postwar airport-planning situation which architect Robert Bruegmann has described as 'quite fluid'.[2]

The influence of improvements made overseas in aircraft engine and aerodynamics on the style of the Australian airport system can be studied, as in the previous chapters in this section, through three periods.[3] In the first, between the beginning of the Second World War and the last quarter of 1941, very few aircraft unsuited to Australian aerodromes were introduced. What pressure there was for civil engineering improvements on aerodromes came from increased usage by training aircraft of various sizes.

Between late 1941 and August 1945, the second period, new aerodrome construction linked to advances in aircraft technology had a geographic rather than a national consistency. The heaviest military aircraft, USAAF B17 (Fortress), B24 (Liberator) and B26 (Marauder) bombers, were more likely to be positioned in Queensland and the

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[1] *Aeroplane*, 12 May 1944, p. 526. Sir Frederick Handley Page on airports and the aircraft designer.
[2] Robert Bruegmann, 'Airport city', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Air Institute of Chicago & Orestel-Verlag, 1996), p. 198.

Northern Territory. Their short-term requirement for landing strips of up to 7 000 feet (2 133 metres) was satisfied by construction undertaken by the Allied Works Council (AWC), in accordance with USAAF standards in runway length and surface condition.

During the third period from 1945 to 1949, major Australian capital-city aerodromes were upgraded to cater for advanced types of propeller-driven civil airliners, such as the Douglas DC4, DC6 and Lockheed Constellation. Although these particular aircraft had been introduced overseas during the late 1930s and early 1940s, apart from the DC4 they had not flown regularly into or around Australian airspace.[4] Having stated in 1946 its intention to control the major aerodromes, the Commonwealth created, extended or reconditioned runways and generally provided the ancillary services that the postwar airlines needed. Other technology-related changes during this period were the establishment of secondary aerodromes in capital cities and a rationalising of the number of flying boat bases.

Transport historian B. K. Humphrey claimed the Second World War placed the victorious nations fifty years ahead in air transport technique, aeronautical knowledge, the development of flying equipment and in public acceptance of this new means of getting around.[5] As a general statement this is true, but must be qualified by the fact that until the introduction into service of the jet-powered Havilland Comet in 1952, aircraft technology remained on a plateau of refinement of existing components, rather than a progression into a new phase of major innovation.[6]

During this period of refinement lasting between the mid 1930s and the late 1940s, the speed in cruise of commercial aircraft increased from 170 mph (273 km/h) to 330 mph (531 km/h). At the same time the distance an aircraft could travel in still air, referred to as range, increased from 600 miles (966 kms) to 4 760 miles (7 660 kms). Operating costs fell 50%, a significant factor in the reduction of government subsidies. Because it was economic and efficient, the propeller-driven, all-metal, low-wing monoplane design of passenger aircraft remained the standard.[7] Table 11 below reveals the progression in size, speed and engine power of land-based aircraft flown in Australia during this period. Other than the DH84, DH86 and DH89, all were monoplanes.

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[3] Though Australia did have an aircraft manufacturing industry during this period, Britain and the United States produced most of the civil and military aircraft flown.
[4] The DC4 in its military form was used for courier flights around the globe during the war.
[5] B. K. Humphrey, 'Nationalization and the independent airlines in the United Kingdom, 1945–51', *Journal of Transport History*, 3 (1976), p. 270.
[6] Ronald Miller and David Sawers, *The technical development of modern aviation* (London: Routledge & Kegan Paul, 1968), p. 128.
[7] P. Brooks, *The modern airliner: Its origins and development* (London: 1961), p. 85; Miller and Sawers, *The technical development of modern aviation*, p. 128.

Table 11: Comparison of selected propeller-driven, passenger aircraft flown in Australia between 1939 and 1949.[8]

AIRCRAFT	AUSTRALIAN OPERATOR/S	PAX.	PROTOTYPE FIRST FLOWN	SPEED	NO. OF ENGINES
De Havilland DH84 Dragon	RAAF; NQA; APL; MMA; C. A. Butler.	6	24 November 1932	109 mph (175 km/h) at cruise	2
Douglas DC2	ANA; RAAF.	14	1 July 1933 (DC1)	Not known	2
De Havilland DH86	QEA; MMA.	10	14 January 1934	142 mph (228 km/h) at cruise	4
De Havilland DH89 Dragon Rapide	RAAF; APL/QAL; RAS; AOA; ANA.	6	17 April 1934	132 mph (212 km/h) at cruise	2
Avro 652A Anson	RAAF; APL/QAL; EWA; MMA; Airlines (WA); J. Woods.	8	December 1935	170 mph (272 km/h) max. in level flight	2
Douglas DC3	ANA; TAA; APL/QAL; RAAF; BAT; Ansett.	28	17 December 1935	170 mph (274 km/h) at cruise	2
Douglas DC4	ANA; TAA; QEA.	52	7 June 1938	227 mph (365 km/h) at cruise	4
Lockheed L18 Lodestar	QAL; QEA; Guinea Airways.	14	21 September 1939	259 mph (417 km/h) max. in level flight	2
Avro 691 Lancastrian	QEA.	13	Lancaster flown first in late 1940	275 mph (443 km/h) max. in level flight	4
De Havilland DH104 Dove	Southern Airlines; Airlines (WA).	8–11	25 September 1945	210 mph (338 km/h) max. in cruise	2
Lockheed Constellation	QEA.	71–95	9 January 1943	323 mph (520 km/h) at cruise at 20 000 ft	4
Douglas DC6	BCPA.	48–52	15 February 1946	315 mph (507 km/h) at cruise	4

In Australia between late 1939 and late 1941 domestic civil operations placed no additional pressure on the existing airport system, other than by increased usage. In 1939 the most technologically advanced fleet of domestic passenger aircraft was ANA's Douglas airliners. Though their minimum takeoff length was greater than that provided at many rural aerodromes, ANA's passenger aircraft were quite capable of operating between capital-city aerodromes, licensed under the DCA's then minimum requirement of 2 400 feet (730 metres), with approaches clear to a slope of one in fifteen.[9]

[8] Michael J. H. Taylor, ed., *Jane's encyclopedia of aviation* (Danbury, Conn.: Grolier Educational, 1980).

[9] Jack L. Davis, History of Australian aerodromes, unpublished manuscript, 1988, p. 8.

Though some twenty to twenty-five new aerodromes were planned or constructed around the coast from Cooktown in Queensland to Wyndham in Western Australia in 1940 and 1941, little change to the all-over grass style of aerodromes was required. The 'critical aircraft', the most complex model operated by the RAAF at the outbreak of the war, was the Avro Anson, a twin-engine, cantilever low-wing aircraft with a retractable undercarriage. The British-designed Anson was fabric covered and seated eight passengers. When they arrived, the new RAAF Lockheed Hudson aircraft likewise had no difficulties with landing or takeoff from aerodromes such as Archerfield, where their squadrons were stationed.[10]

As air traffic increased the operational inadequacies of the system's prewar civil aerodromes were revealed. On Sydney's Kingsford Smith Aerodrome (KSA) several near-collisions emphasised the unsuitability of the timber control tower constructed in 1937. These incidents warned again of a need for secondary aerodromes, in effect a separation of the technologically modern military and fast commercial monoplanes from the slower, fabric-covered training biplanes. Though at this stage such a separation was not possible, improvements were made from April 1940 when work commenced on sealed runways, one extending to 5 000 feet (1 463 metres), and a new DCA administration building complete with control tower. This continued into 1941.[11]

Archerfield Aerodrome had its share of accidents and incidents as air traffic increased. In February 1940, a civilian DH60 flown by instructor Charles Matheson and his pupil collided with a Wirraway, the military trainer sustaining damage to the leading edge (front) of the starboard (right) wing.[12] Shortly after, tenders were called for Archerfield's identical administration building and control tower. Work commenced on the £15 000 three-storey structure in January 1941.[13]

The pace of improvements to aerodromes quickened late in 1941. Between that year and August 1945, civil airline operations nationwide increased 55%, from 59 897 hours per annum to 93 055 hours per annum. More importantly, the RAAF obtained a range of medium and heavy bombers which it operated nationwide, while the USAAF brought

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[10] Douglas Gillison, *Royal Australian Air Force 1939–42* (Canberra: AWM, 1962), pp. 138-9; Entry dated 20 August 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT).

[11] Davis, History of Australian aerodromes, p. 10; Jennifer Gall, *From bullocks to Boeings: An illustrated history of Sydney Airport* (Canberra: AGPS, 1986), pp. 50-2.

[12] T. L. Amos to DG DCA, memo dated 21 March 1940, VH–UGN, VH–UGN Part 2, MP113/1, NAA (Vic.).

[13] *ABJQ*, June 1940 p. 8; *ABJQ*, January 1941, p. 12.

some 2 133 new aircraft on to Australian aerodromes.[14] The immediate impact could be seen where movements were concentrated. US military engineer Hugh Casey reported increased maintenance on the runways was required at Amberley RAAF base outside Brisbane. Though well-constructed, the base's runways had not been designed to withstand the exceptionally heavy loads carried in Allied aircraft.'[15]

The haste of arrangements, contemporary military censorship and the parochial nature of available secondary material all hinder an easy assessment of just how much new knowledge of runway construction US Army engineers transferred to Australian civil engineers and earthmovers at this time. In 1941 the company Sverdrup and Parcel of St Louis, Missouri, was contracted to provide architect-engineer services in conjunction with a USAAF ferry route to the Philippines. This involved the US engineering company in the re-development of Townsville's Garbutt Aerodrome late in 1941. Because they were already located in the South-West Pacific area (SWPA), the much-needed services of Sverdrup and Parcel were extended as the strategic situation worsened.[16]

The company's principal, engineer (later Colonel) Leif J. Sverdrup, arrived in Australia in May 1942. Approximately thirty architects, engineers and draftsmen from his company were based in Melbourne and directed to prepare airfield design blueprints suitable for the US Army's requirements and the Australian conditions.[17] Thereafter a transfer of technology in both directions occurred as experienced American aerodrome designers and Australian constructing authorities more accustomed to building roads set to the task of creating, often without adequate equipment or supplies, runways suitable for fighter and bomber operations.

Contractors Thiess Brothers helped make Eagle Farm Aerodrome operational early in 1942. The work was little different from the prewar road construction they were accustomed to doing; indeed the decomposed granite gravelling trucked in to consolidate the runways was the same. Reflecting on his relationship with the American

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[14] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 178; John Robertson, *Australia at war 1939–45* (Melbourne: William Heinemann, 1981), p. 223.

[15] Hugh J. Casey, *Engineers in theater operations*, vol. 1, *Engineers of the South West Pacific 1941–45* (Tokyo: Reports of operations USAAF in the Far East, SWPA Army Forces Pacific, 1947), p. 44.

[16] Karl L. Dod, *The corps of engineers: The war against Japan*, vol. 2, *United States Army in World War Two: The technical services* (Washington, D.C.: Office of the Chief of Military History, US Army, 1966), pp. 46-7.

[17] Dod, *The Corps of Engineers*, pp. 112-31.

engineers, Leslie Thiess' main comment was that he liked the 'quick, no-nonsense decisions and their ability to get things done fast'.[18]

Thiess' comments and Commonwealth Archive files both suggest that Australian airfield constructors of this period learnt to work faster, rather than to any different design. That sense of haste was evident in official correspondence. Early in 1942 the acting secretary of the QMRC complaining vigorously about his plant being idle because the Department of Interior was slow in removing those private houses in line with the extension to the NW/SE runway at Eagle Farm.[19] Patrick Thiess drove one of his family's bulldozers at the time. He recalled, 'It was three shifts, twenty-four hours a day. We had a new D7 and I don't think I got off it for thirty-six hours—could hardly open my jaws to eat.'[20]

The runway lengths predetermined by the USAAF were 3 000 feet for fighters, 4 000 feet for medium bombers and 5 000 feet for heavy bombers. Initially the arrangement of three intersecting runways favoured on civil airfields in the USA was to be adapted to Australia's prevailing local winds. As priorities changed this was amended to a two parallel runway layout.

Extensions already being made to the prewar civil aerodrome at Charleville were hastened in early 1942. Here an intersecting arrangement of three sealed runways, all greater than 5 000 feet (1 524 metres) in length, was built to cater for Charleville's importance as a refuelling stop on the Inland Ferry Route. At 6 000 feet (1 828 metres), runway 131°M/311°M was marginally in excess of the longest runway at KSA prior to its upgrading in 1947.[21] Five hangars were constructed at the same time as the runways. Given the reduced need for an inland military air route beyond the reach of enemy aircraft, by August 1943 three of these buildings were on their way to Eagle Farm for re-erection there.[22]

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[18] Davis, History of Australian aerodromes, p. 11; Joan Priest, *The Thiess story* (Brisbane: Boolarong Publications, 1981), p. 38.
[19] A/Sec. QMRC to WD BNE, memo dated 1 April 1942, Eagle Farm Hirings, QL805 Part 1, J56/11, NAA (Qld).
[20] Priest, *The Thiess story*, p. 39.
[21] *AM*, September 1954, p. 36; Roger R. Marks, *Queensland airfields WW2 – Fifty years on* (Mansfield, Qld: R. & J. Marks, 1994), p. 217. Charleville today uses two of those original runways, 300°M/120° and 360°M/180°M. The former is now 5 000 feet (1 524 metres) in length, as opposed to its original length of 6 000 feet (1 828 metres). The latter is today 3 500 feet (1 067 metres), somewhat shorter than its wartime 5 112 feet (1 558 metres).
[22] Marks, *Queensland airfields WW2*, pp. 129-31; Divisional Works Officer for Air Services to D/DG of Allied Works, BNE, memo dated 3 August 1943, AAC Eagle Farm – Hangars erection – also at Charleville, KS56/3, BP243/1, NAA (Qld).

In May 1942 work commenced on a two runway and taxiway complex for US forces at Mareeba on the Atherton Tableland. The sealed gravel N/S runway had an effective length of 7 550 feet (2 301 metres), longer by 15 metres than the 156°M/236°M runway at KSA Aerodrome after its extension in 1968. These runways were commonly used by B17 Fortress aircraft with a maximum takeoff weight of 29 170 kgs.[23] The two runways at Mareeba did not intersect. This layout reflected two influences. The first was a notion that an enemy bomb exploding on the intersection would put the whole aerodrome out of commission. The second was a change in policy to avoid the difficulty and expense of finding and preparing the larger area of level land required by intersecting runways.[24]

The desire for adequate length with cleared approaches was a primary factor in aerodrome construction or extension during this period. Archerfield in 1941 had a maximum landing run available in the NE/SW direction of 5 200 feet (1 584 metres).With the arrival of US forces in December 1941, arrangements were made hastily for its extension. Ensuing accidents provided additional evidence of the shortcomings of Archerfield's all-over grass surface. They proved that grass, or a soggy surface created by rain and overuse, was not safe for the technologically more advanced aircraft wanting to make use of it. Archerfield had to be extended to allow for runs of 6 000 feet (1 828 metres) in any direction.

Engineer Trevan Jackson, working in 1942 in hangar no. 6, explained how Archerfield's insufficient landing length affected him:

> The field was really too short for B26 Marauders. On late afternoon landings the Goodyear disc brakes could be seen inside the wheels glowing red-hot when they stopped. The same thing applied to Liberators [B17s] and we had to make a special press with a seven-ton hydraulic jack to remove the tyres which vulcanised to the wheel. In most cases they tore to pieces as we removed them.[25]

Aircraft landing speed is related to wing loading. Mathematically, wing loading is the gross aircraft weight divided by the area of its wings. As aircraft designer Frederick Handley Page explained in 1944, 'For a given size of aircraft, a higher wing loading means faster and longer takeoff runs and faster and shallower approaches and

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[23] Marks, *Queensland airfields WW2*, p. 210; Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 276. The current day Mareeba Aerodrome uses the 1942 E/W runway (280°M/100°M), which had been reduced in length to 4 937 feet (1 505 metres).
[24] Hugh J. Casey, *Airfield and base development*, vol. 6, *Engineers of the South West Pacific 1941–45* (Tokyo: Reports of operations USAAF in the Far East, SWPA Army Forces Pacific, 1951), p. 424; Dod, *The Corps of Engineers*, p. 218.

landings.'[26] In the 1930s designers in America adopted the stressed-metal skin design of earlier German aircraft in an attempt to gain extra speed and carrying capacity. Lighter and stronger, this wing then allowed more weight to be carried for the same area, effectively increasing wing loading. What resulted was a general increase in wing loading from 14 lb per square foot for the Avro 10 of the late 1920s to 34 lbs per square foot for the DC4 of the late 1930s. The wing loading of the B26 Marauder was much higher.[27]

Aside from its problems of insufficient length in which to land, other features had influenced the rejection of Archerfield as the site for the aircraft erection depot which the USAAF wanted to develop in Brisbane. Archerfield was too far from the docks on the Brisbane River and 'involved too long a truck haul of un-assembled aircraft shipments.'[28] So too was the RAAF Base at Amberley. The difficulties of trying to manoeuvre a DC3 fuselage at night between the docks and Archerfield or Amberley along Brisbane's indirect and hilly streets were soon apparent. ANA engineer Les Robinson rode in the company's utility on the first trip:

> We travelled from the wharf at Hamilton and brought those machines out to Archerfield via Gregory Terrace, Highgate Hill, wherever we could get through. It took about twelve hours to do the trip. The Americans thought it was too long...so with the next four they shortened the route by knocking the sides off the bridges...I think we halved the time.[29]

The seasonal presence of fog also emphasised the problem with Archerfield's low-lying location. On 27 March 1943, a fully loaded C47 belonging to No. 38 Transport Squadron departed early morning towards the south-west in fog, only to crash less than a kilometre beyond the airfield's southern boundary. Accident investigators concluded power might have been lost on one engine after takeoff. Conditions of reduced visibility obviously added to the pilot's problems. All twenty-three of the service personnel on board were killed, including three WAAAFs and two members of the US Army. At the time it was the nation's worst air accident.[30] The tragedy confirmed the common sense

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[25] Trevan Jackson, Random ramblings of an early bird 1934–51, unpublished manuscript, 2001, p. 28.
[26] *Aircraft*, 12 May 1944, p. 526.
[27] Miller and Sawers, *The technical development of modern aviation*, p. 49; Brooks, *The modern airliner*, p. 96.
[28] Casey, *Airfield and base development*, p. 2.
[29] Les Robinson, interview with author, 22 January 2001.
[30] *Age*, 29 March 1943, n.p.; Report No. 15 of March 1943, Accident to Douglas aircraft C47 near Archerfield on 27.3.43 – Court of inquiry, 32/18/154, A705/1, NAA (ACT). The C47 was the military

in planning for Eagle Farm, usually fog free, to be developed as Brisbane's postwar primary aerodrome.

Though the war continued until 1945, groups with a vested interest in air transport gave consideration to the style of the postwar system much earlier. In January 1943 the director-general of DCA, Arthur Corbett, outlined a network of twenty-two aerodrome 'distribution centres', roughly three hours flying time apart. His report argued that if Australia were to be served in the future by efficient air transport 'it must have aerodrome and air navigation facilities, whether twenty airliners or 200 use the facilities.'[31]

Navigation would be made easier because the capital-city aerodromes and important intermediate points on the major air routes were being supplied with advanced radio navigation equipment obtained as part of the Lend-Lease arrangements with the USA. On Archerfield the expansion of radio communication facilities that commenced in 1942 included a 500C transmitter. The new device provided point-to-point transmissions between radio stations, thus reducing the amount of administrative chatter on the radio frequencies dedicated to aircraft in flight. The transmitter could act also as a non-directional beacon (NDB). Suitably equipped aircraft now had another means of navigating, by establishing their bearing in compass degrees as they approached the NDB.[32]

Technician Ray White was responsible for servicing Archerfield's NDB in the late 1940s and referred to it as the 'big one we got from the Yanks. We called it the Wilcox because that was the brand on it.' This transmitter sent out the homing signal on long wave at 385 kHz.'[33]

On Archerfield from 1942 the DCA's radio operators were housed on the third storey of the new control building, immediately below the control tower cabin. Staff were rostered in shifts covering twenty-four hours a day. Radio-equipped aircraft approaching the aerodrome could fly the beam of the prewar Lorenz radio beacon, listen out for the Wilcox NDB, or request a course from the operator of the Adcock HF/DF

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version of the DC3. This accident occurred six years and one day after Stuart Cameron, taking off fog in the Stinson VH–UGG, crashed just beyond Archerfield's southern boundary.

[31] Submission by the DG of DCA – Postwar reorganisation: Outline of a plan for civil aviation, January 1943, Reports of Inter-Departmental Committees, Exhibit 3, MP183/16, NAA (Vic.).

[32] A. R. McComb to Sec. Dept of Interior, memo dated 24 August 1942, Archerfield – Extension of radio transmitter site – DCA, QL965, J56/11, NAA (Qld); Plan dated 28 August 1942, Archerfield RAAF Station, W/T transmitting building, W12073, J2774/1, NAA (Qld); Roger Meyer, *Aeradio in Australia* (Canberra: AGPS, 1985), p. 20.

[33] A. R. (Ray) White, interview with author, 4 January 2001.

(high frequency direction finding) receiver. This last, less popular navigation aid was capable of providing an accurate bearing on an aircraft within 150 kms. This was then relayed to the pilot. Archerfield's HF/DF station was located on 36 acres (14.7 ha) of land at the south-east corner of the Mortimer and Beatty Road intersection. Local children kept away as the site with its fences and aerials was considered too dangerous looking.[34]

After the war the more reliable and complex electrical engineering of the visual aural range (VAR) was introduced. The fenced compound for its aerials at Archerfield was in the north-west corner of the aerodrome. Through delays in the supply of equipment the VAR never functioned on Archerfield. Its components were relocated to Eagle Farm around 1949.[35]

During the Second World War the basic air transport network of pilots, aeroplanes and places to land evolved into an aviation system into which other ancillary systems such as radio and air traffic control were of increased importance. So too was aerodrome design and layout.

Civil engineer F. A. Phillips had given the theoretical background to runway design enough consideration to publish his ideas in a supplement to the *Australian Surveyor* in 1944. His treatise commenced with acknowledgment of the growing importance of the topic, and its lack of literature. When designing runways, he reported, he had found that 'methods as derived for road design...proved invaluable'.[36] But laying down runways created problems additional to that of road construction. These included grading to ensure adequate drainage, creating the correct curving on the surface and calculating the thickness of pavement, whatever the surface material. All contributed to additional expense.

In 1944, how the technological development of aircraft would affect runway requirements in the future was still a matter for conjecture. Phillips predicted that individual runways might need to be constructed for aircraft weighing 500 000 lbs (226 800 kgs). He suggested landing surfaces two or three miles (three to five kilometres) in length and costing the equivalent of 30–40 miles (48–65 kms) of first-

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[34] A. R. (Ray) White, interview with author, 30 December 2000; Ray Spring, interview with author, 17 January 2001; Meyer, *Aeradio in Australia*, pp. 17-18; SG & CPO BNE to Sec. Dept of Interior, memo dated 6 September 1939, Archerfield Aerodrome – HF/DF site acquisition, QL718/41, J56/11, NAA (Qld).

[35] A. R. (Ray) White, interview with author, 4 January 2001; Plan dated 11 September 1945, Archerfield Aerodrome – Manproof fence to radio range building, W17751, J2774/1, NAA (Qld); Meyer, *Aeradio in Australia*, p. 20.

class main road would be required.[37] This prediction eventually was realised with the February 1969 introduction of the Boeing 747 Jumbo jet for international flights.[38]

The refinements made to aircraft design during the Second World War had repercussions on aerodromes across the globe in the years that immediately followed. Not only did aircraft require concrete or bitumen landing surfaces, the number of runways and their layout affected the placement or re-placement of the terminal area. What Koos Borma referred to as the 'transporter configuration' continued into this fourth generation of airport. Aircraft still stood out on the aprons, separated from the terminals, and the passengers had to walk to their aircraft. This situation would change when aircraft technology advanced from the era of propeller driven aircraft into the jet age.[39]

With more people choosing to fly, the place of transition between the ground and the aircraft needed to be both larger and better equipped to handle passengers in safety, comfort and with minimum delay. Overseas, architects were beginning to have more influence than engineers in the location of buildings and the movement of people, horizontally or vertically, between ground and air.[40] Committed as it was to the re-use of ex-military buildings, or its newly constructed but old-style terminals, Australia was slow to follow overseas trends.

Architect Robert Bruegmann's description of the years between 1945 and 1949 as 'quite fluid' is most appropriate.[41] While aerodrome design was becoming a serious subject for study by both engineers and architects, all were clearly concerned about 'the size of the aeroplanes to be catered for during the next ten to twenty years, for, clearly, in building a modern airport costing millions of pounds the furthest possible penetration into the dim and distant future must be made.'[42]

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[36] F. A. Phillips, 'Modern runway design', *Australian Surveyor*, 10 (1944), p. 3.
[37] Phillips, 'Modern runway design', p. 47.
[38] Michael J. H. Taylor, *Jane's encyclopedia of aviation*, vol. 2 (Danbury, Conn.: Grolier Educational, 1980), pp. 330-9; Gall, *From bullocks to Boeings*, p. 66. With a maximum takeoff weight of 805 000 lbs (365 140 kgs), the Boeing 747 now operates comfortably from most international airports. Australia's pre-eminent international airport at Mascot was extended in 1969 to 13 000 feet (just under 4 kilometres) to cater for the Boeing 747 and the supersonic Concorde.
[39] Koos Bosma, 'European airports 1945–95', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Art Institute of New York & Prestel-Verlag, 1996), p. 53.
[40] David Brodherson, 'An airport in every city: The history of American airport design', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Art Institute of Chicago & Prestel-Verlag, 1996), pp. 81-3.
[41] Bruegmann, 'Airport city', p. 198.
[42] *Aircraft*, 8 December 1944, n.p.

The provision of runways, control towers and concrete aprons of an acceptable standard had been the responsibility by municipal airport owners in the USA from the 1930s. In postwar Australia, as in Britain, exactly how to integrate runway length, layout and divergence, multiple parallel runways, flightways and clearances, loading bays, airport buildings, hangars and workshops fell to aviation administrators. In Australia primary debate centred on the minimum number of runways, their length and the overall layout of southern capital-city aerodromes that had been neglected during the war.

In Britain in 1944 the Air Ministry published the length and width needed for aircraft in the immediate postwar period. These are summarised in Table 12. Aircraft designer Sir Frederick Handley Page found them unnecessarily long, believing further technological refinement of aircraft could reduce the minimums. Pilots conversely preferred long runways because they provided 'insurance against the occasional hazards and minor failures, which, if they occur on a runway several times that demanded by an aeroplane's performance, lead to no costly accidents.'[43] Australia's system managers needed to establish the median between long and costly and short and unsafe.

Table 12: Requirements of particular types of air services.[44]

SERVICE	TYPICAL STAGE	MAX. EXPECTED GROSS WEIGHT	MAIN RUNWAY LENGTH	MAIN RUNWAY WIDTH
Trans-oceanic	3 000–4 000 miles	360 000 lbs	15 000 feet	1 800 feet
	4 828–6 437 kms	163 296 kgs	4 572 metres*	549 metres
Inter-continental	1 600–3 000 miles	180 000 lbs	11 250 feet	1 350 feet
	2 575–4 828 kms	81 648 kgs	3 429 metres	411 metres
Trans-continental	750–1 600 miles	90 000 lbs	10 050 feet	900 feet
	1 206–2 575 kms	40 824 kgs	3 063 metres	274 metres
Continental	200–1 000 miles	45 000 lbs	8 250 feet	600 feet
	321–1 609 kms	20 412 kgs	2 514 metres	182 metres
Locals	100–500 miles	30 000 lbs	5 700 feet	450 feet
	161–805 kms	13 608 kgs	1 737 metres	137 metres

* The longest runway at Brisbane International Airport in 2003, runway 010°M/190°M, is 3 560 metres in length.

Australian engineer Dr K. N. E. (Bill) Bradfield was a key system manager. The British figures are markedly higher than those he quoted during a 1946 address to the Town and Country Planning Association of Victoria. His estimates, listed in Table 13, were

[43] *Aircraft*, 12 May 1944, p. 525; *Aeroplane*, 18 August 1944, p. 187.
[44] *Aeroplane*, 11 February 1944, p. 150.

based on the forthcoming Provisional International Council of Aviation Organisations (PICAO) minimums.[45]

Table 13: Approximate runway lengths needed for types of Australian aircraft traffic, 1946.[46]

TYPE OF AIRCRAFT	DISTANCE IN FEET	DISTANCE IN METRES
International traffic	8 000 to 10 000 feet	2 438 to 3 048 metres
DC3 and DC4 aircraft	5 000 to 7 000 feet	1 524 to 2 133 metres
Smaller aircraft on lesser routes	4 000 to 5 000 feet	1 219 to 1 524 metres

Dr K. N. E. (Bill) Bradfield spent 1938, the third year of his Rhodes scholarship, working in England with the aerodrome engineering company Norman and Dawbarn. In line with the prewar British aerodrome situation of grass airfields, most of his projects had involved the problems of all-over landing surfaces, such as slope, drainage and the right mix of grass. Employed by the DCA as an aerodrome inspector in November 1939, he was by 1945 the Department's chief airport engineer and well placed to oversee the expansion needed postwar.[47]

In 1947 Dr Bradfield oversaw the development of KSA. The runways he planned were designed for wheel loads of 100 000 lbs (45 000 kgs), about twenty times the loading used for highway design. Here a transfer of the technology of runway construction clearly occurred. According to former DCA superintendent of airports Jack L. Davis, the strength of the runway was based on Works Department calculations 'developed from the USA's Corps of Engineers California Bearing Ratio methods for strength of flexible pavements.'[48] Further consideration though was given to how theories of concrete pavements should be adapted to Australia's drier soil sub-grades, lower traffic densities and absence of ice.

While the planning for airports remained in this fluid stage, debate also centred on whether a system of multiple runways was better than the minimum two. A staff writer for *Aeroplane* magazine in 1944 advocated the latter:

> Two runways if sited with reasonable care somewhere into the directions of the two most prevalent gale directions are sufficient for modern aircraft, and with a

[45] PICAO, when no longer provisional after 4 April 1947, became ICAO.
[46] K. N. E. Bradfield, *Airport design in relation to town planning* (Melbourne: Town and Country Planning Association, Vic., 1946), p. 2.
[47] Dr K. N. E. Bradfield, interview with Barbara Blackman, 7 November 1986, TRC 2127, NLA.
[48] Davis, History of Australian aerodromes, p. 10.

> crosswind limitation even as low as fifteen mph [twenty-four km/h] would be 99.8% useable throughout the year.[49]

By comparison, plans made in 1949 for the postwar reconstruction of Schipol Airport near Amsterdam allowed for a central terminal area surrounded by a tangential layout of six runways, with the possibility of four additional ones. After a protracted debate on the possibility of airport relocation, a scaled-down version of this plan was developed in the 1950s.[50] Dr Bradfield's master plan for KSA Aerodrome likewise was amended. His four-runway system reverted to two runways, in part because of the growing expense of construction.[51]

The technological development of large and reliable land-based aircraft for regular public transport (RPT) flights relegated flying boats and light or general aviation aircraft to roles secondary in importance. As an island continent, Australia had from July 1938 depended on the thirty-two passenger Empire flying boats for its fastest connection to London. According to QEA's Hudson Fysh, flying boats were first considered in the 1930s because land-based aircraft technology was inadequate. When the choice for aircraft upgrade had to be made in the mid-1930s, the four-engine Douglas DC4 had not been fully designed, while the DC2 and DC3 lacked adequate range and engine-out capability.[52] With their four power plants, flying boats provided multi-engine security and extensive range, as well as being able to alight on long straight stretches of still water. The heavy expense of extending or establishing aerodromes could be avoided. The Short S23 'C' class flying boats were also designed and built in Britain, making the QEA choice acceptable politically.

Although military flying boats performed admirable tasks in coastal surveillance in England and Australia during the war, design refinements over the same years placed land-based aircraft at a clear financial advantage understood by airline companies. After the war QANTAS reconstructed its international routes using converted Lancaster bombers and later Constellation aircraft rather than return to flying boats. In Australia the bases established to cater for the prewar amphibious aircraft were converted for use by domestic air-service operators until, through accidents and higher aircraft maintenance costs, flying boats were withdrawn from regular service in the mid-1970s.

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[49] *Aeroplane*, 21 July 1944, p. 76.
[50] Marc L. J. Dierikx and Bram Bouwens, *Building castles of the air: Schipol Amsterdam and the development of airport infrastructure in Europe, 1916–96* (The Hague: Sdu Publishers, 1997), p. 116.
[51] Davis, History of Australian aerodromes, p. 10.

At the end of the war Brisbane required a primary aerodrome for domestic services, a flying-boat base and a secondary aerodrome for light aviation aircraft. In 1946 the DCA chose Eagle Farm, with its three, intersecting, bitumen-surfaced runways, for the primary role. All existing igloo hangars were refurbished and allocated to the airlines and several 'used' buildings from other sites relocated there. Within a few years, however, it was apparent that the runways at Eagle Farm were unable to withstand the heavier aircraft of the postwar period. Over time the ever-present wet, sub-grade conditions necessitated extensive patching of the runways and taxiways on a daily basis.[53]

Flying boat bases had different problems. Part of the £15 million spent by the DCA on acquisition of new sites in the two years leading up to 30 June 1949 was on the Hamilton Flying Boat Base, located on the Brisbane River's northern bank between the Hamilton wharves and the BHP wharf. The problems associated with this site also were revealed gradually over ensuing years. These included the close construction of new wharves, industrial development on nearby Gibson Island and increased shipping movements on the river. Flying boat operations moved to Redland Bay, south of the mouth of the Brisbane River, in June 1953.[54]

Archerfield was designated the aerodrome to cater for the expected revival of private and light aircraft flying after the Second World War. In the United States a postwar boom in this type of flying was forecast 'due largely to civil registration of ex-military pilots and to the GI program.'[55] There, by late 1947, light aircraft were being used as a practical means of transportation in rural areas and for cross-country flying by wealthy individuals and corporate executives, though the expected boom did not eventuate until the 1960s.

In Australia Dr Bradfield warned that postwar growth making use of secondary and small town aerodromes might not be the same as in the USA. He suggested that the 'high upkeep costs of aircraft, with regular maintenance, housing and inspection to

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[52] Hudson Fysh, *Qantas at war* (Sydney: Angus & Robertson, 1968), p. 47. Engine-out capability is the ability of an aircraft to remain flying after the loss of one engine. Aircraft on scheduled passenger flights must meet certain minimum performance criteria related to loss of one engine.

[53] Davis, History of Australian aerodromes, p. 11.

[54] John Wilson, 'Civil Flying Boat Operations: Hamilton Reach and Redland Bay 1946–74', *AHSA Aviation Heritage*, 28 (1997), pp. 107-21. On 19 June 1951 £10 000 damage was caused to VH–TOB, the *Star of Papua*, when it collided with a 20 metre boat at 12:30 a.m. prior to takeoff for Sydney. The following October, VH–TOC collided on takeoff with an unlit bucket dredge. A flare had drifted out of position due to a strong tide. Two other incidents occurred in 1952.

[55] Lynn L. Bollinger and Arthur H. Tully, *Personal aircraft business at airports* (Boston, Mass.: Graduate School of Business Administration, Harvard University, 1948), pp. 11-12.

renew and hold the aircraft's Airworthiness Certificates' might keep numbers down.[56] Statistics would indicate they did. The 1939 peak of 1 123 licensed private pilots in Australia was not exceeded until 1951. Numbers of all aircraft registered in Australia only increased from 206 to 634 between 1945 and 1949.[57]

Between 1940 and 1949 the Australian airport system caught up with the technological development of aircraft, standardised by low-wing metal monoplanes, which had commenced in the 1930s. The presence in Australia of US engineers accustomed to building aerodromes, while an important vehicle by which the transfer of technology could occur, was not the only influence on how change occurred. Well-trained, home-grown engineers and technicians adapted overseas theories and design to Australian situations, making a system which, while a reflection of what was happening in other parts of the globe, was also an adjustment to Australia's smaller population, greater government control and large distances between centres.

During this period the primary artefacts within the Australian airport system made the leap from being grass airfields to enlarged sites served by intersecting concrete or bitumen runways. Though advances in technology made the changes inevitable, it was the intervention of the Second World War which dictated the pace.

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[56] Bradfield, *Airport design in relation to town planning*, p. 1.
[57] Butler, *Flying start*, p. 178.

Chapter 18

'After the war there is no doubt that there will be a demand for larger and better hangars and workshops at Archerfield and Parafield to meet the increase in civil flying operations for which plans are already made.'[1]

To a greater extent than at any other capital-city landing ground, the Second World War changed the built fabric of Archerfield Aerodrome. As well as embodying the physical resources of the society which constructed these buildings, the artefacts reveal the link between defence and the development of air transport which underscored system development during this decade.

Though the civil administrators of the aerodrome system were responsible for some of the built fabric, budgetary considerations and military expedience more often dictated the style of architecture which appeared on capital-city aerodromes. Often prefabricated and considered temporary, some buildings proved useful and were retained in the postwar years. In the architecture and engineering of selected buildings, the transfer of military styles of technology from Britain and the USA also is apparent.

Most land-use changes in the immediate vicinity of Archerfield Aerodrome occurred in 1942 and 1943. Even if some were of a temporary nature, they were markers of a general change towards industrial use of nearby land. With postwar growth, aerodromes constructed on the outskirts of any of the world's larger cities were subject to this trend. The wartime impact of environmental and social changes related to Archerfield Aerodrome will be discussed at greater length in the chapter that follows.

Once again the three periods into which this decade already has been broken reveal the changing priorities in the aerodrome system. Between late 1939 and late 1941 two new RAAF camps were constructed and the DCA control building was completed. Following the arrival of US forces in December 1941, additional land was acquired—to the north and west to extend landing runs and to the east for an Aircraft Repair Unit (ARU). In the third period from late 1945 to March 1949 those structures that were no longer needed were dismantled. Some were transported to other aerodrome sites; others helped alleviate the postwar crisis in housing.

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[1] A. B. Corbett to J. S. Storey, memo dated 4 September 1941, DG of DCA – Concerning desirability of erecting permanent hangars at Archerfield, Parafield and Bankstown, 1152, MP287/1, NAA (Vic.).

Archerfield Aerodrome's Second World War expansion began even before war was declared. As reported by *Aircraft* magazine early in August 1939, No. 23 General Purpose (GP) Squadron had moved in, 'pending establishment of the new RAAF station at Amberley, near Ipswich, Queensland,' at the time under construction but not operational.[2] An advance party of thirty of No. 23 Squadron's men constructed a temporary camp of field huts, along with two Bellman hangars, south of the Grenier pioneer cemetery. The hangars, numbered as buildings no. 71 and 72, were sited between the huts and the grass landing area. (See Figure 45.)

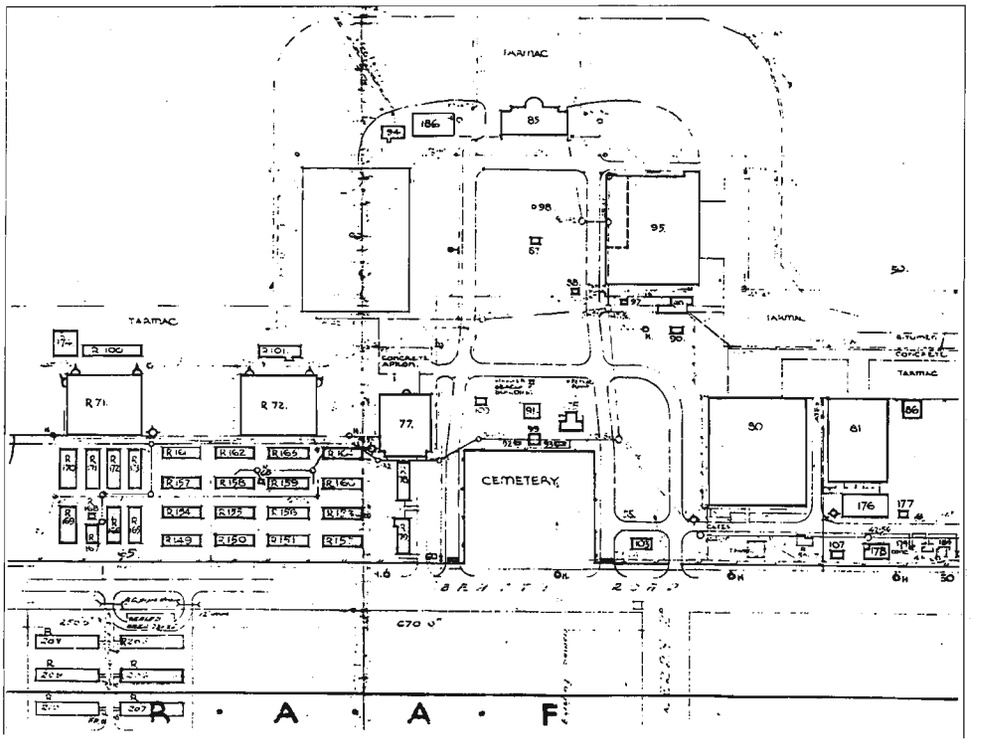

Figure 45: Plan of No. 23 Squadron camp circa March 1943. Key to buildings is in Appendix 3.
Source: Plan dated 21 March 1943, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld)

With the decision to establish a half Empire Flying Training School (EFTS) on Archerfield, builders Turner and Sons were contracted at a cost of £8 637 10s 0d to extend this first camp.[3] At least six of the new buildings erected by December 1939 were steel huts fabricated by Sidney Williams and Company. Each of these cost the Commonwealth £206. A 1997 report on Second World War structures in Queensland referred to such huts as lightweight, angle-framed steel structures with roof and wall

[2] *Aircraft*, 1 August 1939, p. 14.
[3] Department of Works to Turner & Sons, statement dated 21 December 1939, Report on application for extension dated 22 December 1939, Archerfield FTS – Erection of buildings, D55, BP243/1, NAA (Qld). A half school involved only half the usual complement of an RAAF school.

cladding of 26 gauge galvanised iron.[4] Such buildings would have been both hot in summer and cold in winter, a fact not lost on an anonymous RAAF poet who wrote:

> You'll never forget Archerfield,
> You'll never forget the joint,
> You'll always remember the huts of tin,
> (And not saluting was a sin),
> The wind so hard,
> And all that guard...
> —You'll never forget the joint.[5]

.

The Air Member for Organisation and Equipment (AMOE) reported to the Air Board in June 1940 that,' The provision of a laundry, including hot-water services, and the erection of a standard hut subdivided into canteen, recreation room, and sergeants mess would add to the efficiency and comfort of the personnel concerned.'[6] Hot water was provided to the laundry and ablution huts two months later.[7]

Due to the convenient location of Bill Rankin's hangar, on Figure 45 numbered as building 77, the Commonwealth hired what prewar had been hangar no. 7. From 17 October 1940, Rankin received £110 per quarter in compensation from the Hirings Department of the AMF. From this amount he was expected to pay all routine costs, such as the DCA quarterly ground rental of £16 3s 0d. Correspondence reveals he did not believe the compensation he received was sufficient return on his investment.[8]

Commencing in May 1941, a larger RAAF camp was established in the north-west corner of the Beatty and Mortimer Road intersection. Known as South Camp, this new site provided accommodation for the additional numbers of trainees arriving after August 1941, when the half school became No. 2 EFTS. Weatherboard and asbestos-cement sleeping huts, mess huts and latrines were erected in tidy rows around the

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[4] Telegram COMWORKS Melbourne to COMWORKS Brisbane dated 19 October 1939, Archerfield FTS – Erection of buildings, D55, BP243/1, NAA (Qld); Margaret Pullar, *Prefabricated WWII structures in Queensland: A report for the National Trust of Queensland* (Brisbane: National Trust of Qld, 1997), p. 36.

[5] A. J. McIntyre, *Putting over a burst* (Brisbane: John Mills, 1942), p. 22. The poem was entitled 'You won't forget'.

[6] AMOE to DWB, minute sheet dated 4 June 1940, DWB – RAAF Number 2 EFTS – Archerfield, Qld – Buildings & services, 171/16/136 Part 1, A705/1, NAA (ACT).

[7] Quotes for supply, delivery and installation of boiler reticulation and accessories, May 1940, Archerfield FTS – Erection of buildings, D55, BP243/1, NAA (Qld).

[8] WD Dept of Air to WD (Qld), memo dated 23 November 1940, Quarterly invoices circa 1938, WD to A. O'Hare Martin, letter dated 3 October 1942, W Biggs & Biggs to WD, letter dated 27 September 1944, Archerfield – Lease of hangar allotment to W. Rankin, QL312, J56/11, NAA (Qld).

building which until then had housed the aerodrome caretaker, the colonial-style house built originally by Franklin Grenier and sold by Elizabeth Beatty in 1929 to the Commonwealth. It became the commanding officer's residence. (See Figure 46.)

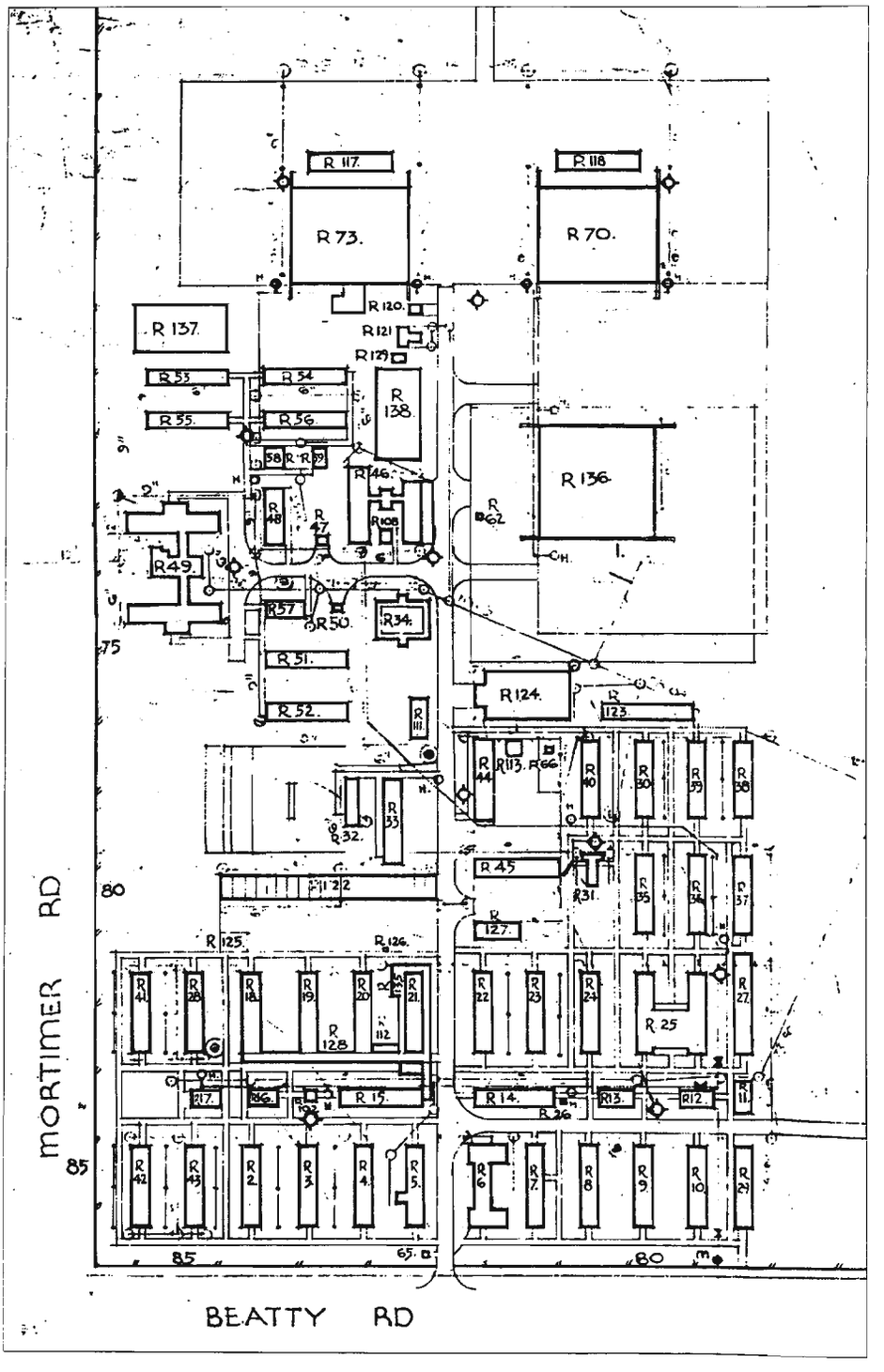

Figure 46: Plan of South Camp circa March 1943. Key to buildings is in Appendix 4. Building R34 was the original Grenier homestead, *Franklin Vale.* Source: Plan dated 21 March 1943, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld)

With the lowest tender of £18 968 1s 0d, Herbert Trelour of Booval was awarded the contract for construction of this camp's forty-nine other buildings. Because of delays caused by non-arrival of supplies and alterations to buildings, work eventually ran eighteen weeks over the eight weeks allowed. Trelour's contract was the first of a total of £93 865 allocated to buildings, services, furniture and fittings in South Camp.[9]

During October and December 1941, contractor J. Kennedy of Homebush, NSW erected two additional Bellman hangars, numbers 70 and 73, on the western edge of the camp.[10] The Bellman hangar was a recognised feature of RAAF aerodromes and a clear example of the military nature of the transfer of aerodrome building technology during this period.

British structural engineer N. S. Bellman designed the first of this type of building in 1936 as a 'temporary hangar capable of being erected or dismantled by unskilled labour with simple equipment and to be easily transportable.'[11] It was constructed on a unit system of rolled steel sections. The joints between the wall and roof were standardised, as were the corner units. Erection using twelve people required approximately 500 working hours.[12]

The standard size Bellman hangar was 95 feet (30 metres) by 112 feet 6 inches (34.3 metres), with a clear height of 17 feet (5.1 metres). According to military historian Murray Moore, the RAAF adopted the Bellman hangar design after an interwar tour of duty in Britain by Fl. Lt Valston Hancock of the RAAF. That Hancock carried the designs home with him in his briefcase is a quite direct example of aerodrome technology transfer. (See Figure 47.) In all, five Bellman hangars were erected on Archerfield. The last, hangar no. 136 to the east of hangar no. 70, was erected for No. 4 Communication Flight in mid-1943.[13]

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[9] WD (Qld) to WD Dept of Air, Melbourne, memo dated 20 May 1941, Report on application for extension, Archerfield No. 2 EFTS, K169, BP243/1, NAA (Qld).
[10] Group Captain commanding No. 2 Training Group to Sec. Air Board, memo dated 14 October 1941, DWB – RAAF No. 2 EFTS – Archerfield, Qld – Buildings & services, 171/16/136 Part 1, A705/1, NAA (ACT); WD (Qld) to Zone Service Manager APC BNE, memo dated 29 May 1942, Archerfield RAAF – Extension of landing area N and W sides, K293, BP243/1, NAA (Qld).
[11] Paul Francis, *British military airfield architecture: From airships to the jet age* (Sparkford, Somerset: Patrick Stephens, 1996), p. 100; Pullar, *Prefabricated WWII structures in Qld*, pp. 46-7.
[12] Francis, *British military airfield architecture*, pp. 100-1.
[13] Murray Moore, Bellman hangars in RAAF service, manuscript, 1998, pp. 1-2; Air Board Agenda 4666 dated 2 March 1943, DWB, RAAF Station Archerfield – Buildings & services, 171/16/136 Part 2, A705/1, NAA (ACT); Plan dated 17 September 1943, Archerfield RAAF Station – Annexe to Bellman hangar no. 136, W14620, J2774/1, NAA (Qld).

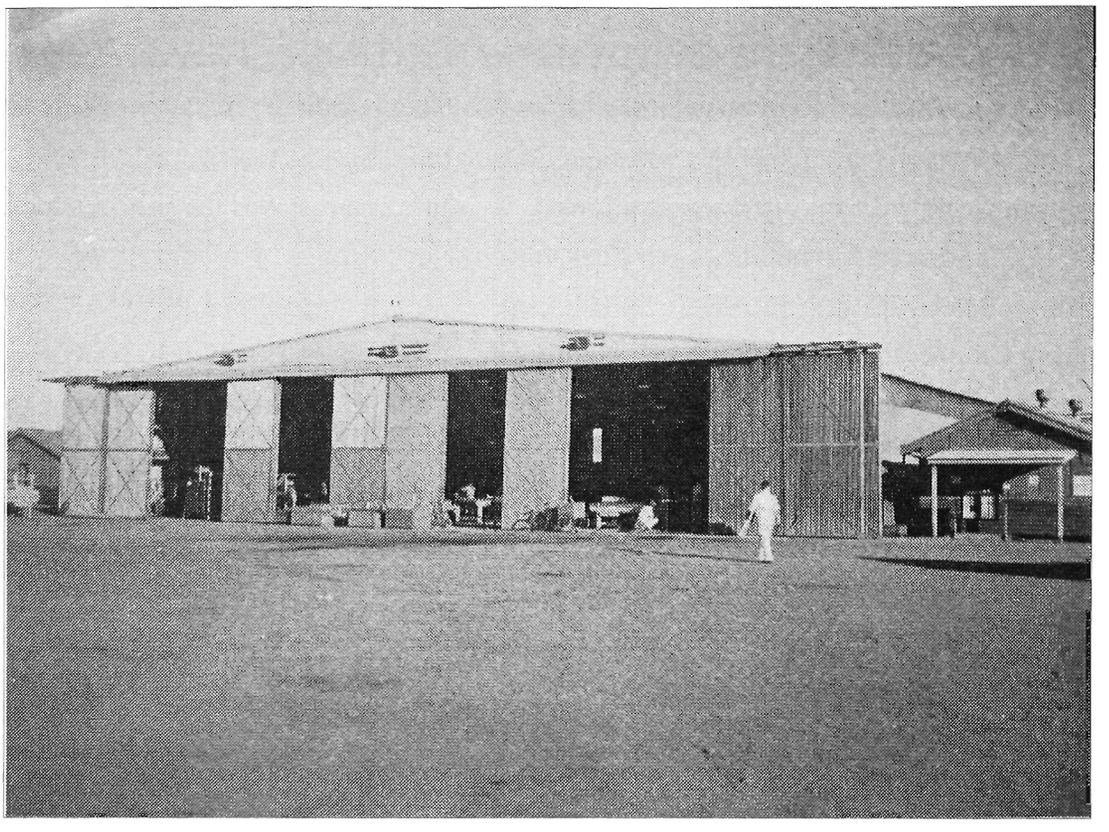

Figure 47: Bellman hangar no. 71 on 30 June 1943
Source: Photo no. 2009, NN, BP34/1, NAA (Qld)

The construction of an RAAF camp around the home of the DCA caretaker required the relocation of Joseph Craker, who had been in residence since July 1940. After a hasty renovation of the now disused RQAC club house, Craker and his family moved there in June 1941.[14] (See Figure 48.)

Finally completed during this first period was the DCA control building, initially announced as a £10 000 aerodrome terminal building for Brisbane in October 1936. The declaration of war delayed the construction of this already slow-moving project, as it had the erection of similar buildings on Kingsford Smith Aerodrome and Parafield Aerodrome.[15] The standard design used for all three buildings originated in an overseas trip, made in 1937 for the purpose of studying such buildings, by Wing Commander Allan Hepburn, the director of works for the Department of Defence.

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[14] Letter dated 1 July 1940, memo dated 5 February 1941, letter dated 11 June 1941, tracing showing temporary partition, club building dated 17 June 1941, Archerfield – Groundsman's cottage, 217/102/154, MP399/1, NAA (Vic.). Since the transfer of Andy Lauchland to Parafield Aerodrome in 1937, A. R. Reid, then Joseph Craker, had occupied the former Grenier colonial homestead.
[15] *CM*, 29 October 1936, p. 15. That there was no terminal building built at Essendon may be accounted for by the fact that the largest airline operator, ANA, constructed their own £20 000 hangar and passenger facility on site in 1938. At this time Fishermen's Bend, closer to the city centre, was under consideration as the airport for Melbourne.

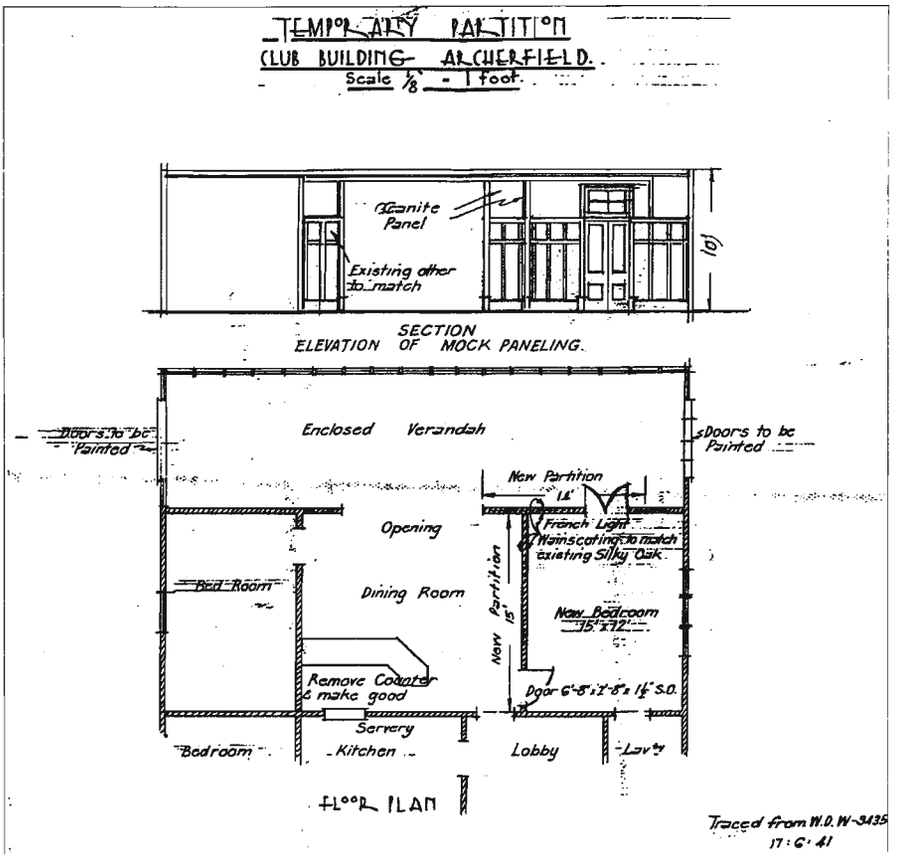

Figure 48: Plan of alterations to RQAC club house
Source: Archerfield – Groundsman's cottage, 217/102/154, MT399/1, NAA (Vic.)

Hepburn's subsequent design guidelines required Australian terminal buildings to be 'capable of being added to by the provision of what has necessarily been cut out because of considerations of cost.'[16] In that respect he was in line with contemporary thinking that sought flexibility of design to allow for the vagaries of economics and the uncharted directions in which aviation might be headed.

In 1944 English aerodrome specialist Graham Dawbarn declared flexibility the 'first and greatest problem of an airport building scheme,' adding that this might be achieved by 'boxes on a unit system which can be extended indefinitely.'[17] Initial plans for the Australian three-box control building were produced by a Department of Interior team, guided by Hepburn but headed by chief architect Edward Henderson. The design produced was of a basic 'semi-steel frame type with steel beams supported on steel

[16] Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW, Terminal building, Mascot Aerodrome, 1938/12, A11960/1, NAA (ACT).
[17] Graham Dawbarn, 'The design and construction of airport building', *Shell Aviation News*, October 1938, p. 16.

stanchions or walls as necessary, reinforced concrete floor and roof slabs and concrete staircases with eternal brick walls and light internal partition walls of brick or terra cotta.'[18]

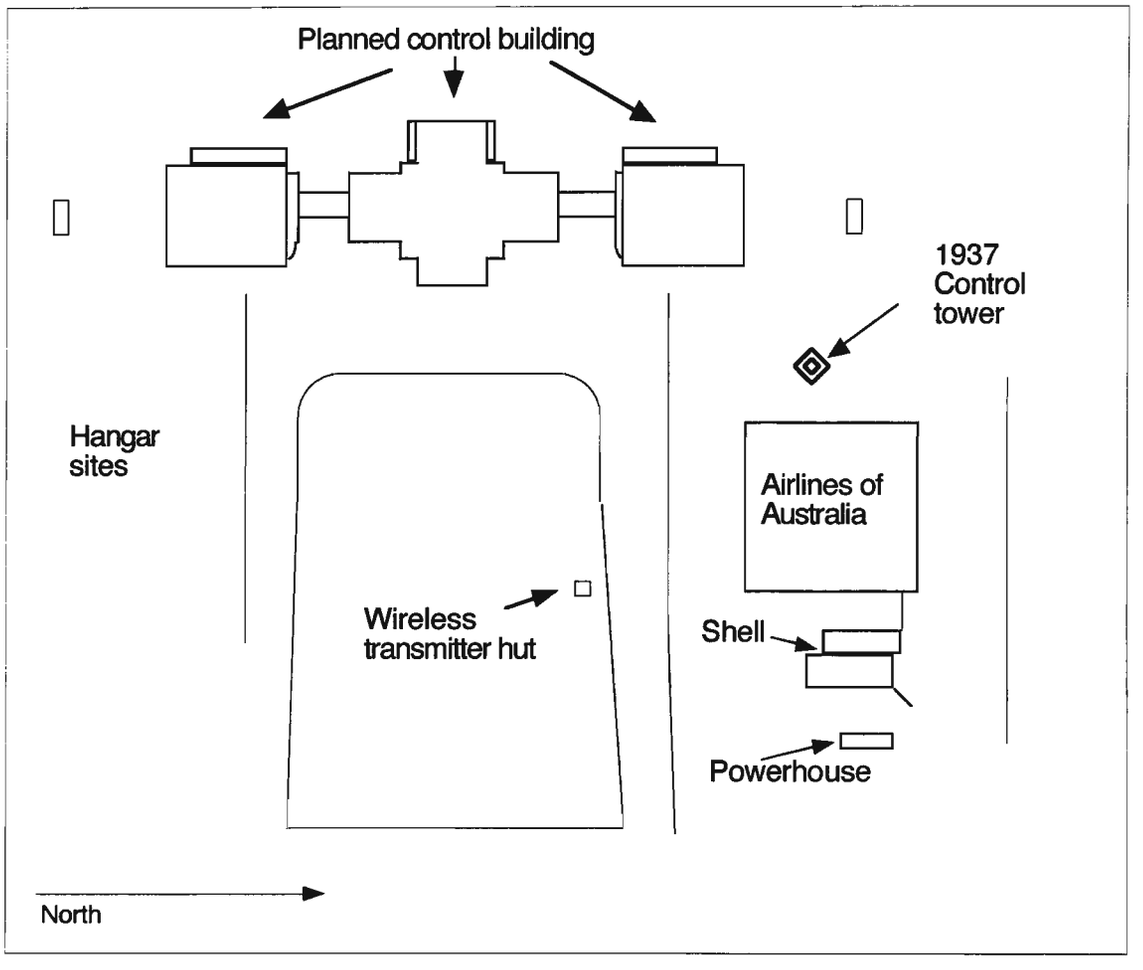

Figure 49: Copy of building and road layout, Archerfield 1938, which showed how its control building was expected to be constructed.
Source: Archerfield Aerodrome re-survey 1943, 3966/1/7, J56/11, NAA (Qld)

Those first plans featured a central concourse of 90 feet (27.4 metres) by 37 feet (11.2 metres) with a waiting room and passenger facilities, as well as office space for up to six airline companies in the building's north and south wings. Atop these wings another floor could be constructed as progress required or finances allowed. People coming or going were expected to keep to the appropriate sides of the central concourse, in adherence to Hepburn's guiding principle that 'one must keep one's lines of traffic

[18] Parliamentary Standing Committee on Public Works, 'Report related to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW', *CGG*, (1937–38–39–40), p. 2.

clear,' be they people or freight.[19] The estimated cost for construction of this design of control building on Mascot in 1937 was a considerable £51 026. Working drawings would take five months to complete and construction, it was estimated, an additional eighteen months.

What Senator Foll referred to as 'heavy defence demands in other directions' affected the final design for Australia's capital-city control buildings.[20] The wings were deleted. To compensate for the loss of space, the core of the building gained an additional storey. The building was eventually constructed with 'streamlined detailing and an emphasis on horizontal lines characteristic of the Moderne Design Movement.'[21] It has symmetrical elevations, a strong horizontal emphasis in design and is decorated with the progressive images of winged badges. (See Figures 76 and 77 in Appendix 5.) In design it is similar to the beaux arts wedding cake style of the 1930s administration building of the Hartsfield Airport in Atlanta, GA.

For KSA and Parafield Aerodromes the construction tenders received for this new design were both in the vicinity of £12 000. On Archerfield the cost was estimated at £15 000 when construction commenced early in 1941. Shortages of building supplies were a contributing factor. Builders J. Hutchinson and Sons were awarded the contract.[22] (See Figure 50.)

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[19] Minutes of evidence relating to the proposed erection of a terminal building at the Kingsford Smith Aerodrome, Mascot, NSW, Terminal building, Mascot Aerodrome, 1938/12, A11960/1, NAA (ACT).
[20] *CPD*, 16 November 1938, p. 1,487.
[21] Archerfield Airport Administration Building, File no. 601140, Queensland Heritage Register.
[22] *ABJQ*, June 1940, p. 8; *ABJQ*, January 1941, p. 12.

Figure 50: Archerfield Control Building in the late 1940s. See Figure 74 in Appendix 5 for comparison
Source: Ken Cross

Located on the ground floor in the new design were the concourse, passenger waiting room with buffet area, offices for four air companies, a baggage room, post office, lavatories, kitchen and servery. Offices for DCA personnel, a two-bedroom apartment for the DCA airport manager and a public viewing deck were situated on the first floor. The second floor housed rooms and offices for radio technicians and meteorological staff, as well as a flight checking room where pilots' flight plans were monitored. A steel ladder connected this room to the control cabin situated on the flat roof of the building.[23]

Working drawings for the Archerfield DCA control building range in date between November 1939 and June 1941, indicating the considerable time taken in its planning and construction. While in peacetime its progress would have been duly recorded in the newspapers, under wartime censorship few reports of the construction of this sensitive building which housed radio communication and navigation facilities have surfaced. One Department of Aircraft Production (DAP) progress report of August 1941 indicated only that eight plasterers, nine carpenters, four plumbers and five labourers were employed there at that time.[24]

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[23] Plan dated 6 March 1940, Archerfield Aerodrome Control Building – Elevation, section and site plans, W7421, J2774/1, NAA (Qld).
[24] Works & Services Branch BNE, Works Progress Return for week ending 22 August 1941, Archerfield No. 2 EFTS, K169, BP243/1, NAA (Qld).

During this first period, smaller auxiliary buildings also were erected within the civil aviation core of the airfield. East of hangar no. 4, the DAP erected a building specifically for repairing the tautened fabric used on aircraft, a process known as doping. Referred to at various times as the dope shop, building no. 21 or building no. 176, this hangar-like structure was completed late in 1941. A stand later was added along its western wall to accommodate up to forty workers' bicycles. Though ventilated by a large wind funnel, working conditions in this south-facing building could not have been comfortable. A 1943 document reports absentee rates as high as 50% amongst the twenty-four people employed there.[25]

QEA's hangar no. 5 was enlarged during this first period. In 1934 the company had extended the hangar by the addition of 'wings', gable roofed workshop areas 36 feet wide (10.9 metres) and 35 feet 6 inches (10.8 metres) in length beyond its northern and southern walls. Parts of these wings were removed in 1941 when the hangar was extended by steel frames and roof trusses covered with galvanised corrugated iron, a design in keeping with the coat-hangar style of the original 1931 section of the building. This extension increased the overall covered area of hangar no. 5 by 11 550 square feet (1 073 square metres) to a total of 34 300 square feet (3 186 square metres).[26]

One of the few pieces of new land added to the aerodrome before the end of 1941 was the HF/DF site on the south-east corner of the intersection of Beatty and Mortimer Roads. *Aircraft* magazine of January 1940 reported somewhat obliquely regarding its introduction that 'another highly important part of the programme for safeguarding air traffic is going ahead, but in something approaching secrecy.'[27] For the HF/DF site an area of 36 acres 1 rood 18.2 perches (14.71 ha) of land belonging to David Jenkins was purchased for £635 late in 1939. Like many neighbours of the aerodrome, Jenkins ran a dairy that supplied suburban Brisbane residents with milk. He was concerned about the loss of what he considered his most productive land.[28]

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[25] Chief Accountant QEA to Manager Aircraft Servicing DAP, letter dated 9 December 1941, Servicing of aircraft – Qantas hangar extension, Archerfield – Fire insurance premium on additions to Archerfield, 2134, MP287/1, NAA (Vic.); W. Low, report dated 19 September 1943, Servicing of aircraft – Qantas hangar extension, Archerfield – Fire insurance premium on additions to Archerfield, 2134, MP287/1, NAA (Vic.); Plan dated 28 July 1943, Archerfield – DAP bicycle stand, W14229, J2774/1, NAA (Qld).
[26] Sidney Williams & Co. to CCA, letter dated 10 July 1934, Archerfield, Qld – Lease of hangar allotment to QEA – No. 1 hangar, 217/102/403 Part 1, MT399/1/0, NAA (Vic.); Chief Accountant QEA to Manager Aircraft Servicing DAP, letter dated 9 December 1941, Servicing of aircraft – Qantas hangar extension, Archerfield – Fire insurance premium on additions to Archerfield, 2134, MP287/1, NAA (Vic.).
[27] *Aircraft*, 1 January 1940, p. 20.
[28] *CGG*, 21 September 1939, p. 1,969; *CGG*, 20 March 1940, pp. 650-1.

Increased aerial activity placed pressure on the existing DCA wireless transmitting site in Coronation Street (later Postle Street), Coopers Plains. New RAAF installations were included in the wireless transmitter (W/T) building around November 1940. A DCA upgrading of the radio transmitting equipment was completed on 24 March 1941, one which necessitated the acquisition of an additional block of 5 acres 14 perches (2.05 ha) to allow for more aerials. This extension was obtained for £150 in an acquisition gazetted in December 1942. The brick W/T building was enlarged late in 1942 and a further 4 acres 1 rood 4 perches (1.02 ha) of adjoining land acquired in May 1943.[29]

The presence on Archerfield of increased numbers of RAAF personnel necessitated the establishment of a sewerage treatment plant to replace the earth closets and septic tanks which been adequate until the war. The plant was situated on a rectangular block of 3 roods 28 perches (0.37 ha) hired from William and Florence Brown, whose property adjoined the northern boundary of the airfield. Sewage from the camps and hangars was reticulated north from the building area to a pumping well then directly west along Boundary Road to the treatment plant.[30]

Set into the ground against the aerodrome fence at the south-west corner of Beatty and Boundary Roads, this pumping well was precariously placed. Just after Christmas 1943 the brakes of a RAAF Lockheed Ventura loaded with depth charges failed during its landing roll. According to ANA engineer Trevan Jackson the Ventura ran over the well, losing its undercarriage in the process, and 'continued out to spin round the road on its belly, scattering the bomb load from its bomb bay.'[31] On board, though not for long, was future Prime Minister Gough Whitlam, then an RAAF navigator.[32]

The arrival of US forces late in 1941 marked the beginning of the second period. Archerfield was extended hastily on its western and northern boundaries to cater for their generally heavier aircraft. (See Figure 51.) Houses belonging to nearby residents were removed, demolished or acquired for use by service personnel. (See Appendix 1.)

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[29] *CGG*, 3 December 1942, p. 2,810; *CGG*, 13 May 1943, p. 986; Valuation by P. A. Edwards dated 17 August 1939, Archerfield Aerodrome HFD Site Acquisition, QL718/41, J56/11, NAA (Qld); CCS to Fitzgerald, Halliday & Co, letter dated 28 January 1943, Archerfield aerodrome – Extension to radio transmitter – Search against titles, BL670, J1889/1, NAA (Qld).

[30] *CGG*, 4 December 1941, p. 2,674; Entry dated 29 August 1941, Book 190, Operations record book, Archerfield Station Headquarters, 190, A9186/9, NAA (ACT); V. G. Crawford to the Civil Engineer, Works & Services Branch, Dept of Interior BNE, handwritten memo dated 29 August 1941, Archerfield RAAF – Extension of relief landing ground at Eagle Farm, K353, BP243/1, NAA (Qld); Plan dated 20 February 1942, Archerfield RAAF Station – Additions to pump well, W320, J2790/1, NAA (Qld); Plan dated 16 September 1943, Archerfield RAAF Station – Sewerage pump house, QA8392, J2698/1, NAA (Qld).

[31] Trevan Jackson, Random ramblings of an early bird 1934–51, manuscript, 2001, p. 28.

[32] Laurie Oakes, *Whitlam PM: A biography* (Sydney: Angus & Robertson, 1973), p. 43.

Explosive growth occurred as new buildings to house personnel or aircraft under repair were constructed.

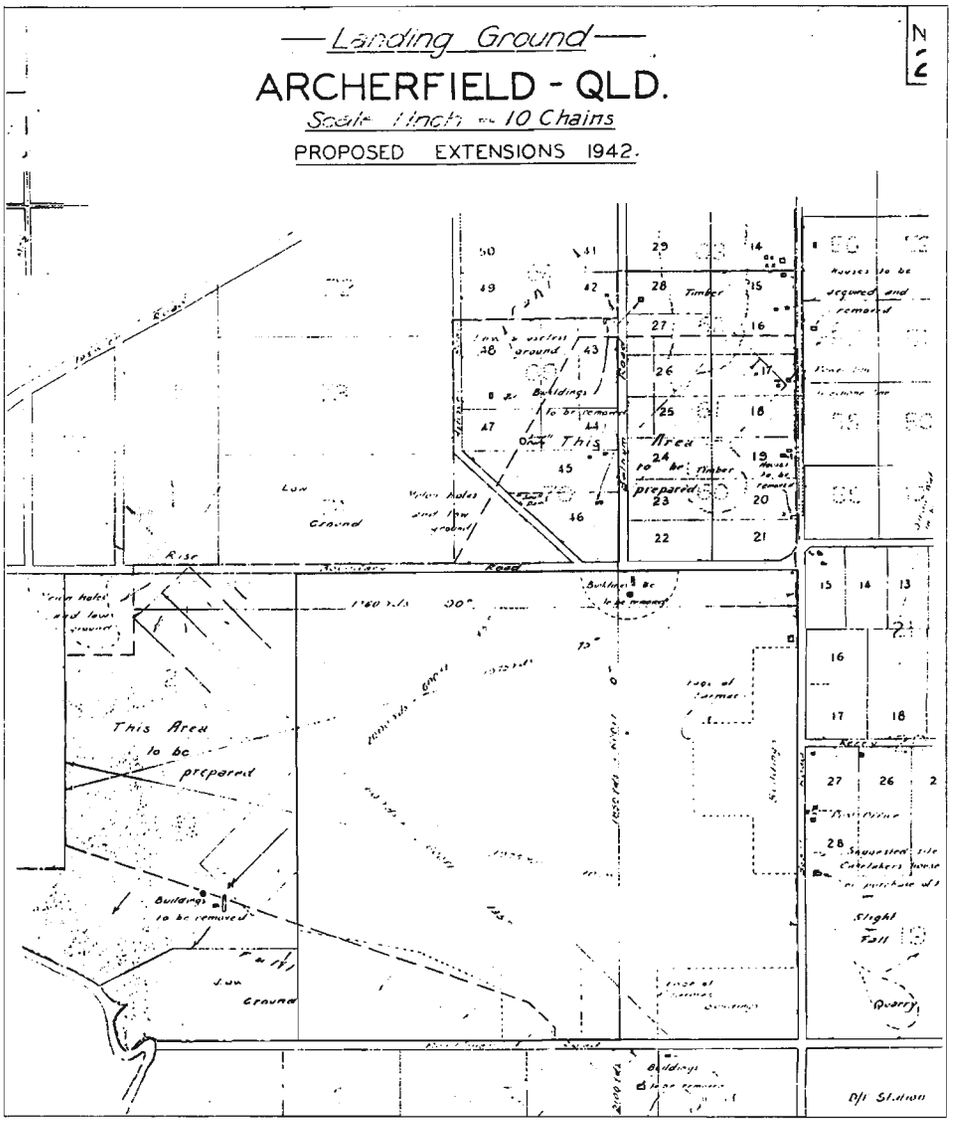

Figure 51: Plan of 1942 extensions to Archerfield Aerodrome dated 24 March 1942
Source: NAA (Qld), J56/11, QL718 Part 1

In some cases bureaucratic adherence to regulations caused hardship. Because removal of the buildings was required urgently, the Commonwealth initially used the process of hiring some of the land. Unfortunately the hiring money paid regularly to owners ceased with publication of acquisition details in the *Commonwealth Government Gazette* (*CGG*) in November 1942. For Rachel Stiles this meant having to pay rent

elsewhere while waiting for the Commonwealth to settle her compensation claim. As she notified Queensland Senator Joseph Collings:

> The procedure is most inequitable and to my mind is just another way of putting the screw on me by withholding rent money [hiring payments] so that I will be glad enough to accept any offer they may care to make. I am an old age pensioner and my son is in receipt of the invalid pension and this is our only means of living.[33]

Rachel Stiles was by no means the only aerodrome neighbour affected as the needs of war forced the hurried development of Archerfield and Eagle Farm aerodromes.

With the 1942 extensions, Boundary Road west of Beatty Road ceased to exist as part of the main traffic thoroughfare between the South Coast Road and Ipswich Road. Through traffic thereafter travelled along Cameron and Granard Roads to the north. Ironically, the closed section of Boundary Road, now a part of the airfield, was camouflaged to resemble a road so that enemy observers might be deceived.

On the southern side of what had been Boundary Road the semi-circular RQAC enclosure was dismantled. The club house, occupied since June 1941 by caretaker Joseph Craker, was moved by the Queensland Main Roads Commission to a site in Kerry Road. Here the Craker family once again settled in. RQAC received £1 500 for the club house, though payment was slow in coming. President Leslie Nissen complained of the matter in December 1942, advising the Commonwealth that the Committee firmly believed 'sufficient time has lapsed from the date when the Club House was shifted for this matter to have been finalised.'[34]

Buildings close to the east and south of the prewar aerodrome boundaries also were affected. A high-set colonial home on the southern side of Mortimer Road constituted a hazard to heavily loaded aircraft taking off towards the south-west. Much to the consternation of the then tenants, Florence Wheildon and Ann Hendry, the house was taken over and demolished. They returned to collect what remained of their stored possessions several weeks later, in early February 1942:

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[33] A/Sec. QMRC to WD, memo dated 8 May 1942, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld); Rachel Stiles to Senator John Collings, letter dated 2 December 1942, Archerfield Aerodrome – Extensions north and west, QL718 Part 1C, J56/11, NAA (Qld).
[34] President RQAC to SG & CPO, letter dated 17 December 1942, Archerfield Aerodrome – Extensions north and west, QL718 Part 1C, J56/11, NAA (Qld).

> Various members of the USA Air Corps volunteered the information that the Army had taken the goods. The large meat safe...was stated to have been forwarded by rail to some northern station occupied by the Army.[35]

Wheildon and Hendry eventually received compensation totalling £88 16s 0d.

The tendency on the southern side of Mortimer Road was for hiring rather than acquiring land. Property belonging to the Marshall family was used for aircraft dispersal and camps for US military personnel. John Irwin Senior's land was likewise the subject of a hiring. From 7 January 1942 until 30 September 1942 he was paid £6 10s 0d per month for RAAF occupation of part of his land on the southern side of Mortimer Road. Thereafter the US 419th Signal Corps moved in. Tents were erected near the original Mortimer House, the colonial homestead with a central brick chimney that Irwin then owned. A smaller cottage of his also was deemed to be in the aircraft flight line. It was removed to the 40 acre (16 ha) quarry block on the opposite corner, which he also owned. This cottage became a club for NCOs.[36]

The houses located to the east of Beatty Road owned by Oliver and Jane Shelley and Robert Wood, as well as the hut occupied by Bill Sinnamon, were acquired eventually by the Commonwealth. Hiring payments to Oliver and Jane Shelley ended on 9 February 1944 and by November 1944 they were still awaiting advice as to their claim for compensation.[37]

Seventy-year-old Bill Sinnamon refused to move from his cottage near the corner of Beatty and Kerry Roads so that a vehicle parking area could be prepared there. Authorities were hesitant to eject the old man who was in a bad condition physically. A new parking area was built on the opposite side of Kerry Road on land hired from QEA.

Jeannetta and Bill Freney's house and barber shop on the south-east corner of the intersection of Boundary and Beatty Roads were too close to what was a commonly used approach direction. Eventually their buildings were shifted to separate sites, though

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[35] Assessor D. H. Hardy, memo dated 12 December 1947, DWB – Property – Archerfield, Qld – No. 2 dispersal area – Hiring of site, 171/16/183, A705/1, NAA (ACT).
[36] Neil Gates, interview with author, 5 January 2001; Request for services for RAAF form F/T1A dated 29 April 1948, Submission and Determination for Hiring 923/1 dated 3 November 1947 and 13 January 1949, DWB – Property – Archerfield, Qld – No. 2 dispersal area – Hiring of site, 171/16/183, A705/1, NAA (ACT).
[37] SG & CPO to Property Officer BNE, memo dated 25 November 1944 quoting Shelley letter, Archerfield Aerodrome – Claim of Miss I. Wood – Tuck shop, QL718/11, J56/11, NAA (Qld).

not before a number of low-flying aircraft unnerved the residents when the wires of their trailing aerials skimmed across the roof.[38]

Other land in the general aerodrome area was hired so that aircraft might be dispersed and refuelled, wrecked parts stored, or camp accommodation built. The Coopers Plains State School in Beaudesert Road became RAAF hiring 2226 and US hiring HSS2177. Students then travelled to the state school at Runcorn in a bus referred to by the children as the 'Green Frog'.[39] Land owned by David Jenkins south of the HF/DF site became a tent camp as RAAF hiring 796 and US hiring HSS936.[40]

Over eighteen months the built fabric that surrounded the aerodrome changed markedly. The combination of large dairying properties and smaller holdings was replaced either by clear grass areas, temporary camps or large aerodrome buildings.

By far the largest hiring in the area was the 175 acres (70.8 ha) south of Mortimer Road on which Camp Muckley was located. According to US engineer Karl Dod, this was designed to house 1 000 service personnel 'on a dispersal basis, with buildings to be constructed in wooded areas and concealed from air observation.'[41] The plan of the camp bears this out. (See Figure 52.) While the precise layout of the RAAF's South Camp followed a regimented peacetime plan, the US Army's camouflaged and hidden weatherboard huts reflected the nature of temporary accommodation built in a war zone.

The nature and future value of those constructions was under discussion at high levels. Late in 1941 Arthur Corbett, the head of the DCA, advanced his opinion to J. S. Storey of the Aircraft Production Commission:

> There is a constant conflict between the advantage of purely temporary and cheap construction, with a view to meeting immediate needs, and the desirability of

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[38] Jeannetta Harvey, interview with author, 31 January 2001.
[39] Ray Spring, interview with author, 17 January 2001; Drawing Bris/W-78B dated 22 February 1942 [folio 55], DWB – Property – Archerfield, Qld – Extension to 'drome – Hiring of site, 171/16/184, A705/1, NAA (ACT); Folio item 42A, memo dated 19 December 1942, DWB – Property – Archerfield Qld – Dispersal areas – Camp site – Sewerage works – Disposal of assets, 171/106/727 Part 1, A705/1, NAA (ACT).
[40] Ray Spring, interview with author, 7 February 2001; Brig. Gen. P. W. Johnston to Dir. Reciprocal Lend Lease, memo dated 19 January 1945, Drawing Bris/W-78B dated 22 February 1942 [folio 55], DWB – Property – Archerfield, Qld – Extension to 'drome – Hiring of site, 181/16/184, A705/1, NAA (ACT).
[41] The hiring for Camp Muckley was RAAF 2225, US HSS2178. Karl L. Dod, *The corps of engineers: The war against Japan*, vol. 2, *United States Army in World War Two: The technical services* (Washington, D.C.: Office of the Chief of Military History, US Army, 1966). Camp Columbia at nearby Darra was designed to accommodate 5 000 personnel.

making somewhat higher capital expenditure with a view to creating a valuable asset.[42]

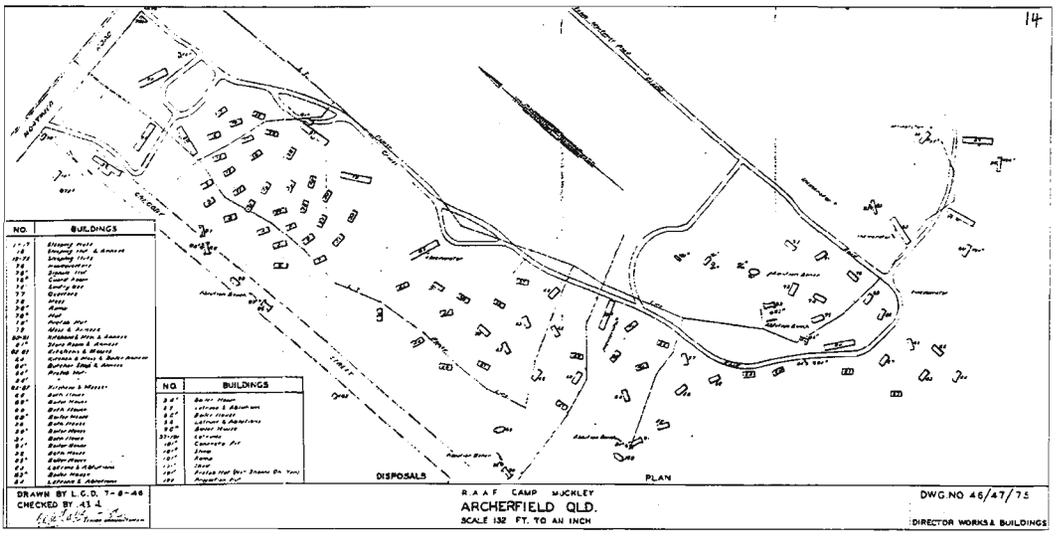

Figure 52: Plan of Camp Muckley dated 7 August 1946
Source: DWB – Muckley Qld – Mortimer Road – Disposal of surplus assets 171/106/577, A705/1, NAA (ACT)

The urgent need for working space also forced extensions to a number of Archerfield's existing buildings. In particular, extensions constructed by the Department of Aircraft Production were not architecturally sympathetic to the original hangar sections.

The Government hangar of 60 feet (18.2 metres) airside width with its 35 feet (10.6 metres) wide 1939 annexe was extended to the east by the CCC an additional 92 feet (28 metres). This £7 428 addition accommodated engine workshop space for ANA, dressing rooms for men and women and a general office. Hangar space increased to 8 835 square feet (820.7 square metres).[43] (See Figure 53.)

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[42] A. B. Corbett to J. S. Storey, memo dated 5 September 1941, DG of DCA – Concerning desirability of erecting permanent hangars at Archerfield, Parafield and Bankstown, 1152, MP287/1, NAA (Vic.).

[43] *Aircraft*, 1 March 1940, p. 17; Plan dated 15 June 1939, Archerfield Aerodrome – Additions to government hangar, W6097, J2774/1, NAA (Qld); Sec. DAP to DG DAP, memo dated 1 April 1942, Australian National Airways – Alterations to No. 1 hangar Archerfield, 2608, MP287/1/0, NAA (Vic.); Plan dated 5 March 1943, Archerfield Aerodrome – ANA hangar no. 1 extensions, W13178, J2774/1, NAA (Qld); Plan dated 15 September 1943, Archerfield – DAP hangar no. 1 alterations, W14799, J2774/1, NAA (Qld); Sec. DAP to Sec. Works Priorities Sub-Committee DOD, memo dated 28 January 1943, Servicing of aircraft – Alterations to No. 3 Hangar, Archerfield, 1819, MP287/1, NAA (Vic.).

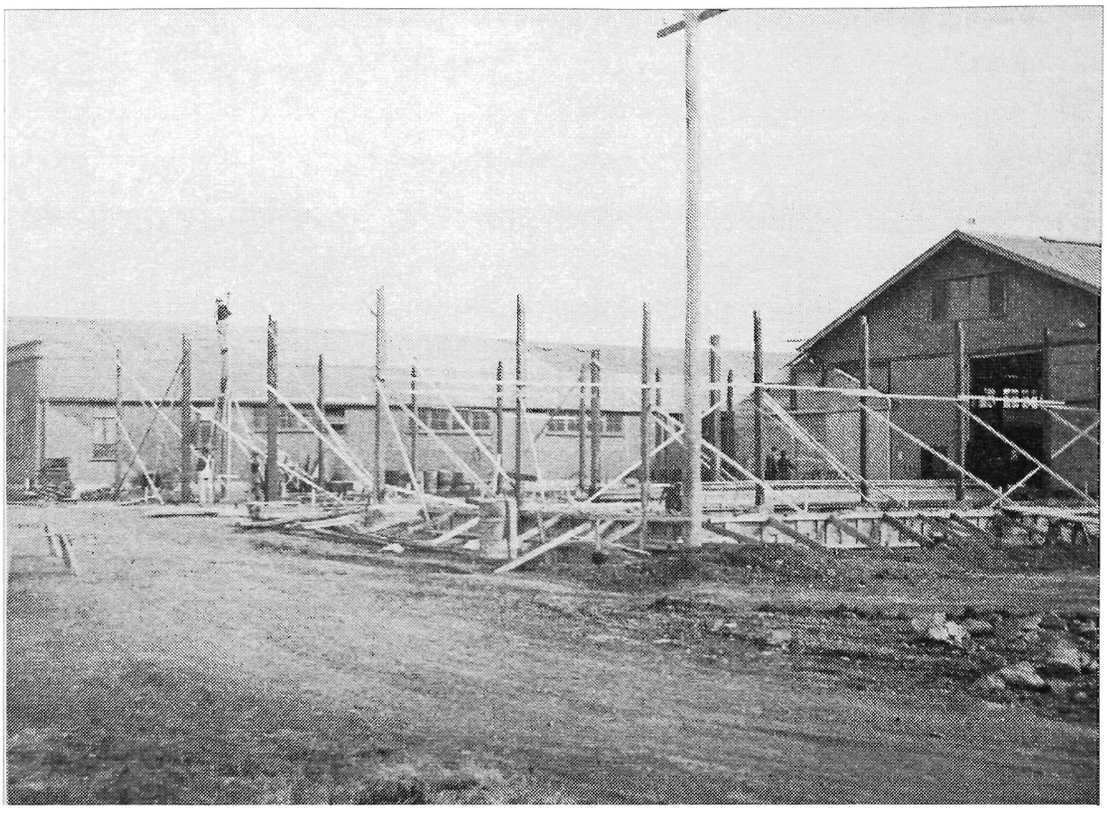

Figure 53: DAP extension to hangar no. 1 under construction, 2 July 1943
Source: Photo no. 2116, NN, BP34/1, NAA (Qld)

In 1942 the 86 feet (25 metres) wide hangar no. 3 was still owned by Ellie Jones. Each month she received £32 10s 0d in compensation from the Commonwealth for its allocation of the space to ANA for another engine workshop. As had happened to hangar no. 1, a timber-framed workshop with a saw-tooth roof was added to the building's eastern wall. The extra 7 224 square feet (671 square metres) provided by the extension of 86 feet 8 inches (26.4 metres) towards Beatty Road enclosed an engine cleaning department, working space for engine sub-assembly benches, rest rooms and a casualty station. A monorail was attached to the roof supports so that heavy parts could be moved efficiently.[44]

The CCC also enlarged hangar no. 4, owned by QEA. The additional 5 400 square feet (501.6 square metres), again a timber-framed workshop extension with saw-tooth roof,

[44] Sec. DAP to Sec. Works Priorities Sub-Committee DOD, memo dated 28 January 1943, Ethel B. Parer to Financial Accountant DAP, letter dated 5 September 1944, Servicing of aircraft – Alterations to No. 3 Hangar, Archerfield, 1819, MP287/1, NAA (Vic.); Plan dated 12 March 1943, Archerfield Aerodrome – ANA hangar no. 3 extensions, W13252, J2774/1, NAA (Qld); Plan dated 19 May 1943, amended 18 August 1943, Archerfield Aerodrome – DAP no. 3 ANA hangar extensions, W13693, J2774/1, NAA (Qld); Plan dated 12 April 1943, Archerfield Aerodrome – DAP no. 3 ANA hangar, roof details, W13450A, J2774/1, NAA (Qld).

cost £7 123 5s 4d and enclosed another engine repair unit and the necessary staff facilities.[45]

To alleviate the need for space at the time when engineer Trevan Jackson reported they were working 'two twelve-hour shifts a day and six days a week,' alterations were made to ANA's hangar no. 6.[46] The first extension of 36 feet (10.9 metres) by 58 feet 6 inches (26 metres) on the south-east corner was constructed by the CCC. The second extension was of 170 feet (51.8 metres) by 111 feet 6 inches (34 metres) at the south-west corner of the hangar. These early 1943 extensions, required and overseen by the DAP, increased the hangar space from 18 700 square feet (1 737 square metres) to 27 790 square feet (2 582 square metres) but still did not provide enough space.[47]

A sense of urgency accompanied the extensions and new construction undertaken in 1943. Unfortunately, a shortage of steel hampered the erection of building no. 25, the three-storey steel workshop and hangar south-east of the control building for which tenders were called in September 1942. Subsequently the firm of Drysdale and Ridgeway were responsible for the supply and erection of steelwork while a £28 475 plus fixed fee contract for sheeting and covering the building was awarded to S. S. Carrick. Delays were lengthy.[48]

QEA also erected a small timber-framed office building east of hangar no. 4 early in 1943, building no. 178 on Figure 45. It cost the company £849, but alleviated the need for extra administrative offices which were a consequence of increased contract maintenance work for the allied forces.[49]

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[45] *Aircraft*, 1 February 1940, p. 24; Sec. DAP to Sec. Works Priorities Sub-Committee DOD, memo dated 28 January 1943, Servicing of aircraft – Alterations to No. 3 Hangar, Archerfield, 1819, MP287/1, NAA (Vic.); F. J. Shea to Sec. DAP, memo dated 31 December 1942, Property Officer to A. Bourne, Finance Branch, memo dated 28 March 1945, Servicing of aircraft – Qantas hangar extension, Archerfield – Fire insurance premium on additions to Archerfield, 2134, MP287/1, NAA (Vic.); Plan dated 15 March 1943, Archerfield Aerodrome – Extension to hangar no. 2 for Qantas, W13263, J2774/1, NAA (Qld); Plan dated 24 March 1943, Archerfield Aerodrome – DAP extension to Qantas hangar no. 4, W13325, J2774/1, NAA (Qld).

[46] Jackson, Random ramblings, p. 24.

[47] Plan Z43 dated 14 May 1943, General expenses, Dept of Interior dated May 1952, Archerfield Aerodrome – Lease ANA hangar no. 6, QL278, J56/11, NAA (Qld); A. R. McComb to Sec. Dept of Interior, memo dated 14 July 1943, Archerfield Aerodrome – Lease ANA hangar no. 6, QL278, J56/11, NAA (Qld).

[48] D/DG for Allied Works to Dir. Aircraft Maintenance Division APC, memo dated 3 September 1942, WD (Qld) to A/DG for Works, progress report dated 15 September 1942, Archerfield Aerodrome – Erection of hangar and workshop for ANA Ltd, S7, BP243/1/0, NAA (Qld).

[49] R. Dyson Rudder, plan of new office building dated 19 October 1942, C. P. Heath to Works Department, handwritten note dated 4 February 1943, Archerfield hangars 4 and 5, QL128, J56/11, NAA (Qld). This building was demolished in 1999.

An eight-room timber and fibro cement transportation office to accommodate travelling military personnel, building no. 186 on Figure 45, was constructed on a cost-plus basis in mid-1943 by J. Hutchinson and Sons. It was of a standard design, one prepared by engineers of Base Section 3 of the United States Army Forces in Australia (USAFIA), then located in Brisbane. Located just south of the DCA control building, the transportation office was 65 feet 4 inches (19.9 metres) in length and 40 feet (12 metres) in width. A building 100 feet (30.5 metres) by 20 feet (6 metres) was erected for the same purpose at Kingsford Smith Aerodrome.[50]

With the February 1943 decision to establish a military Aircraft Repair Unit on Archerfield, land on the southern side of Kerry Road was chosen as the location for the necessary additional hangars and workshops. Hirings commenced. The farming and dairying land belonging to the Spring and Sims families eventually was acquired by order of the National Security (Supplementary) Regulations on 9 February 1944. The four houses involved were either moved to other positions or auctioned.[51]

Until his family's house was relocated to Colvin Street in Rocklea in 1945, a young Ray Spring continued living in the Queensland-style house belonging to his parents Alex and Edna Spring. Their house served as a first-aid station and was sandbagged to just below the window sills. His mother, like his grandmother Annie Spring, washed clothes for service personnel based on Archerfield. At the time his father was in the RAAF, serving in New Guinea.[52]

Relocation was not as easy for some of those involved, especially the elderly Tom and Annie Spring who, as well as losing their income from dairying, suffered because compensation payments were slow. Eventually they received compensation for the two parcels of land acquired from them by the Commonwealth (See Appendix 2).

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[50] Plan dated 20 March 1943, Archerfield Aerodrome passenger and operational building, W13424, J2774/1, NAA (Qld); I/C Admin. HQ Northern Command to Div. Property Officer RAAF, memo dated 15 April 1947, DWB – Property – Archerfield Qld – Dispersal areas – Camp site – Sewerage works – Disposal of assets, 171/106/727 Part 1, A705/1, NAA (Qld); Plan dated 21 May 1943, Archerfield – General extension, QL718 Part 2, J56/11, NAA (Qld); Inter-service transfer certificate dated 6 August 1946, No. 4 EFTS, Mascot NSW – Hiring of aero club house – Kingsford Smith Aerodrome, 171/23/188, A705/1, NAA (ACT).

[51] Plan of Archerfield dated 12 October 1955, Archerfield survey plan, LS3406C, J1018/2, NAA (Qld). George Sims' house was moved to nearby Boniface Street. Cyril Sims' house was moved to Beaudesert Road. Tom and Annie Spring's house was auctioned and dismantled.

[52] Ray Spring, interview with author, 7 February 2001; P. A. Edwards, valuations dated 28 November 1942, Archerfield – General extension, QL718 Part 1A, J56/11, NAA (Qld); P. A. Edwards, valuation dated 3 June 1943, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld).

Thirty-nine buildings were erected within the Kerry Road ARU. They constituted hangars, workshops, operations stores, stores for inflammable supplies, heat treatment rooms, hydraulic press rooms, offices, a garage and a number of locker and lavatory buildings.[53]

The largest buildings in the ARU were five igloos, four of which were hangars while the fifth was a operations store. Historian Margaret Pullar described the economy and effectiveness of their construction:

> The igloo is a light nailed hardwood timber arch construction, where each arm is made up of two half arches more or less freely pinned at two abutments close to ground level and at a central or crown pin. Each half arch consists of two adjacent trusses laced together at top and bottom chord level and each truss consists of a top and bottom chord laced together in arch form. As a result, each half truss is made up of four main timber chords sprung into arch form, and light timber bracing nailed into position to form a curved open-latticed box truss.[54] (See Figure 54.)

The first igloo, building no. 16, was constructed using Oregon timber and served as an operations store. It measured 170 feet (51.8 metres) by 255 feet (77.7 metres). Of the remaining four, QEA maintenance workers occupied buildings no. 7 and no. 27, the most westerly of the igloos. ANA was responsible for repair work carried out in buildings no. 8 and no. 28, east of the centre of the unit. The two central igloos, no. 7 and no. 8, were the largest. Each of these was 170 feet (51.8 metres) wide and 33 feet (10 metres) high. Buildings no. 27 and no. 28 were 188 feet 6 inches (57.4 metres) wide. All four buildings were 353 feet (107.6 metres) in length.[55]

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[53] Sec. DAP to Sec. Dept of Interior, memo dated 5 February 1943, Archerfield – Acquisition Aircraft Repair Unit and operations store, QL718 Part1B, J56/11, NAA (Qld); Plan dated 20 October 1943, Repair Unit – Archerfield Aerodrome Qld, W14949, J2774/1, NAA (Qld).

[54] Pullar, *Prefabricated WWII structures in Qld*, pp. 63-4.

[55] Plan dated 2 February 1943, Archerfield Aerodrome – Operations store for DAP igloo – Arch roof details, W13205, J2774/1, NAA (Qld); Plan dated 23 February 1943, Archerfield Aerodrome – Operations store for DAP igloo, W13207, J2774/1, NAA (Qld); Plan dated 4 March 1943, Archerfield Aerodrome, 170 ft nailed arch igloo – Foundation plan, W13283, J2774/1, NAA (Qld); Plan dated 28 June 1943, Archerfield – Diagrammatic elevation plan of 170 inch nailed arch, W14030, J2774/1, NAA (Qld); Plan dated 26 October 1943, Archerfield AR Unit – Nailed arch 188 ft 6 inch warehouse, foundation and floors, W15028, J2774/1, NAA (Qld); Plan dated 27 October 1943, Archerfield AR Unit – Nailed 188 ft 6 inch warehouse – General details, W15027, J2774/, NAA (Qld). Building no. 27 was demolished in 2002.

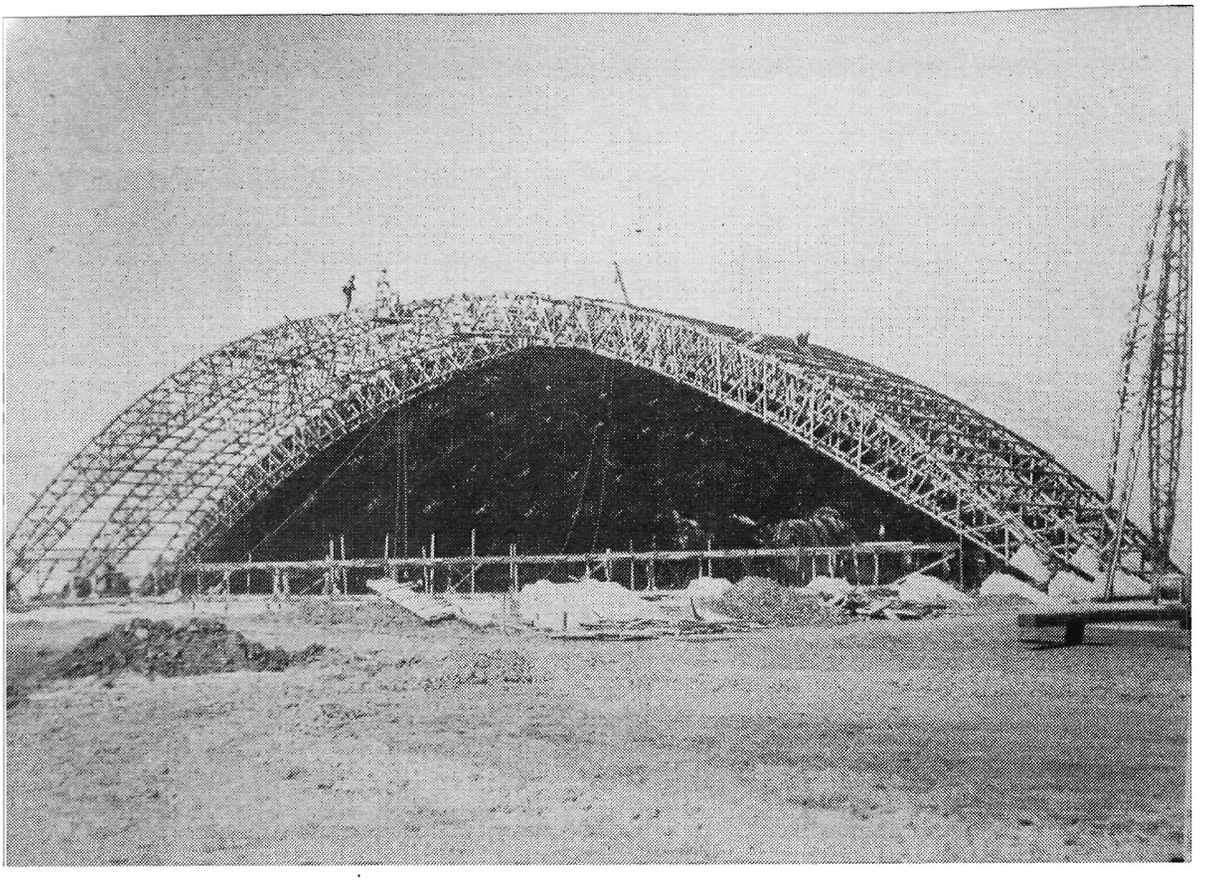

Figure 54: ANA igloo hangar under construction on 5 May 1944. The pylon crane was used to hold the half trusses in place until permanently fixed by the crown pin. Aircraft maintenance work was conducted even as the hangar was constructed.
Source: Photo no. H23964/3094, NN, BP34/1, NAA (Qld)

Uncertainty surrounds the design of these buildings, though indications are that Emil Brizay, a French engineer who was evacuated to Australia from Singapore, contributed to the design of igloo hangars or warehouses when working for the Brisbane firm M. R. Hornibrook. Earlier hangars designed by Brizay were covered by camouflage netting and easily constructed because they consisted of arches of scrap timber. The greater strength of local Australian hardwoods over imported timber made the design economical.

Evidence of the use of scrap timber is clear on an Allied Works Council plan for the larger of the two hangar styles used in the Kerry Road ARU. Construction notes advise that with the grading of timber, 'Each piece shall be free of hards, shakes, fractures,

knots in groups, decay other than in small patches and any combination of decays which reduces the strength to less than 60% of the strength of clear timber.'[56]

In his postwar account of the influence of US engineers, Hugh J. Casey noted that the 170 feet (51.8 metres) design was a standard used for heavy bombers.[57] Military engineer and historian Karl Dod went further, identifying four designs of warehouse which were common during the time of allied co-operation. He acknowledged, 'Among the most widely used was the igloo warehouse, modelled on a hangar designed by Mr Brizay, a French engineer who had come to work for the base section engineer in Brisbane after fleeing from Malaya.'[58] Without further research, the exact role played by Brizay in the design of the Archerfield igloos cannot be established.

In 1944–45 these igloos dominated the landscape. (See Figure 44.) Their large areas of covered space unimpaired by structural support columns made them an asset to the airfield and later the surrounding industrial estate. As other igloos constructed around Queensland were demolished, this unique group remained as a reminder of architectural innovation and the hasty requirements of war.

As the numbers of workers reporting to the various hangars increased throughout 1943, so did the need for a larger sewerage facility. A new site was established in 1943 on land owned by John L. Irwin Senior on the western side of Beatty Road between Mortimer Road and Oxley Creek. Originally hired, the land was acquired in 1946.[59] Chesterfield and Jenkins constructed the facility for approximately £9 940. Servicing Camp Muckley and the Kerry Road ARU, the sewerage plant was sold to the Brisbane City Council for £1 000 in 1964.[60]

The third period, between 1945 and 1949 was a period of rearrangement on Archerfield Aerodrome. Military activity decreased, while the DCA pursed a policy of ownership of all aerodrome assets. This led inevitably to the purchase of those buildings that had been privately owned.

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[56] Plan dated 27 October 1943, Archerfield AR Unit – Nailed 188 ft 6 inch warehouse – General details, W15027, J2774/, NAA (Qld).
[57] Hugh J. Casey, *Airfield and base development*, vol. 6, *Engineers of the South West Pacific 1941–45* (Tokyo: Reports of operations USAAF in the Far East, SWPA Army Forces Pacific, 1951), p. 460.
[58] Dod, *The Corps of Engineers*, p. 217.
[59] *CGG*, 28 February 1946, p. 496; Plan dated 12 March 1943, Archerfield – Sewerage treatment site, LS647, J1018/2, NAA (Qld); Plan dated 14 June 1943, Archerfield – Sewerage treatment works site plan, W826, J2774, NAA (Qld).
[60] A/Regional Dir. DCA to S & PO, Dept of Works, memo dated 19 September 1950, Drawing no. W679, Archerfield – Sewerage installation, QL1012, J56/11, NAA (Qld); A/Asst Disposals Officer, memo for file dated 11 September 1963, Agreement between Commonwealth and BCC dated 24 December 1964, Archerfield – Sewerage installation, QL1012 Part 2, J56/11, NAA (Qld).

The corrugated iron huts of No. 23 Squadron camp south of the cemetery were vacated by the RAAF on 1 November 1942 in favour of US forces, but reoccupied by No. 38 Squadron with their arrival on Archerfield in December 1944.[61] By June 1946 they were not in use and considered 'unsuitable and unfit for human habitation.'[62] The huts were removed to Helidon near Toowoomba or sold.

After wartime occupation by US military personnel, South Camp reverted to its original role as an RAAF facility, on 1 April 1948 becoming the home of No. 23 Squadron, a re-formed Citizen Air Force (CAF) fighter squadron.[63] By 1948 the condition of buildings in the camp had deteriorated to the point where the Air Board was informed 'it is lacking in technical and domestic facilities; its standards are unacceptable and its appearance unattractive for a Unit which will come under public inspection and publicity.'[64] Work commenced on refurbishing the site.

US forces vacated Camp Muckley on 20 November 1944. The following February members of the Royal Navy Fleet Air Arm HMS Nabsford moved in. They departed on 2 May 1945 and the camp reverted to RAAF ownership. By November 1946, squatters were living in twelve of the camp's huts. The number occupied had increased to twenty-four by the time the Queensland Housing Commission was given permissive occupancy of the buildings in 1947, pending negotiations for purchase of the camp.[65]

Parts of the Kerry Road ARU complex were occupied at various times during the late 1940s by the RAAF, the Royal Navy personnel of the No. 1 Transportable Aircraft Maintenance Yard (TAMY) and the No. 19 Squadron of the NEI.[66] By the end of the

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[61] W4 to WD1, memo dated 18 November 1946, DWB – Property – Archerfield Qld – Dispersal areas – Camp site – Sewerage works – Disposal of assets, 171/106/727 Part 1, A705/1, NAA (ACT); Requisition for Works & Services required dated 23 February 1945, DWB – RAAF Station Archerfield Qld – Buildings & services, 171/16/136 Part 3, A705/1, NAA (ACT).

[62] Group Captain commanding No. 82 Wing Amberley to HQ Eastern Area, memo dated 26 June 1946, DWB – RAAF Station Archerfield Qld – Buildings & services, 171/16/136 Part 3, A705/1, NAA (ACT).

[63] Doug Hurst, *The part-timers: A history of the RAAF Reserves 1948–98* (Canberra, ACT: Department of Defence, 1999), p. 120.

[64] Air Officer commanding Eastern Area to Sec. Air Board, memo dated 13 May 1948, DWB – RAAF Archerfield (Qld) – Postwar station – Buildings & services, 171/16/261 Part 1, A705/1, NAA (ACT).

[65] Air Board Minute 7555/1946 dated 20 September 1946, Property Manager CDC to Sec. Dept of Air, memo dated 4 November 1946, W. C. Wyeth to DWB RAAF HQ, memo dated 31 January 1947, DWB – Muckley Qld – Mortimer Road – Disposal of surplus assets, 171/106/577, A705/1, NAA (ACT); Folio item No 25A, undated, DWB – Property – Archerfield Qld – Dispersal areas – Camp site – Sewerage works – Disposal of assets, 171/106/727 Part 1, A705/1, NAA (Qld).

[66] Schedule of approved works, RNNAA – Kerry Road, Archerfield (Qld) – Buildings & services, 171/16/240 Part 1, A705/1, NAA (ACT); D/Dir. NEI in Australia to Sec. Dept of Air, memo dated 11

decade the igloos were being used as aircraft storage facilities by the RAAF. Some of the buildings which surrounded them had been auctioned and removed.

As part of its postwar policy, the DCA elected to purchase those hangars, or parts of hangars that it did not already own on Archerfield. Though the extensions made to some during the war complicated the question of ownership, gradually most hangars were acquired, as can be seen in Table 14. The DCA policy of retaining these core buildings strictly for aviation activities was adhered to, even though some were not occupied for extended periods. In the late 1940s all five Bellman hangars were in use either by the DCA or the RAAF.

Table 14: Ownership of hangars in the civil aviation section of Archerfield following the Second World War.[67]

HANGAR	SITUATION IN 1945	OUTCOME
Hangar no. 1	Owned by Commonwealth.	Commonwealth asset.
Extension to hangar no. 1	Owned by Commonwealth.	Commonwealth asset.
Hangar no. 2	ANA – originally constructed by AOA.	Sold to Commonwealth – no figures available.
Hangar no. 3	Sold by Ellie Jones to QEA in 1944.	QEA sold to Commonwealth for £3 640 in March 1953.
Extension to hangar no. 3	Constructed by DAP in 1943.	DAP sold extension to DCA – no figures available.
Hangar no. 4	Owned by QEA.	QEA sold to Commonwealth for £3 000 in March 1953.
Extension to hangar no. 4	Constructed by DAP in 1943.	DAP sold extension to DCA for £1 200 in June 1949.
Hangar no. 5	Owned by QEA.	QEA sold to Commonwealth for £5 750 in March 1953.
Extension to hangar no. 5	Constructed by DAP in 1943.	DAP sold extension to DCA for £5 425 in May 1949.
Hangar no. 6	Owned by ANA – originally constructed by AOA.	ANA sold to Commonwealth in May 1952 for £9 074.12.11.
Extensions to hangar no. 6	Constructed by DAP in 1943.	DAP sold extension to DCA – no figures available.
Hangar no. 7	Owned by Bill Rankin, constructed in 1938.	Building sold to Commonwealth in January 1950 for £3 000.

March 1946, DWB – Property – Archerfield Qld – Acquisition of DAP buildings, Kerry Road, 171/16/200 Part 1, NAA (ACT).

[67] Australian National Airways –Alterations to No 1 hangar Archerfield, 2608, MP287/1/0, NAA (Vic.); Servicing of aircraft: Alterations to No 3 hangar Archerfield, 1819, MP287/1/0, NAA (Vic.); Archerfield hangar no 3, QL270, J56/11, NAA (Qld); Servicing of aircraft: Qantas no 4 extension, 2134, MP287/1/0, NAA (Vic.); Archerfield hangars 4 and 5, QL128, J56/11, NAA (Qld); Archerfield Aerodrome: Lease ANA hangar no 6, QL278, J56/11, NAA (Qld); Archerfield – Lease of hangar allotment to W. Rankin – hangar 7, QL312, J56/11, NAA (Qld).

From 1939 to 1945 the Second World War forced progress in air transport and in the development of the aerodrome system which ordinary civil expansion could not have achieved in a comparable time span. Though Australian capital cities reaped the benefit of Commonwealth capital expenditure on the aerodrome system, the price paid was in architectural integrity. This wartime construction on Archerfield Aerodrome was the last significant improvement the Commonwealth would make on the site. Postwar it was not so much a case of economic stringency; rather that other sites in the system had priority.

When the expected postwar boom in light aviation did not arrive, secondary aerodromes such as Archerfield were caught between the DCA's desire to own and control development of the aerodrome system and the Commonwealth's reticence to spend money altering or replacing structures which seemed adequate for existing conditions. For that reason, nestled in the core of Archerfield Airport in 2003, along with its 1930s hangars, is the built fabric of the Archerfield Aerodrome of the mid-1940s.

Chapter 19

'The airlines were the smart new way to go... Only the impecunious, the unimaginative and the timid would now chose to put up with the appalling standard of service available on the nation's government railways.'[1]

The Second World War transformed the lives of Australians. It also propelled the nation's air transport system towards what Thomas P. Hughes has classified as the third phase in the evolution of a system, the period of growth, competition and consolidation.

Significant growth also was evident by 1949 in the aerodrome system, although without the dual nature of competition being fostered in the airline sector. While the Commonwealth's monopoly of ownership of the most important sites had allowed for their rapid expansion to meet military requirements, such total control distorted the priorities within the civilian aerodrome system. The hurried wartime pace of development and the consequent dictates of postwar reconstruction decided the fate of Archerfield Aerodrome.

What makes Hughes' system approach popular with historians of technology is his insistence on dealing jointly with the technological and the social. His belief that technological systems are socially constructed artefacts is grounded in the fact that people invent them.[2] People are responsible for their expansion and modification. Although indications of technological growth are presented in statistical or economic terms, these cannot be isolated from the social forces which propel that growth, nor can their subsequent effect on people's lives be disregarded.

To an even greater extent than they had been prior, aerodromes during this period became social loci, places not only where those involved in aviation met, but also where wider societal changes are apparent. At a simple level, the general public's greater exposure to this now relatively reliable and safe form of travel demystified aviation,

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[1] Macarthur Job, *Aircrash: The story of how Australia's airways were made safe*, vol. 2 (Weston Creek, ACT: Aerospace Publications, 1992), p. 40.

[2] Donald MacKenzie, 'Missile accuracy: A case study in the social processes of technological change', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 196; Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological*

contributing to the postwar demand for flying services. For their part, former military service personnel supplied the skilled workforce that allowed the aviation industry to meet that demand.

At a more complex level, those who learnt new skills on aerodromes and in aircraft manufacturing but could not find postwar employment in aviation contributed in other ways to Australia's postwar manufacturing economy. The women who overhauled engines or de-riveted aircraft may have been forced to return to traditional roles at the war's end; however, this period of moderate economic independence contributed to the advancement of women in later decades.

Prior to 1939 even the nation's major aerodromes at Mascot (KSA), Essendon and Archerfield were relatively isolated centres of human activity. The people who occupied them, DCA employees, the staff of aviation companies, their passengers and the members of aero clubs all performed some role in aviation's steady development. Were it not for the Second World War, this gradual expansion of the Australian aerodrome system would have continued.

Between 1940 and 1945, however, two groups from the wider community moved into roles newly created by the wartime growth of aviation. The first group consisted of the anonymous thousands of civilians who worked at or near aerodromes, either manufacturing or repairing aircraft. Members of a greatly enlarged RAAF, who likewise performed a range of aviation-related tasks, made up the second group. Women constituted small but significant percentages of both groups.

Exactly how many is difficult to assess. Historian Leigh Edmonds has estimated that at its peak in mid-1944 the number of civilians who gained direct experience in aviation through the aircraft manufacturing industry alone was 44 000.[3] As aircraft manufacturing was centred in the southern states, this figure does not necessarily include those who worked on Archerfield Aerodrome. Being closer to northern battlefields, and with already established civil aviation workshops, Archerfield became a centre for aircraft repair. Though the type of exposure to aviation-related tasks may have varied, the effect of it on the lives of people did not.

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systems: New directions in the sociology and history of technology, (Cambridge, Mass.: MIT Press, 1987), p. 52.

[3] Leigh Edmonds, 'How Australians were made airminded', *Australian Journal of Media & Culture*, 7 (1993), pp. 183-206.

On Archerfield Aerodrome, ANA, RQAC and APL initially expanded their staff numbers to service and repair RAAF aircraft. Of Wirraway A20-139 which crashed near the NSW border ANA engineer Trevan Jackson recorded:

> We were given the job of rebuilding it without drawings, so we levelled her up in flying position and ran piano wires about 100mm apart from wing root to wing tip and used them to calculate wing rib profiles and then made hardwood forms to hand beat new material over. Subsequently the Wirraway was test flown satisfactorily and delivered.[4]

RQAC was contracted to maintain the training aeroplanes of No. 2 EFTS. By 17 February 1942 the club employed twenty-two people, making the average amount paid in wages to the entire engineering staff each week four times the amount paid to their aerodrome staff in 1936. Although the aero club had trained one woman aircraft engineer in the late 1930s, in 1942 all women employed by the club were administrative staff.[5]

One postwar article claimed that at its peak in 1944 Aircrafts Pty Ltd (APL) employed more than 1 000 men and women across three hangars at Archerfield.[6] Ray Denning was one of those employees, having been sent there at the age of fourteen in September 1942 by the Manpower authorities. Based with approximately thirty others in the sheet-metal shop in hangar no. 2, his duties were to assist in the repair of the empennage and cowlings of Kittyhawks, Spitfires and Avro Ansons.[7] Having worked up to sixty hours a week, sometimes sixteen hours a day, he recalled:

> But of course it was wartime. An effort had to be made. So it was on us to get there very early in the morning. I can remember riding a pushbike down Beatty Road and the icicles hanging off the barbed wire fence as we rode along.[8]

After the arrival of US forces in Brisbane late in 1941, the Department of Aircraft Production (DAP) expanded Archerfield's role as a site for aircraft repair.

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[4] Trevan Jackson, Random ramblings of an early bird 1934–51, manuscript, 2001, p. 22.
[5] M. C. Langslow to Sec. RQAC, letter circa May 1940, Staff List of RQAC as at 17 February 1942, RQAC – Contract to maintain EFTS Half School at Archerfield, 208/33/81, A705/1, NAA (ACT). Annual report for the year ending 31 December 1936, (Royal) Queensland Aero Club – policy file, 5/102/119 Part 4, MP115/1/0, NAA (Vic.). In 1936 the total weekly wages paid by RQAC to aerodrome staff was £22.14.6. Engineering staff wages in February 1942 were £81.8.6. Constance (Connie) Jordan, trained in the RQAC workshop, was in 1942 employed by QANTAS.
[6] *Aircraft*, May 1947, p. 22.
[7] Empennage includes the horizontal and vertical control surfaces at the rear of an aeroplane.
[8] Ray Denning, interviews with author, 13 & 18 December 2000.

Concurrently, because Archerfield's airspace was so busy, the 1920s Eagle Farm aerodrome site was redeveloped to cater more specifically for the task of assembling and test flying newly arrived aircraft.[9] In this manner was the idea of a separate role for each of Brisbane's aerodromes clearly established and readily accepted by mid-1942.

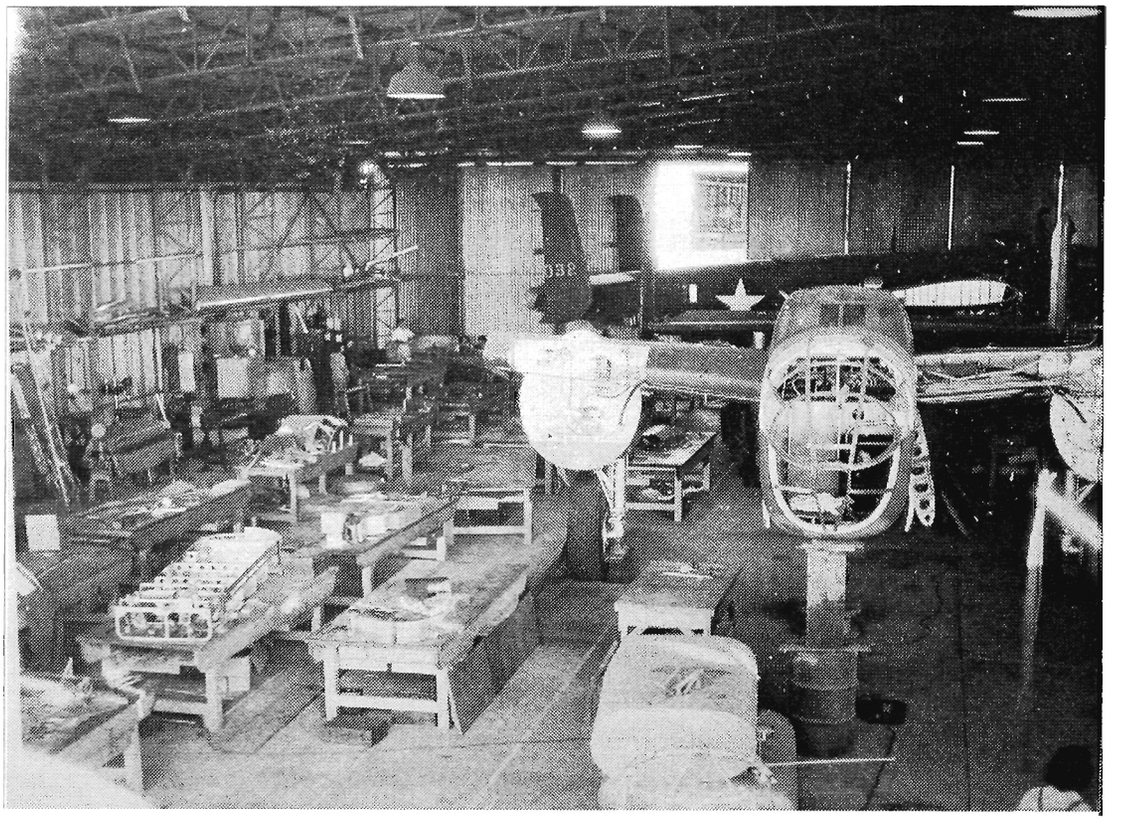

Figure 55: Inside ANA's Bellman hangar on 30 June 1943. Women worked alongside men in these hangars.
Source: Photo no. 2012, NN, BP34/1, NAA (Qld)

Overseen by the DAP and in conjunction with the 81st Air Depot Group, workers at ANA and QANTAS on Archerfield in 1942 commenced the repair of damaged US aircraft. ANA panel beater Harry Wilcox had arrived on Archerfield in April 1941 as one of the first nine employed in their airframe division. Though only in his late twenties, by 1944 he was a sub-foreman, in charge of seventy people on a day shift or 140 at night. He was also capable of hand-making any fairing required for a Douglas DC3.[10] By the end of 1944 Wilcox was one of the approximate 1 500 men and women employed in ANA's Archerfield airframe division.[11] (See Figure 55.)

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[9] Brian Creer, *Eagle Farm 1942: Airacobra assembly* (Archerfield, Qld: Service Aero Prints, 1987), pp. 10-12.
[10] Fairing is used to streamline surfaces which otherwise would produce additional drag on an aircraft, e.g. where the wing meets the fuselage.
[11] Harry Wilcox, interview with author, 19 January 2001.

On the airfield, women generally performed clerical duties or repair tasks regarded as unskilled. Harry Wilcox recalled that the women, some transferred from the munitions factories in Rocklea, disassembled the aircraft undergoing repairs in the Kerry Road ARU. (See Figure 56.) Ray Denning remembered women working throughout hangar no. 2:

> We had women in the sheet metal shop. There were women in the airframe part of the hangar up the middle and women doing dismantling work and in the timber shop.[12]

Figure 56: ANA workers on a break. Five of the six in this forward section of a Liberator are women
Source: Ray Spring

They clearly outnumbered men in the dope shop where fabric coverings were stretched taut over the metal frames of aircraft tailplanes and wings, a sewing-related task undertaken by women as early as the First World War. In September 1943 the staff of Archerfield's dope shop consisted of three men and twenty-one women, all of whom would have suffered the uncomfortable side-effects associated with the fumes of acetone-type aircraft dopes.[13] (See Figure 57.)

[12] Ray Denning, interview with author, 18 December 2000.
[13] W. Low, report dated 19 September 1943, Servicing of aircraft – Qantas hangar extension, Archerfield – Fire insurance premium on additions to Archerfield, 2134, MP287/1, NAA (Vic.). WAAAF fabric workers were given a pint of milk each day to combat the effects of the fumes.

Women's Employment Board Regulations, introduced in March 1942, meant that if they were doing work where a man had been employed previously, women received more than two thirds, but no greater than of the usual male rate of pay.[14] Though inequitable when viewed by today's standards, even a small wage meant some financial freedom for many women. Only rarely were they paid the full rate. Whether employed by RQAC or QANTAS, licensed ground engineer Constance Jordan, when repairing in-line and radial aircraft engines, was paid the same salary as the men she worked beside.[15] Jordan though was an exception.

Figure 57: Remnant exhaust vent on building no. 21, formerly QANTAS dope shop
Source: Author's collection

The thousands reporting daily for work placed pressure on the limited capacity of the aerodrome's prewar civil infrastructure to provide food, transport and ablution facilities. While the solutions to these wartime problems were undertaken to 'conform to the future development of the aerodrome' where possible and be wherever practicable 'set out in accordance with a master plan evolved by the DCA for permanent improvements to the area', invariably they were of a temporary nature.[16]

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[14] A. W. Foster, 'The experience of the Women's Employment Board in Australia', *International Labour Review*, 52 (1945), pp. 636-7; Sec. APL to Cost Investigation Officer, Minister of Munitions, letter dated 20 January 1944, Aircrafts Pty Ltd – Payment of claims, 2406, MP287/1, NAA (Vic.).
[15] *CM*, 1 June 1938, p. 8; Sheila Mann, *The girls were up there too: Australian women in aviation* (Canberra: AGPS, 1986), p. 18.
[16] 'Defence construction in Queensland and Northern Territory', *CPP*, 2, (1943–44 & 1944–45), pp. 1,653-4; Plan, no date, Archerfield – layout of canteen, LS558, J1018/2, NAA (Qld).

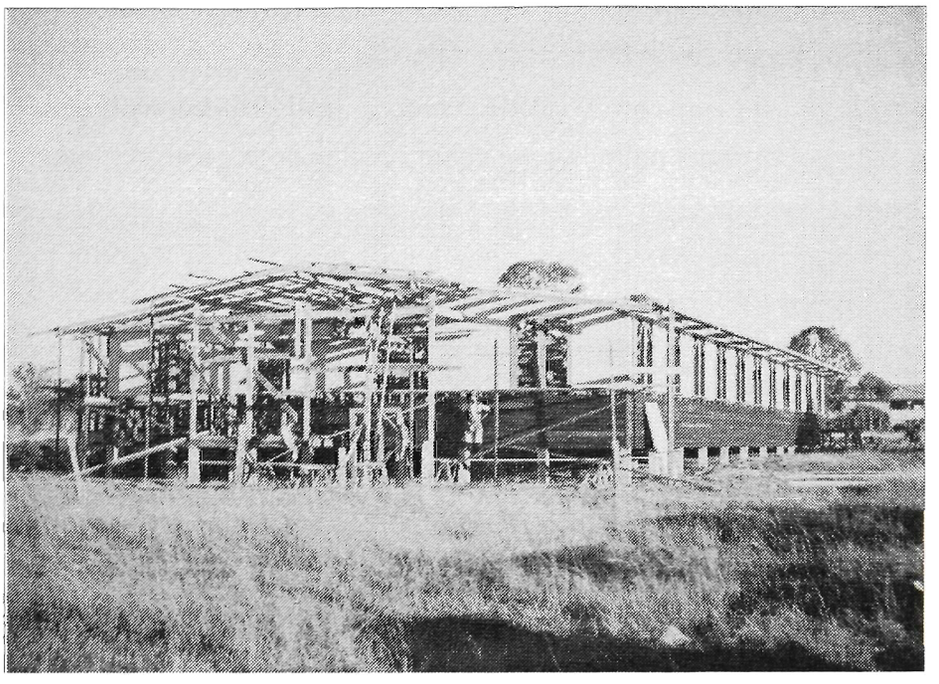

Figure 58: DAP canteen under construction in June 1943. After the war this was removed to nearby Salisbury where it was re-used by a local church congregation.
Source: Photo no. 2006, NN, BP34/1, NAA (Qld)

Prior to November 1943, the only canteen facilities available for workers were the cafeterias at hangar no. 6 and in the new terminal building. Like many others, Ray Denning and ANA apprentice engineer Keith Fedrick solved the problem by taking packed lunches. Nevertheless, official concern was expressed about the lack of catering facilities, the DAP having 'receiving constant complaints from contractors and their employees.'[17] According to Denning, the weatherboard and asbestos cement canteen, when completed in November 1943, made hot lunches at a reasonable price.[18] (See Figure 58.)

The large numbers working on the airfield highlighted the continuing lack of direct public transport. Harry Wilcox, who lived with his family at The Grange, initially rode his pushbike the nearly twenty kilometres to work. Living in nearby Annerley and Moorooka respectively, so did Ray Denning and apprentice engineer Les Robinson. Later, when working twelve-hour night shifts, Wilcox bought a 1924 Chevrolet Tourer

[17] Dir. DAP Maintenance Div. to DG DAP, memo dated 27 January 1943, AWC: regarding building projects being carried out in connection with servicing of aircraft, 2359, MP287/1, NAA (Vic.).
[18] Ray Denning, interview with author, 18 December 2000; Report on Qld servicing projects dated 6 April 1944, AWC: regarding building projects being carried out in connection with servicing of aircraft, MP287/1/0, 2359, NAA (Vic.).

which he nicknamed the 'Flying Fowl House'. In this 'improved' mode of transport he picked others up along the way.[19]

Obtaining extra petrol under rationing regulations had to be negotiated through the Fuel Control Board. Carpenter G. H. Muller travelled daily from Kelvin Grove to work on the construction of the RAAF's South Camp. On 28 June 1941 he wrote to the Board asking for an increase in his ration:

> My present allowance is 23 gallons [104 litres] per month. I have to travel 24 to 30 miles [39 to 48 kilometres] per day, six days a week. I am carrying several men who have been reduced to such an extent that they cannot run their cars so they have to get a lift with someone else.[20]

Sources do not indicate whether he was successful.

Other workers chose to catch the DAP bus which operated between the aerodrome and the tram stop at Moorvale four kilometres away.[21] Ray Denning distinctly remembered the spartan nature of the buses, likewise the consequences of being late:

> [They were] semi-trailers with garden seats bolted right across the trailer, a bit of a rough old roof and side curtains in case it rained, a ladder to climb up to get on to the bus and it was pretty rough. You had to be a bit smart once the bell went to knock off. You didn't mess about. You got ready and got to the bus as quick as you could, otherwise you walked. They didn't run too many schedules.[22]

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[19] Harry Wilcox, interview with author, 19 January 2001; Les Robinson, interview with author, 11 January 2001.
[20] G. H. Muller to WD, letter dated 28 June 1941, Archerfield No 2 EFTS, K169, BP243/1, NAA (Qld). The private motorist's ration was calculated to allow for 80 miles (129 kilometres) per month.
[21] The tram service was extended from Annerley to Moorvale shops at suburban Moorooka in 1938. In 1941 the line was extended from Moorvale an additional two kilometres to the Rocklea Munitions Works.
[22] Ray Denning, interview with author, 18 December 2000.

Allan Hodge sold newspapers to these wartime commuters. According to Hodge, 'The bus would just pull away when it was full, whether they [the workers] got their change or not.'[23] (See Figure 59.)

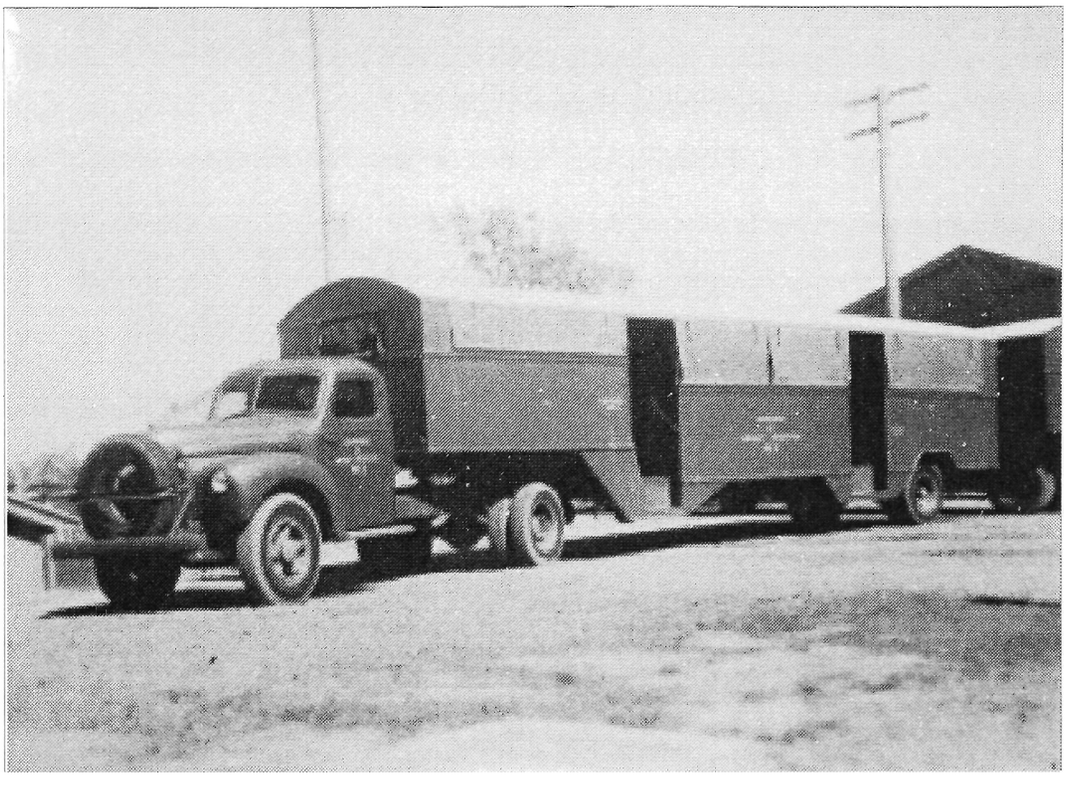

Figure 59: DAP trailer bus and prime mover, 19 August 1943
Source: NN, BP34/1, NAA (Qld)

Such large numbers also required adequate sewerage facilities, a matter soon brought to the attention of the RAAF and the Allied Works Council by the Brisbane City Council (BCC). The plant constructed north-east of the airfield in late 1941 to accommodate 23 Squadron was by late 1942 discharging effluent with too high a bacteria count. In defence, the Works Director explained to the Town Clerk that it was 'designed for a very much smaller population than it has been serving of late.'[24] The new facility was built to the south of the aerodrome later in 1943 to cater for approximately 5 000, more than its wartime requirements. A small irony existed in the fact that the Hunter Brothers' trucks, which carried the city's night soil, travelled past the airfield each day on their way to the disposal pits at Willawong.[25]

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[23] Allan Hodge, interview with author, 6 January 2001.
[24] WD to Town Clerk BCC, letter dated 7 January 1943, Archerfield RAAF – Water supply and sewerage, 3805/1, BP262/2, NAA (Qld).
[25] 'Defence construction in Queensland and Northern Territory', *CPP*, 2, (1943–44 & 1944–45), p. 1,654; WD to Town Clerk BCC, memo 21 December 1951, AF RAAF – National Service Training Accommodation – Married Quarters – Architectural, AR633/1, BP881/1, NAA (Qld).

In response to increasing US military requirements, workers on Archerfield commenced the overhaul of aircraft engines early in 1942. The following year operations expanded into two purpose-built facilities, one for ANA and one for QANTAS, constructed in nearby Moorooka. (See Figure 60.) Special hostels were erected to accommodate their working staff, and others from the Rocklea Munitions Works, parts of which also were converted for engine overhaul.[26] (See Figure 61.)

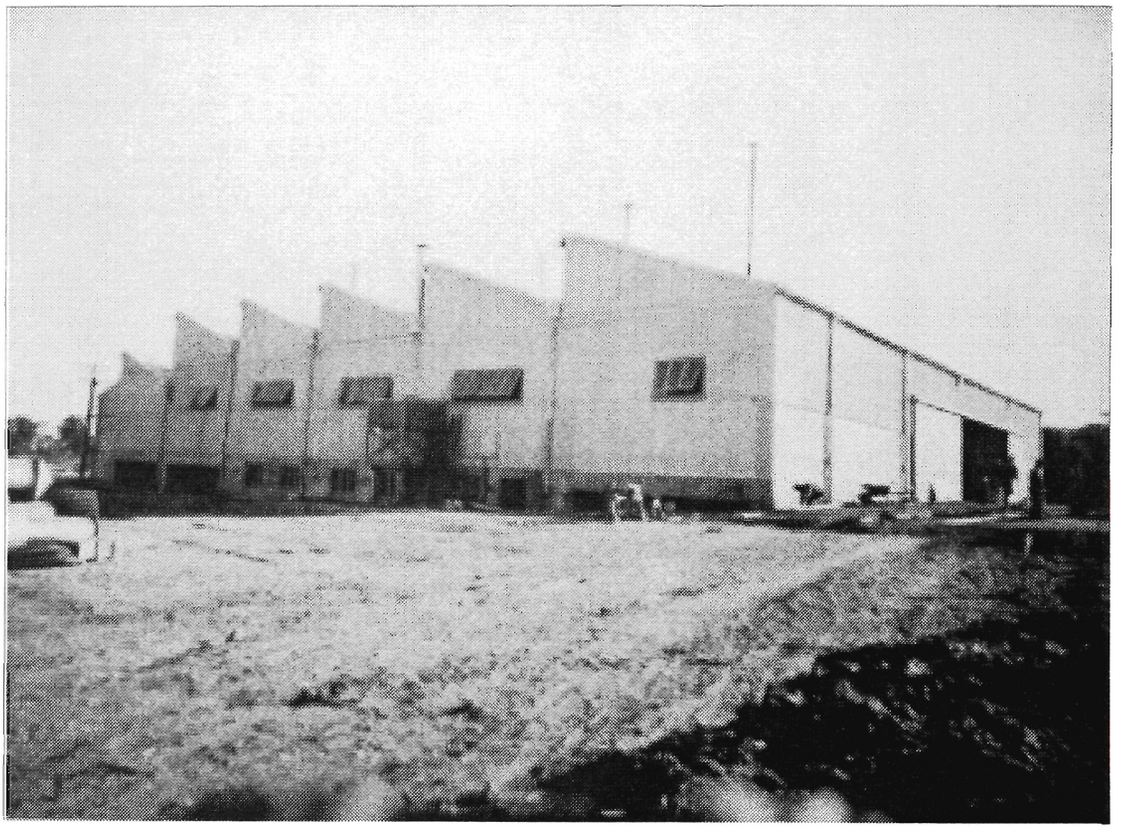

Figure 60: QANTAS engine overhaul shop in Hamilton Road, Moorooka. Having been extended, this building currently houses Boolarong Publications and two other companies. Source: Photo no. 2119, NN, BP34/1, NAA (Qld)

One worker who transferred from munitions work to engine overhaul was Jean Grosert. She recalled the period of changeover:

> We were taken in a big bus to Archerfield Aerodrome. We learnt about the Liberator aeroplanes and also saw a few Lightnings. From there, we went to

[26] Plan dated 18 March 1943, Archerfield Aerodrome – ANA engine workshop and canteen – site plan, W13288, J2774/1, NAA (Qld). The complex was referred to as Rocklea Hostels 1 & 2. An estate of Commonwealth Workers Dwellings was constructed nearby. Overhaul of US aircraft engines ceased entirely in December 1944.

> Hamilton Road, Moorooka, where QANTAS had a building. We learnt about aeroplane engines. I made a lot of good friends there and learned a lot too.[27]

The overhaul of aircraft engines was not restricted to the area around Archerfield. In 1942 the US 81st ADG employed approximately 1 200 Brisbane civilians. Around 630 were based at the GMH Allison overhaul facility at inner city Breakfast Creek, with an unknown number at Archerfield and Moorooka. In a one-year period from May 1942 these workers overhauled 819 aero engines.[28] (See Table 15.)

Civilians working on Archerfield were not the only ones to gain first-hand experience of aviation. Increased numbers of allied service personnel located on aerodromes after 1939 did likewise. Unlike other capital-city civil aerodromes, Archerfield's role as a military aerodrome between 1940 and 1949 involved the service personnel of four separate countries.

Table 15: Aircraft engines overhauled in the Brisbane area for the 81st ADG between 11 May 1942 and 11 May 1943.[29]

MONTH/YEAR	ANA ARCHERFIELD & MOOROOKA	QANTAS ARCHERFIELD & MOOROOKA	GMH BREAKFAST CRK & ROCKLEA	TOTAL
May 1942	2			2
June 1942	1			1
July 1942	2	4		6
August 1942	17	9		26
September 1942	9	11		20
October 1942	46	28		74
November 1942	18	54	3	75
December 1942	23	25	19	67
January 1943	37	24	34	95
February 1943	30	23	66	119
March 1943	26	15	93	134
April 1943	40	18	116	174
May 1943	12	6	44	62
Total	263	181	375	819

Between August 1941 and April 1942 the strength of RAAF personnel on Station Archerfield averaged a total of 370. (See Table 16.) To this must be added the unknown numbers of personnel of No. 23 Squadron, No. 2 EFTS and later No. 4

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[27] Matthew Byrnes, ed., *Wartime recollections* (Moorooka: Australia Remembers 1945–95 Moreton Commemorative Committee, 1995), p. 28.

[28] Keith O'Neill, telephone conversation with author, 31 January 2001; V. Condie, ed., *There will always be an 81st* (Brisbane: W. R. Smith & Paterson, 1943), p. 87; Hugh J. Casey, *Airfield and base development*, vol. 6, *Engineers of the South West Pacific 1941–45* (Tokyo: Reports of operations USAAF in the Far East, SWPA Army Forces Pacific, 1951), p. 59.

Communication Flight, No. 38 (Transport) Squadron, No 2 Air Ambulance Unit and a number of transient units.[30]

Table 16: Personnel numbers at RAAF Station Archerfield, August 1941 to April 1942.[31]

DATE	OFFICERS	OTHERS	TOTAL
August 1941	25	319	344
February 1942			
Max.	32	363	395
Min.	30	356	386
March 1942			
Max.	32	365	387
Min.	30	354	384
20 April 1942	30	292 (includes 36 WAAAFs)	322

Their lives revolved around offshore searches for enemy vessels, flight training, administrative duties, occasional fatal crashes, court martials and the arrival and departure of VIPs. Yet there was still time for humour. In a 1942 collection of verse from Archerfield's RAAF station, one poet tried to come to terms with what the cooks were serving:

> There's a subtle change in the Airmen's mess,
> And it really is a sin;
> To see the foreign element,
> That's slowly creeping in.
> It's with us nearly every meal,
> The Japs may call it nice;
> But a little goes a long, long way—
> That ever-present RICE.[32]

Graduating approximately twenty-five basic pilots per month at Archerfield's No. 2 EFTS cannot have been easy for the training staff involved. One anonymous flight instructor claimed his vocation required insight as well as 'That patience which will permit him to demonstrate for the hundredth time some elementary manoeuvre as

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[29] Condie, ed., *There will always be an 81st*, p. 92.
[30] Dennis Olsen et al., eds, *RAAF Archerfield Honour Board presentation* (Brisbane: No. 23 Squadron Association, 1993).
[31] Operations record book – Archerfield Station HQ Ver. A9186/9, 190, NAA (ACT).
[32] A. J. McIntyre, *Putting over a burst* (Brisbane: John Mills, 1942), p. 13.

though he was imparting to his pupil some secret information hitherto unrevealed to anybody.'[33]

Wireless operator/air gunner (WAG) Ken Cross transferred into No. 4 Communication Flight on 25 March 1943. When his aircraft was not rostered for air courier duties or transporting VIPs, Cross lived in South Camp. In his spare time he visited the large gymnasium where they ran pictures and staged concerts. His lasting impression of the Archerfield Aerodrome during the war was that it was a hive of activity.[34]

Fewer members of the Women's Australian Auxiliary Air Force (WAAAF) appear to have been stationed on Archerfield than in conjunction with other military installations. The difficulties they faced though were universal and often involved accommodation. At Cootamundra in NSW in March 1942 the 144 WAAAF personnel of No. 1 Air Observers School were accommodated in huts on a very public Cootamundra West Railway Station.[35]

The nineteen WAAAF mess attendants and five teleprinter operators of No. 4 Comm. Flight on Archerfield by comparison were allocated two huts on the end of a line of huts occupied by RAAF personnel.[36] Such accommodation arrangements were deemed less than satisfactory by an inspector who reported, 'I was informed by the one in charge that all windows have to be shut when undressing...There are two cold water showers and one lavatory.'[37] Numbers of WAAAF on Archerfield increased only slightly from that time. Throughout 1944 an average of only thirty-four members of the WAAAF, all attached to No. 4 Comm. Flight, were stationed there. These women constituted a very small percentage of the 653 officers and 18 011 airwomen who served in the WAAAF after its formation early in 1941.[38]

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[33] *Aircraft*, August 1942, p. 24.
[34] Ken Cross, interview with author, 17 January 2001.
[35] E. M. Robertson, *WAAAF at war: Life and work in the Women's Australian Auxiliary Air Force* (Canterbury, Vic.: Mullaya, 1974); Clare Stevenson and Honor Darling, eds, *The WAAAF book* (Sydney: Hale & Iremonger, 1984).
[36] Ben Dannecker, *Cootamundra aerodrome* (Essendon, Vic.: B. Dannecker, 1976), pp. 24-6; Senior inspector, Inspector General of Administration to Sec. Board of Business, memo dated 5 March 1942, DWB – RAAF Number 2 EFTS – Archerfield Qld – Buildings and services, 171/16/136 Part 1, A705/1, NAA (ACT).
[37] Senior inspector, Inspector General of Administration to Sec. Board of Business, memo dated 5 March 1942, DWB – RAAF Number 2 EFTS – Archerfield Qld – Buildings and services, 171/16/136 Part 1, A705/1, NAA (ACT).
[38] Copy of minute from file 231/9/1956, dated 13 March 1944, Air Board Agenda 5865 dated 26 May 1944, DWB – RAAF Station Archerfield – Buildings and services, 171/16/136 Part 2, A705/1, NAA (ACT); Robertson, *WAAAF at war*, p. 103.

US military personnel also were stationed on Archerfield Aerodrome. Former serviceman Bill Bentson has identified fourteen separate US units based there between 1942 and 1945, the longest serving being the 21st Troop Carrier Squadron. Neil Gates was a radio operator with that squadron between April 1942 and February 1943. He remembered sleeping on straw palliases in corrugated iron huts that were cold in winter but otherwise comfortable. Entertainment was provided at the NCOs club in the cottage near the quarry, or by playing baseball.[39] Archerfield was also home, if only for a short time, to 200 members of the US Women's Air Corps (WAC). They were accommodated in fourteen huts in South Camp in August 1944.[40]

The additional numbers of service personnel on Archerfield placed even more strain on the existing infrastructure. Again areas causing concern for individuals were transport and food.

Having in June 1944 married an Australian woman whose family lived in the bayside suburb of Wynnum, Neil Gates had first-hand experience with slow commuting. Returning to Wynnum from Archerfield after an operational tour in a northern war zone involved taking the US Services bus or a tram to the city, then making sure not to miss the last train at 10:00 p.m. Either way it was a 'three to four hour journey.'[41]

However, Archerfield's local entrepreneurs profited by the lack of variety in service food. Jeannetta Freney ran a nearby corner store alongside her husband Bill's barber shop at the intersection of Beatty and Boundary roads. She recalled 'the Yanks used to go up for their meals at the mess...and then they'd come in and they'd have ice cream and all sorts of things...Often I had to run in to Annerley to get extra cakes.'[42] Isobel Wood ran a store close to the airfield entrance. Neil Gates remembered her 'tuckshop' only sold cheese sandwiches, but made a fortune doing so.[43]

Also based on Archerfield in the latter part of the war were the members of HMS Nabsford, a Royal Navy (RN) Transportable Aircraft Maintenance Yard (TAMY). These RN personnel occupied the former US Camp Muckley. Smaller numbers of

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[39] Neil Gates, interview with author, 5 January 2001; Archerfield file, Bill Bentson Collection.
[40] CO Forward Echelon, RAAF HQ BNE to Dir. Organisation, RAAF HQ, memo dated 22 July 1944, DWO to DWB, memo dated 16 August 1944, DWB – RAAF Station Archerfield – Buildings & Services, 171/16/136 Part 2, NAA (ACT).
[41] Neil Gates, interview with author, 5 January 2001.
[42] Jeannetta Harvey, interview with author, 31 January 2001.
[43] Neil Gates, interview with author, 29 December 2000.

personnel from the RAF's 1315 Transport Flight also occupied some of the camp's huts during 1945.[44]

The fourth national force stationed on Archerfield was the Netherlands East Indies (NEI) No. 19 Transport Squadron, which operated within the RAAF Eastern Area Command from 15 August 1945 to 1 January 1947. Based in a section of the former Kerry Road ARU, until its departure in September 1947 this squadron employed up to sixty Australian civilians.[45] Joan White was an engineering clerk there, responsible for making and delivering copies of engine statistics to all section heads each morning. She remembered at first being teased about a fear that her actions might 'drop a plane out of the sky.'[46] Gradually she became more accustomed to the requirements of working with aircraft.

The time spent at aerodromes during the war, and the experiences gained, altered the lives of many people. Aviation was more readily accepted as a form of air transport. At times this filtered into the next generation.

Ray Denning stayed with aviation until 1948 when he moved into poultry farming and later insurance assessing. He remembered his years at Archerfield as 'an experience that I possibly would never have had, had it not been for the war. But I learnt skills there and I met people there. It was quite worthwhile.'[47] In 2003 his son Matthew completed the reconstruction to flying standard of a Second World War Boomerang aircraft, a task that took twenty-seven years.

In 1948 Harry Wilcox and his brother started Wilcox Motor Body Works, a company they operated for thirty-three years. He regretted his connections to aviation were severed when his licence to weld aircraft parts was cancelled by the DCA because he

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[44] Schedule of approved works, Air Board Agendum 6667 dated 17 July 1945, RNNAA – Kerry Road, Archerfield (Qld) – Buildings & services, 171/16/240 Part 1, NAA (ACT); Folio item 25A, undated memo, DWB – Property – Archerfield Qld – Dispersal areas – Camp site – Sewerage works – Disposal of assets, 171/106/727 Part 1, A705/1, NAA (ACT). Over two thousand transient British naval officers and ratings also were accommodated in the nearby Rocklea Hostels.

[45] Alan Shawsmith, interview with author, 16 January 2001; No. 19 (NEI) Transport Squadron, David Wilson to Alan Shawsmith, letter dated 11 July 1995, Alan Shawsmith Collection; CO No. 1 NEITS to DG Manpower, Sydney, letter dated 13 August 1945, Employment of Australians by the Netherlands Government in NEI – Policy (including limitations on employing Australian females overseas etc.), 1944/70/10715, B551, NAA (ACT).

[46] Joan White, interview with Adam McCafferty, no date, CPLHG. Three Australians and three Dutch airmen were killed when their DC3 crashed into the sea off Stradbroke Island on 26 February 1947 during a test flight.

[47] Ray Denning, interview with author, 13 December 2000.

was not working in the industry. Ray Denning's son used some of Wilcox's specialist tools to complete his aircraft rebuild.[48]

When ANA moved its engineering workshops to Eagle Farm, licensed engineer Trevan Jackson left aviation, choosing instead to work closer to his Salisbury home in the Rocklea Industrial Estate, formerly the Rocklea Munitions Works. On retirement he wrote an account of his years in aviation.

Though he too lived close to Archerfield, engineer Keith Fedrick elected to travel the distance to Eagle Farm each day after his transfer there with ANA in 1948. This grandson of a rural blacksmith retired from his position as general manager of Ansett Corporate Aviation in Brisbane in December 1987. All three of his children have worked in aviation.[49]

Connie Jordan remained with QANTAS postwar, relocating with the company to Sydney to work on their flying boats. Though she left full-time work as an engineer after her marriage to Paavo Karhula, she retained her engineering licences until 1970.[50]

After the war indications appear of a faith that air transport would become the chosen means of travel for more people, in itself a reflection of the mood of postwar reconstruction. That initial optimism was replaced by the reality that rapid growth in civil aviation might not be sustained by actual demand. The realisation can be seen in the activities of people on and around Archerfield Aerodrome.

Having been such a social force prior to 1939, RQAC used the years until 1949 to recover its momentum as a leading institution in civil flight training. A 1946 aviation magazine article saw as one ingredient to recovery the 'thousands of ex-RAAF members eager to keep on flying, or—in the case of groundstaff men—to learn to fly.'[51] RQAC's first task was to acquire the necessary new training aircraft, a job made easier by the availability of DH82 Tiger Moths from the Commonwealth Disposals Commission. Club pilots ferried the new fleet from storage on RAAF bases in southern

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[48] Harry Wilcox, interview with author, 19 January 2001; Matthew Denning, interview with author, 31 August 2002.
[49] Keith Fedrick, interview with author, 18 January 2001; Jackson, Random ramblings, p. 39.
[50] Browsing book on Australian women pilots, Stockman's Hall of Fame & Outback Centre, Longreach.
[51] *Aircraft*, February 1946, p. 16.

states. By late 1946 RQAC possessed thirty-four aircraft, compared to its 1936 fleet of eight training and one cross-country machine.[52]

Pilot Harold Kenny, who hoped to make a career in postwar aviation, was involved in more than one of these flights. Of one such ferry flight from Tamworth he recalled:

> For me such flights were reasonably important, as I needed the cross-country time for my commercial licence. My aircraft on this flight was to be A17-423... The flight was carried out via Tenterfield, in four hours and five minutes on 21 August 1946, my twenty-sixth birthday.[53]

Kenny later carved out an adventurous career in general aviation.[54]

All aero clubs were assisted in their recovery by the introduction in 1948 of a new scheme of Commonwealth subsidies which more than doubled the previous total figure of £20 000 provided to aero clubs.[55] Despite this financial incentive, by 1949 concern was being expressed openly that the expected postwar boom in light aircraft flying might not eventuate. In one article *Aircraft* editor Stanley Brogden expounded 'the horrid truth...that fewer Australians climb into a light plane than any other nationals—except probably, Liberians or Libyans.'[56]

The reality was that Australians were not yet as airminded as the optimists believed. According to military historian John Robertson, a total of 21 530 pilots were trained under the EATS between late 1940 and mid 1945. Stanley Brogden, who had served in the RAAF, estimated 11 000 of these were available to be employed in postwar aviation.[57] Yet the chances of them succeeding were slim, as an ex-RAAF reader reported for *Aircraft* in May 1946:

> Bitterest of the facts facing the man leaving the RAAF's aircrews is that the odds against him flying again are very large. We might as well face the

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[52] *Aircraft*, November 1946, p. 42; Annual report for the year ending 31 December 1936, (Royal) Queensland Aero Club – policy file, 5/102/119 Part 4, MP115/1/0, NAA (Vic.).
[53] Harold Kenny, 'Living to fly' might well become 'flying to live', Part 1, manuscript, 1994, p. 105.
[54] Harold Kenny, interview with author, 9 January 2001; Harold Kenny, 'Living to fly' might well become 'flying to live', Part 2, manuscript, 1994.
[55] *Aircraft*, November 1948, p. 23; Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 223.
[56] *Aircraft*, August 1949, p. 16.
[57] *Aircraft*, February 1946, p. 19; John Robertson, *Australia at war 1939–45* (Melbourne: William Heinemann, 1981), pp. 217-21.

> unpalatable fact that most RAAF aircrewmen will not fly again in civil life, for one reason or another.[58]

The chief reason was the lack of positions available in civil flying, and without a greater public demand for flying services, commercial operations could not be sustained. Key industry journal *Aircraft* reported that by November 1945 only around 150 former members of RAAF aircrew were employed with civil airline companies. Without actual passenger demand, airlines just did not need that many pilots. By October 1946 the new government airline, TAA, employed only forty-five qualified pilots on route operations, though it was expecting a further intake of twenty-five that November.[59] In May 1947 Brisbane-based APL employed a total of fifty-six men and women undertaking all the tasks of running an airline. Their staff included only seven pilots.[60]

For the fortunate few who kept flying the rewards were long-term. Alan Wharton had commenced his working life as a Lismore bank teller. After RAAF service he joined QANTAS, eventually becoming their director of flight operations. Bob Gray had already decided he did not want to be an accountant before he joined the RAAF for wartime service. Employed by QANTAS in 1947, he retired as a B747 jumbo jet check captain in 1975, sad that his flying career had come to an end. Ashley Gay operated a textile agency before his service in the RAAF. Like Wharton and Gray he flew for QANTAS postwar, eventually remaining with the airline for twenty-seven years.[61]

Aviation growth, however, did occur slowly. In his history of the DCA, airline executive Arthur Butler saw the rationing of motor spirit and aviation fuel as the boost to air transport which resulted in the carriage of 1 232 506 passengers on regular domestic services in the year ended June 1948. People and freight were travelling more often by air. The number of passenger kilometres increased 496.7% between 1938–39 and 1945–46, while the amount of freight carried increased a staggering 640% over the same bracket of years.[62] Passenger kilometres flown between 1944–45 and 1964–65 would increase eleven fold from 277 million to 2 637 million. In 1949 though, such grown was still in the future.[63]

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[58] *Aircraft*, May 1946, p. 31.
[59] Ian Sabey, *Challenge in the skies: The founding of TAA* (Melbourne: Hyland House, 1979), p. 109.
[60] *Aircraft*, May 1947, p. 48.
[61] 'Alan Wharton DSO, OBE, DFC, MID', *AHSA Aviation Heritage*, 31 (2000), pp. 50-63; 'R. A. (Bob) Gray', *AHSA Aviation Heritage*, 33 (2002), pp. 19-28; 'Ashley Gay', *AHSA Aviation Heritage*, 32 (2001), pp. 25-32.
[62] *Aircraft*, October 1946, p. 25; C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), p. 87.
[63] Howard G. Quinlan, 'Air services in Australia: Growth and corporate change, 1921–96', *Australian Geographical Studies*, 36 (1998), p. 159.

While airline positions were scarce in the immediate postwar years, the chances of employment with the DCA seemed more likely as it commenced a period of massive expansion. As early as 1942 the planners within the DCA had forecast the need for large numbers of employees postwar to construct and maintain the aerodromes, runways and control buildings, as well as provide the services of meteorological forecasting, radio communication and system of electrical lighting needed at major aerodromes. Director-General Arthur B. Corbett estimated 'a period of probably two years of a large amount of work for a large variety of unskilled and skilled workers...which would continue to provide permanent employment in positions not previously existing.'[64]

Between 30 June 1944 and 30 August 1945 the number of DCA employees in all categories increased from 685 to 953, an increase of 40%. By 1947 the number of DCA employees had increased to 2 030, in part due to the department taking over responsibility for its own construction works.[65] This marked increase in DCA staff numbers was due to continued acceptance by the Commonwealth of a policy that 'unified control and operation of aviation and airports were essential for the Commonwealth to meet its international obligations in air navigation.'[66] As countries sought to re-establish airline routes postwar, a provisional International Civil Aviation Organisation (PICAO) had been formed. Between 1947 and 1953 Australia's representative at PICAO and later International Civil Aviation Organisation (ICAO) councils in Montreal, Canada, was aerodrome engineer K. N. E. (Bill) Bradfield.[67]

Radio operator Ken Cross was one of the 150 former RAAF personnel newly employed by the DCA between August 1945 and April 1946. After six months training on civil operations he was posted initially to Adelaide's Parafield Aerodrome, then Darwin and Archerfield.[68] Like many Australians of this period, the most pressing problem he faced after employment was that of accommodation for his family.

The DCA saw provision of accommodation where possible as an obligation to employees. Unfortunately Cross was not one of the lucky recipients. With no accommodation vacant in the DCA Archerfield Staff Housing Scheme on his return to

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[64] Submission by the DG of DCA – Postwar reorganisation: Outline of a plan for civil aviation, January 1943, Reports of Inter-Departmental Committees, Exhibit 3, MP183/16, NAA (Vic.).
[65] W. Davies, *This flying business: A life of Arthur Schutt* (West Melbourne: Thomas Nelson (Aust.), 1976), p. 125.
[66] Martin Painter and William Sanders, 'Reshaping Australian aviation and airports administration: Some comparative reflections', *Policy Organisation and Society*, 10 (1995), pp. 27-8.
[67] Bill Bradfield, interview with Barbara Blackman, 7 November 1986, TRC 2127, NLA.
[68] Ken Cross, interview with author, 17 January 2001; *Aircraft*, May 1946, p. 31; Butler, *Flying start*, p. 68.

the airfield in September 1946, Cross chose to board nearby with relatives, travelling to Southport on his days off to be with his wife and child.[69]

Even into 1951, DCA officers based at Archerfield were experiencing accommodation difficulties, such as those described by a communications officer living in Red Hill:

> [We occupy] two rooms which are portion of house occupied by three families, one containing three very young children, two of whom are home all day. Myself and stepson both on shift duties at Brisbane Aeradio [Archerfield], unable to obtain normal sleep. Wife suffering nervous disorders and is under specialist treatment.[70]

According to WAAAF historian Joyce A. Thomson the war 'brought about dramatic changes to the status of women.'[71] Contemporary documents more than hinted at the changes occurring in the lives of women who had joined the WAAAF. Patricia Massey-Higgins wrote that through the co-educational atmosphere of an air station 'the girls get a truer perspective on men. Old Victorian ideas are discarded, and the men are assessed on their real qualities... It is an era of complete emancipation.'[72] It was, however, an era that optimistically predicted change would take some time to achieve.

Given the number of demobilised RAAF and other former military personnel in the employment market, the wartime service of women did not have the chance to translate into postwar employment opportunities. Women generally returned to the more traditional role of unpaid work within the family. Even Yvonne Righetti, the only woman aerodrome control officer trained during the war, retired so that a returned servicemen might be employed.[73]

The social effects of more immediate access to aerodromes and aircraft by ordinary men and women cannot be quantified in a graph or set of figures. They are evident in the changes seen in the lives of many individuals. It is not easy either to calculate just how much influence that involvement with aeroplanes had on singular people, especially

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[69] Ken Cross, interview with author, 17 January 2001; Archerfield DAP road intersections, LS1158B, J1018/2, NAA (Qld). The scheme consisted of a group of houses resumed from residents during the war and shifted to a small estate north of Kerry Road. A swimming pool and parks were planned in a larger facility which was never constructed.

[70] J. Davis to S&PO, memo dated 16 May 1951, Archerfield RAAF Married Quarters – Dept of Air, QL718/23 Part 1, J56/11, NAA (Qld).

[71] Joyce A. Thomson, *The WAAAF in wartime Australia* (Carlton, Vic.: MUP, 1991), p. 253.

[72] Patricia Massey-Higgins, *They speed the eagles* (Sydney: F. H. Johnston Publishing, 1944), p. 64.

[73] *Airnews*, September 1980, pp. 8-9; Mann, *The girls were up there too: Australian women in aviation*, p. 24. Yvonne Righetti married, becoming Yvonne Swanson.

when few have told their story in a written form, or have been asked to do so orally. Women have done so to a lesser extent than men. When time to do so is available, it is often after the passage of many years. Sometimes too there exists a desire to gloss over incidents considered uncomfortable or upsetting.

The clearest marker of the social acceptance of air transport lies then in the changed attitude of Australians towards air travel and the role that women play in it. Deborah Wardley was the first woman employed by a major Australian airline as a pilot. Her appointment to Ansett Airlines in November 1979 was the outcome of societal changes which were accelerated on aerodromes such as Archerfield after 1940. These changes were indelibly linked to the development of the mature technological system in which Wardley could establish her career forty years later.

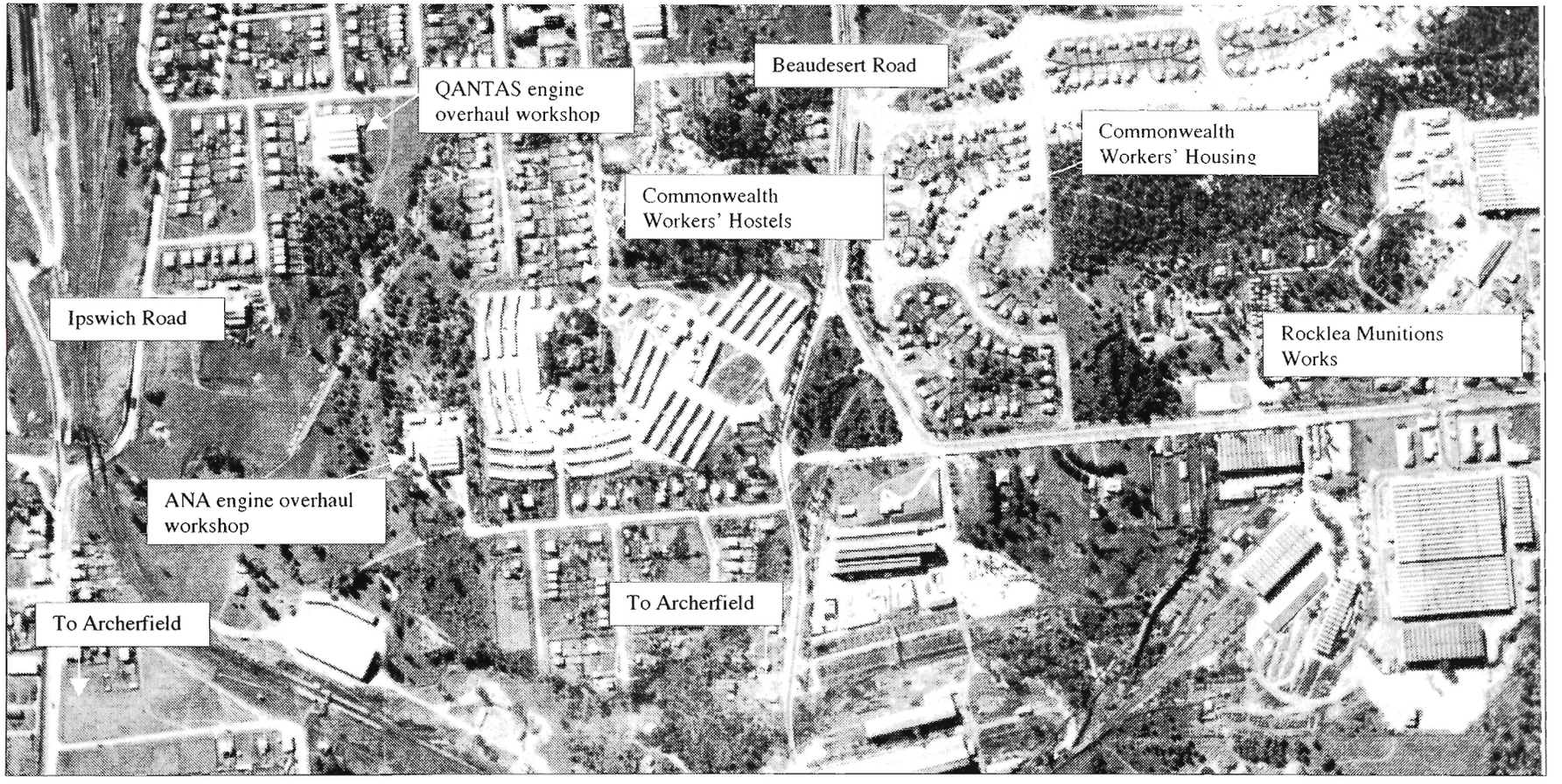

Figure 61: 1946 aerial view of Moorooka and Rocklea, just north of Archerfield, showing related expansion during the Second World War
Source: BCC Heritage Unit

Chapter 20

'Movement is what really matters in life. The critical dimensions are where you have been, where you are going and the rate at which you get there.'[1]

By the early 1950s the Australian air transport and aerodrome systems had progressed into what Thomas P. Hughes referred to as the growth, competition and consolidation phase of system development. From then until 1988, the year Brisbane's new International Airport opened, that phase consisted of two, distinctly different brackets of years.[2]

Domestic airline companies consolidated their routes into workable networks during the first bracket of years, the decade of the 1950s. At the same time the Commonwealth restricted competition into what would emerge as a duopoly, a state of air transport organisation known colloquially as the Two Airline policy. As if to mark a new stage in the growth of air transport, in 1958, for the first time, arrivals into Australia by air outnumbered those by sea. In the second period, from then until 1988, the nation accelerated towards the era of mass air transportation, most especially after the introduction of the Boeing 727 to domestic services in November 1964.[3]

As it had done previously, the Commonwealth controlled air transport consolidation and competition, as well as ensuring the provision of airports for scheduled services. In so doing it had created by the late 1980s a highly regulated system, one which aviation lobbyist and subsequent Civil Aviation Authority Chairman Dick Smith referred to at the time as an aviation 'Hall of Doom'.[4]

The Commonwealth's desire to control postwar aviation was affected by three broad trends apparent even in the late 1940s. Firstly, it was recognised that both the air transport and airport systems were expensive to operate and costs were accelerating. Works at Sydney's Mascot are ample evidence. In the late 1940s parliamentary approval was given for a £5 million upgrading of Sydney's Mascot. By 1953 the cost

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[1] J. Clifford, 'Travelling cultures', in L. Grossberg, C Nelson, and P. A. Treichler, ed., *Cultural studies*, (New York & London: Routledge, 1992), pp. 96-116.
[2] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 56.
[3] Peter J. Rimmer and Sandra M. Davenport, 'The geographer as itinerant: Peter Scott in flight, 1952–96', *Australian Geographical Studies*, 36 (1998), p. 125; Neville Parnell and Trevor Boughton, *Flypast: A record of aviation in Australia* (Canberra: AGPS, 1988), p. 305.

of improvements had blown out to £8.5 million, even with a reduction in the number of runways being constructed. The engineer-in-charge, K. N. E. (Bill) Bradfield, provided an insight into the impending costs in 1945 when he advised *Aircraft* readers that 'Paved runways cost money—big money.'[5] Because the nation's major airports were owned by the Commonwealth, increasing amounts of public money would be needed to ensure system growth, else other means would need to be found to reduce or share costs.

All the new artefacts of air transport proved expensive. To enter the jet age, in November 1956 the Commonwealth borrowed $US27 million to cover the cost of QANTAS' first seven Boeing 707 airliners. This exciting, new technology was introduced into service in 1959.[6]

The second trend apparent in this period is the evolution of aircraft configuration into what we recognise as the technological style of airliners of the late twentieth century. Until challenged by the Airbus Industries conglomerate, this trend could be recognised in the products of the pre-eminent US aircraft industry. Regardless of manufacturer, the airliner configuration that has proved most efficient consists of two or four jet engines suspended as pods beneath swept-back wings centrally located on the fuselage. Until a series of early 1950s accidents caused by catastrophic depressurisation shook the faith of people and air transport companies in its design, the British de Havilland DH106 Comet 1 held the technological lead. The US Douglas and Boeing companies dominated thereafter, acceptance of their product as a mass air transport vehicle never really challenged by the supersonic Concorde design of joint British and French origin.[7]

Lack of a settled technological style in the early years of this period made forward planning difficult for airport designers and administrators. In overseas situations this was especially so when the owner was a municipal authority accountable to its ratepayers. Due to a twenty-year lag between design and implementation, a delay attributable to municipal indecision, the design of Holland's new Schipol Airport when opened in 1967 was based on a technology that was no longer used.[8] As British

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[4] Dick Smith, *Two years in the aviation hall of doom* (North Sydney: ACORP, 1984).
[5] K. N. E. Bradfield, 'Some notes on Australian airport development and design', *Aircraft*, December 1945, p. 14; Parnell and Boughton, *Flypast*, p. 250.
[6] John Gunn, *Contested skies: Trans-Australia Airlines, Australian Airlines, 1946–92* (St Lucia, Qld: UQP, 1999), p. 121.
[7] Ronald Miller and David Sawers, *The technical development of modern aviation* (London: Routledge & Kegan Paul, 1968), p. 194.
[8] Marc L. J. Dierikx and Bram Bouwens, *Building castles of the air: Schipol Amsterdam and the development of airport infrastructure in Europe, 1916–96* (The Hague: Sdu Publishers, 1997), p. 291.

aerodrome designer A. C. (Morris) Jackaman reported in 1946, 'It would be a rash man who would attempt to foretell what major problems the next ten years of Civil Aviation will bring to the airport designer.'[9]

The third trend can be identified through a range of social issues exacerbated by the introduction of jet technology. The most pressing and controversial were the time lost in journeying to and from the airport and pollution, either of the air or by excessive noise. The solutions to these problems were to be found in urban planning, in linking airports with rail and road networks or, more particularly in the case of air and noise pollution, legislating to reduce their impact on the existing urban fabric. Solutions had to be peculiar to individual sites and often required difficult negotiations. As geographer Mack J. Bouman explained, 'Each place also has its socio-political network, the various parts of which respond differently and at times conflictingly to the prospect of so huge a public investment as an airport.'[10] How and where development occurred within the Australian system of aerodromes was, more than at any other time, the consequence of political, economic, technological and social factors.

The three trends apparent during this period were global, invariably revealing their impact overseas earlier than in Australia. To assist their finances, European and American airports owned by municipal authorities had applied a variety of non-aeronautical solutions to the problem of expense. Schipol Airport conducted tarmac tours for a fee, while Atlanta's Hartsfield Airport recouped part of the $US170 000 cost of its 1948 terminal by a ten cent charge for entering the building's observation desk.[11] Concessions to operate lucrative duty-free stores raised revenue, though not all authorities saw the full potential in this at first. A British article from 1960 entitled 'Can we make airports pay?' argued that even then authorities paid insufficient regard to the sale of 'fuel and oil, from the use of various concessions, and from car-parking fees paid by visitors to the airport.'[12]

To achieve the best return on capital equipment costs, aircraft needed to be in the air as often as possible and with as little turn-around time as possible. British European

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[9] A. C. (Morris) Jackaman, 'Some thoughts on aerodrome development in Australia', *Aircraft*, March 1946, p. 21.

[10] Mark J. Bouman, 'Cities of planes: Airports in the networked city', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich and New York: The Art Institute of Chicago and Prestel-Verlag, 1996), p. 179.

[11] Betsy Braden and Paul Hagan, *A dream takes flight: Hartsfield Atlanta International Airport and aviation in Georgia* (Atlanta, Georgia: University of Georgia Press & the Atlanta Historical Society, 1989), p. 118.

[12] *Flight*, 9 December 1960, p. 903-5. The announcement of the installation of the first 100 parking meters at Eagle Farm Airport was made in September 1959.

Airways' traffic director E. P. Whitfield was particularly sensitive to the fact that his aircraft still spent approximately 30% of their time on the ground during 'the most commercially useful hours of the day'.[13] He believed the solution was quicker turn-around and shorter transit times.

Time mattered more to the business traveller and many planners of the period worked to reduce what they considered were the productive hours wasted in getting to the airport and onto the aircraft. Whitfield observed an 'ever-growing disparity between time spent on the ground and in the air in the course of a journey.'[14] Some planners in the US referred to the condition as 'timevalue' and moved rapidly to connect airports to central business district using multi-lane highways.

Australian engineer K. N. E. (Bill) Bradfield believed the solution was 'locating the airport as close as possible to the centre of population which it serves, while providing the facilities necessary for the safe and satisfactory operation of aircraft.'[15] Inevitably this solution would create new and additional problem as the size and noise emissions of aircraft increased. In the early postwar years British airport designer Morris Jackaman suggested that modern development, either for housing estates or farming areas, should be in the general direction of proposed or existing airport sites to allow ground transport infrastructure to be shared.[16] What is evident in the thinking of these planners is what architect Mark J. Bouman identified as the search for a balance between centrality and peripherality. Unfortunately, this driving force behind airport location created other urban conundrums.

Highways and improved access to airports opened up land for residential development, land which, when well serviced by automobile transport was, by virtue of its distance from the city, comparatively inexpensive and affordable. Where there were no restrictions on land-use adjacent to an airport, complaints about air and noise pollution soon were received from these new and close neighbours. Gradually a shift in focus occurred as airport planners and municipal administrators were forced to consider the wider picture, to cater for the community obligations of airports to the same extent as they had the operational requirements of aircraft technology.[17]

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[13] E. P. Whitfield, 'Terminal design for the jet age', *The Aeroplane*, 13 June 1958, p. 809.
[14] Whitfield, 'Terminal design for the jet age', p. 809.
[15] Bradfield, 'Some notes on Australian airport development and design', p. 13; Paul Barrett, 'Cities and their airports', *Journal of Urban History*, 14 (1987), pp. 118-9.
[16] Jackaman, 'Some thoughts on aerodrome development in Australia', p. 21.
[17] Barrett, 'Cities and their airports', p. 128.

Some designers had held solid, contrary views about noise pollution. Prior to the introduction of jets, Morris Jackaman viewed aircraft propeller noise as 'not as consistent as the continual rumble and grind of trains and trams, which render hideous the day and night hours of those who work or live within earshot of any main railway station.'[18] It is not known whether he varied his opinion in the years which followed.

As the owner of the country's capital-city airports, and many of its minor ones, the Australian government was directly responsibility for the postwar development of the aerodrome system. In the allocation of funding for projects, inevitably some sites received less than others. For most of this period, Brisbane's airports received the minimum of funding to ensure they remained functional. Still coping with wartime igloos in the 1980s, the consequences for travellers through Eagle Farm Airport were inconvenience, discomfort and delays. When unimproved landing surfaces at Archerfield Airport could not be used safely in wet weather, the result for its businesses was decreased profitability.

Between 1950 and the late 1970s the priority for new airport facilities was given in turn to other Australian capital cities. Adelaide's entirely new airport at West Beach was constructed only six kilometres from the CBD in 1953. Perth International Airport, formerly Guildford Aerodrome, gained a new international terminal in 1953 and a new domestic terminal for the Commonwealth Games in 1962. Prime Minister Menzies announced the construction of a new international airport for Melbourne in 1962. The resultant Tullamarine complex was completed at a cost of $50 million in 1970.[19] Throughout those years the nation's third busiest capital-city airport in Brisbane retained its overcrowded igloos, though a well-overdue, new international terminal was constructed in 1976.

In the long-term Brisbane's wait for a new airport appears worthwhile. When the city's current airport with its new domestic facility was opened in mid-1988, two years after originally planned, it was the nation's most up-to-date. American pilot and author Lockhart Wood reported it as one of the few airports in the world which had an airside structure of runways and taxiways designed to accommodate aircraft having a wing span of 262 feet (79.8 metres) and envisaged to carry 800 passengers. Due to external influences on air transport technology, these mammoth airliners have yet to fly, further

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[18] Jackaman, 'Some thoughts on aerodrome development in Australia', p. 22.
[19] *Aircraft*, April 1950, p. 17; David Webb, ed., *Perth Airport 1944–94: Fifty years of civil aviation* (Mascot, NSW: FAC, 1994), p. 18; Gunn, *Contested skies*, p. 186.

proof that Jackaman's dictum about the rashness of foretelling the future of civil aviation still applies.[20]

Since the early 1950s Archerfield has remained an airfield capable of landing only general aviation (GA) aircraft. After the departure of the RAAF in the mid-1950s, most of its on-field military structures were dismantled. In line with world wide trends in light aircraft flying, activity on Archerfield and other secondary aerodromes increased during the 1960s. In the late 1960s and early 1970s the number of graded landing strips in Archerfield's layout was reduced, a reflection of both cost cutting and the improved manoeuvrability of the new generation of recreational, business and training aircraft.

With the only restrictions on nearby development placed on building height, Archerfield Airport by the late 1970s was ringed by residential and industrial estates. At times residents of the suburbs of Acacia Ridge, Rocklea and Inala expressed their concerns about aircraft 'flying directly over their homes' at altitudes they considered to be too low.[21] Nearly fifty years after its establishment the airport was the target of harsh words of protest from a community that had changed its attitude to aircraft and aerodromes in its midst.

This period, though one of massive development in air transport in Australia, was underlined by a latent questioning of the need for a publicly funded, national system of airports. The doubts behind the system's value to the community were sparked by the inability of the system's managers to predict what was necessary for future air transport and airport development. Though its administrators planned according to what purpose and who they believed air transport and airports should serve, the system's changing political masters placed such limits on their funding that restrictions and delays were normal procedure, especially for Brisbane's airports. Though the system consolidated into a mature airport network in the 1980s, the factors which would lead to its dismantling in the years beyond the scope of this study already were in place.

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[20] Wood Lockhart, 'A pilot's perspective on airport design', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Art Institute of Chicago and Prestel-Verlag, 1996), p. 224; Jackaman, 'Some thoughts on aerodrome development in Australia', p. 21.

[21] *SM*, 1 October 1978, p. 16.

Chapter 21

'Almost all the 750 000 passengers who pass through those igloos each year can testify to better terminals in other parts of Australia.'[1]

In the postwar years, Australian developed a style of air transport system that was quite unique and, more than anything else, a reflection of the interconnected nature of changing federal political and economic attitudes and policies over four decades. That distinct style could be recognised in the range of imported aircraft being operated by Australian-owned airline companies, the operations of which were heavily regulated by the Commonwealth. It was evident too in the expanded aviation bureaucracy that fought to retain its control over the nation's most conveniently and strategically placed civil airports.

Thomas P. Hughes acknowledged in 1987 that the factors shaping style as it relates to technological systems are numerous and diverse.[2] During this mature period of Australia's aviation history, the dominant forces creating that style were those decisions made by the system's controllers and administrators, decisions strongly influenced by the divergent policies of different governments and the increasingly global nature of transport economics. All contributed to what Hughes referred to as momentum—the rate of growth achieved by a mass of technological and organisational components working towards a goal—in this case the mass transportation of people and goods by air.

Until the late 1960s, conservatism and stability guided how the Australian air transport system developed. A steady civil aviation industry growth was reflected in the totals of annual domestic-airline passengers. These increased more than fourfold over the first two decades of the period, from 1.499 million in 1950 to 6.346 million in 1970–71.[3] Two decades of conservative government were followed by a period of economic uncertainty which commenced in the early 1970s. Against a background of inflation and rising unemployment, key political and aviation industry figures questioned the need for the nation's air transport and aerodrome systems to be so heavily regulated, and consequently so expensive to regulate.

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[1] *CM*, 28 January 1966, p. 5.
[2] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 68.
[3] CBCS, *Official year book of the Commonwealth of Australia*, vol. 38 (Canberra: CGP, 1951), p. 204; ABS, *Official year book of Australia 1975 & 1976*, vol. 61 (Canberra: A/CGP, 1977), p. 403.

Yet the momentum of air transport growth continued throughout. Domestic airline passenger numbers doubled between 1970–71 and 1987–88, from just over 6 million to 13.704 million.[4] At the end of this period however, and in response to politically based demands for economy and efficiency, the administrative framework of airport development constructed over its first seventy years was dismantled. From 1 January 1988 the aviation industry was regulated and administered by two new government business organisations, the Civil Aviation Authority (CAA) and the Federal Airports Corporation (FAC).[5]

In the first two decades following 1950, Australia was governed by a unbroken series of Liberal/Country Party coalitions led consecutively by Sir Robert Menzies, Harold Holt, John McEwen (caretaker), John Gorton and William McMahon. Of their economic impact on the nation Robert Catley has observed: 'The Federal and state governments combined to fashion an internationalist state...which produced what might with hindsight be termed a "mini-economic miracle"'.[6] Geoffrey Bolton's view is that Australia's good fortune during the 1950s and 1960 was 'founded on a continually expanded world trade and a stable international monetary system.'[7]

With an economy considerably influenced by external factors and controlled, when necessary, through deflationary fiscal measures, Australia until the late 1960s enjoyed a stability during which Commonwealth expenditure grew, as did the size of its bureaucracies. The Department of Civil Aviation (DCA) was just one part, albeit a technologically demanding part, of the framework of government. Unfettered by restrictive budgetary considerations with regard to personnel, staff numbers for the DCA reached 5 143 in June 1963, expanding to 8 799 by June 1970.[8]

During most of that period the DCA director-general was Donald Anderson (later Sir Donald), a Second World War RAAF transport pilot who had entered the public service in 1946 as an examiner of airmen. Anderson's promotion was rapid, being appointed

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[4] CBCS, *Official year book of the Commonwealth of Australia*, vol. 56 (Canberra: CGP, 1970), p. 373; ABS, *Year book Australia 1989*, vol. 79 (Canberra: CGP, 1989), p. 643.
[5] Some of the administration of aerodromes and airports, such as the Local Ownership Plan, remained with the Department of Transport and Communication.
[6] Robert Catley, 'The politics of inflation and unemployment, 1970–82', in Brian Head, ed., *State and economy in Australia*, (Melbourne: OUP, 1983), p. 277.
[7] Geoffrey Bolton, *The middle way*, ed. Geoffrey Bolton, *The Oxford History of Australia* (Melbourne: OUP, 1990), p. 90.
[8] C. A. (Arthur) Butler, *Flying start: The history of the first five decades of civil aviation in Australia* (Sydney: Edwards & Shaw, 1971), pp. 130-40.

director-general upon the retirement of Sir Richard Williams in 1955. Anderson's long term of office until retirement in 1973 reflects the stability of the times.[9]

The administrative framework of the DCA was amended at times to meet the new demands of the system. In 1946 the DCA altered its hierarchical structure so that it might 'more efficiently encompass its growing responsibilities.'[10] The department in 1947–48 then was divided into Administrative and Technical sections, each under the supervision of an assistant director-general. As part of a policy of decentralised administration, regional directors were appointed. Former RAAF bomber pilot Arthur Doubleday became Queensland's regional director in 1946, followed in 1960 by R. M. (Mike) Seymour, a former RAAF Catalina pilot.[11]

The postwar DCA employed a considerable number of former military personnel. Macarthur Job claimed the DCA was so RAAF-conscious that 'it was seriously suggested that the names of office doors should include the officer's RAAF rank.'[12] The civilian pilot Arthur Schutt reportedly disliked the postwar DCA because 'many of the ex-air force trained men who joined the Department in the period after the war had no knowledge of civil aviation—the old story of the practical man coming under the rule of the bureaucrat.'[13] Whether this influence was necessarily good for civil aviation or not, it was an administrative reality.

In the process of regionalisation the man who in the 1920s had helped choose both Eagle Farm and Archerfield aerodromes, A. R. (Roley) McComb, was placed in charge of the Victoria–Tasmania region. Engineer K. N. E. (Bill) Bradfield was promoted to the position of chief airport engineer in place of McComb. Some of these long-term public servants would serve later as Australian representatives in global aviation regulation through the International Civil Aviation Organisation (ICAO) in Montreal.[14]

In 1956 the DCA's Division of Airports was split into two sections: the Division of Airport Engineering and the Division of Aviation Buildings and Property. By 1960 the whole of the DCA consisted of eleven separate divisions, namely Air Transport and

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[9] Letter dated 28 April 1960, Sir Donald Anderson CBE – Biographical details, 1971/863 Part 1, J23/35, NAA (Qld).
[10] CBCS, *Year book Australia 1951*, p. 196.
[11] R. M. (Mike) Seymour, interview with author, 31 July 2001.
[12] Macarthur Job, *Aircrash: The story of how Australia's airways were made safe*, vol. 2 (Weston Creek, ACT: Aerospace Publications, 1992), p. 65.
[13] W. Davies, *This flying business: A life of Arthur Schutt* (West Melbourne: Thomas Nelson (Aust.), 1976), p. 124.
[14] Butler, *Flying start*, p. 86. The only one of the four not involved directly in ICAO was Arthur Doubleday.

External Relations; Administration, Personnel and Equipment; Finance and Stores; Airport Engineering; Aviation Buildings and Property; Flying Operations; Airworthiness; Airways Operations; Airways Engineering; Aviation Medicine and Accident Investigation and Analysis.[15] Each division had a vested interest in the growth and durability of the air transport and airport systems.

The air transport system between 1950 and 1988 was dominated by what is termed the Two Airline policy. This aimed to retain stability in air transport by regulating the development of the two major airlines, one of which was owned by the Commonwealth. The first act of parliament related to this policy was the *Civil Aviation Agreement (1952).*[16] The *Civil Aviation Agreement (1957)* renewed the 1952 agreement.[17]

Control over air transport development was retained through the government's power to prohibit the importation of aircraft through the Customs (Prohibited Imports) Regulations. Additional associated legislation included the *Airlines Equipment Act (1958),* the *Australian National Airlines Act (1959),* the *Airlines Agreement Act (1960)* and the *Australian National Airlines Act (1961).*[18]

According to Peter Forsyth, 'in terms of what was perhaps its key objective, ensuring the financial stability of the airlines, it was very successful.'[19] Though the policy fostered the inconvenience of schedules run in parallel, it achieved what aviation economist Robin Hocking believed was its rationale, efficient aviation services derived from competition between operators and the safety and financial stability of operations.[20] The resultant outcome of this stability was the technological style that encompassed what Martin Painter and Will Sanders described as 'a strong rather technocratic Commonwealth presence...in all aviation and airport administration.'[21]

For Brisbane this technocratic presence amounted to little capital expenditure on the runways at Eagle Farm, some in the establishment of a new flying boat base at Redland

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[15] CBCS, *Official year book of the Commonwealth of Australia*, vol. 46 (Canberra: CGP, 1960), p. 551; Butler, *Flying start*, p. 101.
[16] *The acts of the Parliament of the Commonwealth of Australia passed during the year 1952* (Canberra: L. F. Johnston, 1952), pp. 404-10.
[17] *The acts of the Parliament of the Commonwealth of Australia passed during the year 1957* (Canberra: A. J. Arthur, 1957), pp. 542-5. The Two Airline policy concluded in October 1990.
[18] M. Kirby, *Domestic airline regulation: The Australian debate* (St Leonard's, NSW: Centre for Independent Studies, 1981), pp. 96-8.
[19] P. Forsyth, 'Microeconomic policy and the Two Airline Policy', in S. Prasser, J. R. Nethercote, and J. Warhurst, ed., *The Menzies era: A reappraisal of government, politics and policy,*, (Sydney: Hale & Iremonger, 1995), p. 205.
[20] Robin Hocking, *Some aspects of Australia's Two Airline policy* (Melbourne: CEDA, 1972), p. 3.

Bay and very little other than general maintenance at Archerfield. Most of the available funds prior to the 1970s were absorbed in providing new airports at Adelaide, Hobart and later at Tullamarine on the edge of Melbourne. Despite rating third after Sydney and Melbourne in the number of passengers it processed annually, Brisbane was not a high priority. As its residents were advised in 1954, the plan for its jet strip just 'had to wait'.[22] Other components in the system required more attention.

As the costs of maintaining the system increased, the government sought ways to recoup its expenditure, particularly from those receiving the benefits. The key strategies used in relation to the air transport and aerodrome systems were cost recovery and cost sharing.

The concept of cost recovery in aviation, though not named as such, had existed since the 1930s. Aerodrome tenants paid rental on site leases. Aircraft owners paid hangarage charges as well as a tax on aviation fuel. When airport engineer K. N. E. (Bill) Bradfield addressed the Town and Country Planning Association of Victoria in 1946, he explained that aerodrome costs had now reached the point where it was 'difficult, if not impossible, for them to be made into paying commercial propositions from aircraft landing dues, hangar rentals and ground charges alone.'[23] He favoured a charge being placed on sightseers and obtaining income from concessions for 'airport kiosks', both common practices in the US and Europe. The latter was instituted at capital-city airports.

From the early 1950s air navigation charges were collected through the *Air Navigation Charges Act (1952)*. All registered aircraft paid a charge calculated on their type. Being chiefly administered through the Airline Agreement Acts, cost recovery allowed for ceilings to be placed on the collection of revenue from the airlines, should that be necessary. Inevitably it was, leading to shortfalls of up to 40%.[24]

The second means by which the Commonwealth attempted to recoup some of the heavy expenditure in aviation infrastructure was through cost sharing, specifically under the Aerodrome Local Ownership Plan (ALOP). Here the Commonwealth removed particular sites from what was proving to be a capital-intensive system. Instituted in the

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[21] Martin Painter and William Sanders, 'Reshaping Australian aviation and airports administration: Some comparative reflections', *Policy Organisation and Society*, 10 (1995), p. 29.

[22] *SM*, 17 January 1954, p. 4; Draft statement on Brisbane Airport dated 30 December 1953, Major airports – Brisbane no. 1 1949–72, CAHS, Melbourne. Passenger embarkations through Sydney in 1964–65 were 2 086 571 while Melbourne passengers numbered 1 587 833. Brisbane rated next, recording 754 296 passengers. The ranking remained the same for following years. Brisbane numbers had increased to 2 218 780 in 1974–75 while those of Sydney and Melbourne stood at 4 953 051 and 4 037 585 respectively.

[23] K. N. E. Bradfield, *Airport design in relation to town planning* (Melbourne: Town and Country Planning Association, Vic., 1946), p. 4.

late 1950s, the ALOP provided for the ownership and operation of community aerodromes to be vested in local authorities, with assistance towards their maintenance and development being provided by the Commonwealth. According to Arthur Butler:

> The valuable experience and knowledge of engineers and other professional personnel employed by these local authorities was utilised and aerodrome works were completed with savings in both cost and time.[25]

He believed local interest and pride of ownership also was encouraged and developed. The ALOP emerged as a response to the increasing cost of maintaining a large number of sites in the system. It changed the style of the system to one where the Commonwealth became the financial partner of rural communities rather than the owner of the aerodrome in their midst. The plan achieved its other aim of retaining for public use these community assets.

The post-introductory peak in numbers of licensed aerodromes owned by local authorities and private interests in the 1960s can be seen in Table 17. Reduction in the number of government-owned aerodromes is similarly apparent between 1947–48 and 1988.

Table 17: Ownership of Australian aerodromes, 1947–48 to 1988.[26]

YEAR/S	GOVERNMENT-OWNED AERODROMES	LICENSED AERODROMES OWNED BY LOCAL AUTHORITIES AND PRIVATE INTERESTS
1947–48	133	240
1950	183	213
1953	186	260
1955	185	303
1960	149	323
1964	125	511
1969	118	563
1975	93	380
1984	71	370
1988	67	363

[24] Painter and Sanders, 'Reshaping Australian aviation and airports administration', p. 29.
[25] Butler, *Flying start*, pp. 102-3.
[26] CBCS, *Year book Australia 1951*, p. 202; CBCS, *Official year book of the Commonwealth of Australia*, vol. 41 (Canberra: CGP, 1955), p. 179; CBCS, *Year book Australia 1960*, p. 554; CBCS, *Official year book of the Commonwealth of Australia*, vol. 51 (Canberra: CGP, 1965), pp. 581-2; CBCS, *Year book Australia 1970*, p. 376; ABS, *Year book Australia 1975 & 1976*, p. 405; ABS, *Year book Australia 1980*, vol. 64 (Canberra: CGP, 1980), p. 534; ABS, *Year book Australia 1985*, vol. 69 (Canberra: CGP, 1985), p. 457; ABS, *Year book Australia 1989*, p. 644. In 1947–48 and 1950 there were also five flying boat bases. This number increased to eleven in 1953 and stabilised at thirteen until 1960.

In its cost sharing arrangements, Australia's postwar aerodrome system differed markedly from that of Canada. To enable airport operations to be standardised and hopefully improve the efficiency of its scheduled airlines, the Canadian government offered funding for maintenance and improvements to municipalities that owned aerodromes. The major difference between the two countries was that if this arrangement proved unsuitable, the Canadian Department of Transport was willing to transfer municipal airport interests to their federal government at no cost.

The Australian ALOP, which also provided a level of funding assistance, was in the long term the means by which the government could divest itself of regional airports. In Canada by the late 1970s the reverse had occurred. Their federal government operated all main line and international airports because the municipalities, finding increasing running costs difficult, handed over their airports to the government.[27]

The realisation that the technology behind aircraft now required vast investment in airport and airways infrastructure likewise left its mark on the style of system which evolved in Britain in the postwar years. After deciding in 1945 to take over and run all domestic airfields used for scheduled services, the British government, with ownership of some forty airports, gradually abandoned that policy. By 1960 the principal state-owned airports, then numbered at fifteen, were not financially self-supporting, some becoming what Hughes would refer to as reverse salients, components within the system which had fallen behind others. This was the result, according to one critic, of the 'Treasury/Civil Service systems of control and annual budgeting, and in particular by being for so long the concern of a Ministry that also had heavy commitments in road building and other surface transport problems.'[28] These reverse salients were removed from the British system when in 1966 only four airports, Heathrow, Gatwick, Stansted and Prestwick (Scotland), were transferred to the newly formed and government-backed British Airports Authority (BAA).

Britain had other airport problems. Considerable controversy ensued when the Roskill Commission reported in 1970 on the viability of building a third airport for London at Foulness, on the northern edge of the Thames River estuary. After much public debate, plans for any new airport were shelved.[29] According to economist R. C. Fordham, the Roskill Commission's report was influenced by political, social and economic pressures

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[27] Tom M. McGrath, *History of Canadian airports* (Ottawa: Lugus Publications, 1992), pp. 18-20.
[28] M. J. Hardy, 'Can we make our airports pay?', *Flight*, 9 December 1960, p. 905.
[29] Foulness is sometimes referred to as Maplin or Maplin Sands, which is one district on the island of Foulness. Plans to abandon this site coincided with the oil crisis of 1973–74.

which indicated that the issue of airport placement had become one of the most critical problems in the aviation system. As in the ongoing case of a third airport for Sydney, the decision to proceed had such considerable electoral ramifications that politicians were reticent in their support.[30]

Political and economic factors were central to administrative and corporate changes which further altered the style of Australia's air transport and aerodrome systems between the early 1970s and 1988. During 1968–72 the country experienced a series of currency crises which contributed to an inflationary spiral within its economy. This coincided with an increase in unemployment and divisions forming within the ruling Liberal/Country Party coalition.[31] At the same time, leadership of the Labor party under Gough Whitlam 'was able skilfully to combine these circumstances with increased electoral dissatisfaction to provide an election-winning political package.'[32] It was time. Whitlam was elected Prime Minister on 2 December 1972.

Compared to the economic stability that had preceded it, aviation in the early 1970s was beset by financial uncertainty. A worldwide slump in air travel began in 1971–72. QANTAS made a loss that year, though between 1969–70 and 1970–71 it had recorded profits of $8 million and $5 million respectively.[33] In October 1973 the OPEC nations decided to cut oil production as a consequence of US support of Israeli actions in the Middle East, introducing into the air transport system an intractable factor—one not able to be controlled by its managers—in the form of increased fuel costs. Nationally, the higher price of oil increased inflation and led to a reduction in government spending. It also provided incentive for the government to improve its rate of cost recovery from the aviation industry.

In opposition Whitlam had believed that civil aviation was subsidised to far too great an extent. Of the 141 recommendations presented in June 1973 by a task force reviewing expenditure policy, twelve were related to aviation and six directly to airports. Along with plans for cut backs in expenditure, the government planned to achieve 80% cost recovery from the aviation industry by 30 June 1978.[34] In addition, the $2.00 per barrel

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[30] W. A. Robson, 'British Airport Authority', *Political Quarterly*, 42 (1971), pp. 423-4; Roger C. Fordham, 'Airport planning in the context of the third London Airport', *Economic Journal*, 80 (1970), p. 307.
[31] Catley, 'The politics of inflation and unemployment, 1970–82', p. 278; Bolton, *The middle way*, p. 187.
[32] Catley, 'The politics of inflation and unemployment, 1970–82', p. 278.
[33] M. Southern, ed., *Australia in the seventies: A survey by the Financial Times* (Ringwood, Vic.: Penguin, 1973), pp. 163-4.
[34] H. W. Poulton, *Law, history and politics of the Australian Two Airline system* (Parkville, Vic.: H. W. Poulton, 1981), pp. 169-73. Dr H. C. Coombs led the task force.

levy on oil, a levy that cost the aviation industry $12 million annually, was directed to consolidated revenue rather than attributed to aviation cost recovery. This action caused discontent within the industry, along with a proposal in the 1975 budget to increase total air navigation charges from $44.9 million to $77 million.[35] Before these issues were resolved, the political events of November 1975 led to a change of government.

Evidence of government cut backs on airport spending in the 1970s is apparent in Table 18. Capital expenditure on building and construction costs at government aerodromes was reduced from $13.6 million for the 1975 financial year to $5.9 million four years later. Maintenance costs, an outlay more accountable to safety, remained reasonably stable.

Table 18: Commonwealth expenditure on airports and aerodrome, range of years between 1969 and 1988.[36]

YEAR ENDED	CAPITAL EXPENDITURE ON GOVERNMENT AERODROMES	MAINTENANCE COSTS ON GOVERNMENT AERODROMES	GRANTS TO LOCAL AUTHORITIES UNDER ALOP
30 June 1969	$29 million	$3.75 million	$750 000
30 June 1975	$13.6 million	$4.4 million	$1.289 million
30 June 1979	$5.9 million	$6.245 million	$3.354 million
30 June 1984	$68.6 million	$11.87 million	$34.22 million
30 June 1988	$42.5 million	$18.9 million	$10.9 million

The comparatively high expenditure for the year ended June 1969 is a reflection of the $50 million cost of Melbourne's Tullamarine International Airport, completed in 1970. Increased expenditure during the latter part of the 1980s reflects capital costs for Brisbane's new airport, the necessity for which was apparent in the 1960s when the *Courier-Mail* had reported, 'more pile-ups at the vintage terminal are inevitable before a new one is built.'[37] In all an estimated $221 million was spent in upgrading the airport network between 1966 and 1975, while a further $630 million was invested in government airports when spending increased again between 1979–80 and 1986–87.[38]

Despite the economic uncertainty of the 1970s, domestic air travel and the carriage of freight and mail by air generally increased, especially after the introduction of the wide-

[35] Poulton, *Law, history and politics of the Australian Two Airline system*, pp. 189-91.
[36] CBCS, *Year book Australia 1970*, p. 376; ABS, *Year book Australia 1975 & 1976*, p. 405; ABS, *Year book Australia 1980*, p. 534; ABS, *Year book Australia 1985*, p. 457; ABS, *Year book Australia 1989*, p. 644.
[37] *SM*, 25 July 1966, n.p.; *CM*, 20 June 1968, p. 3; John Gunn, *Contested skies: Trans-Australia Airlines, Australian Airlines, 1946–92* (St Lucia, Qld: UQP, 1999), p. 186.

bodied jets of greater capacity such as the Airbus A300, the Boeing 737 and the Boeing 767. The steady increase in the number of air travellers and the amount of freight carried by airlines, in effect the momentum of the air transport system, can be seen in Table 19.

Table 19: Figures related to Australian domestic civil aviation activity between 1964 and 1988.[39]

FINANCIAL YEAR	HOURS FLOWN	KMS FLOWN PER '000	PAYING PAX	FREIGHT (TONNES)	MAIL CARRIED (TONNES)
1964–65	256 231	84 203	3 363 936	71 078	7 859
1970–71	285 793	114 605	6 340 036	91 401	9 916
1974–75	282 706	138 928	9 393 104	107 813	9 613
1977–78	279 410	134 720	10 288 959	120 890	11 307
1982–83	245 567	127 952	10 332 934	141 853	16 767
1987–88	288 341	Not available	13 704 500	147 939	20 915

Though Malcolm Fraser at the head of a Liberal/National Party coalition replaced Whitlam's Labor government at the December 1975 election, plans for the recovery of costs from the aviation industry were unaltered. Paying by far the greatest amounts were the major airlines. Air navigation charges for the use of the airways saw QANTAS paying $15.1 million to the government in 1976–77 while Ansett Airlines paid $10.5 million and TAA $10.4 million. Airport costs were additional. Airline companies always had paid a lease figure for the space they were allocated in terminals; now they were to be asked to contribute to the 'public' areas.

Civil aviation administration also had received a blow to its established, departmental identity after the Whitlam government in November 1973 transferred civil aviation, along with shipping and road transport, to a new Department of Transport (DOT). Writing in 1992, accident investigator and author Macarthur Job claimed this turned civil aviation into 'a political football—a condition from which it has not yet been able to emerge.'[40]

By the late 1970s small aircraft operators were complaining of growing inequities, not entirely, as Stanley Brogden suggested, because Australians are unhappy to pay for anything.[41] Their industry representatives claimed they were paying for 'heavy-duty runways, large terminals and advanced technological air navigation systems that they did

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[38] Jack L. Davis, History of Australian aerodromes, manuscript, 1988, pp. 18-20.
[39] CBCS, *Year book Australia 1970*, p. 373; ABS, *Year book Australia 1975 & 1976*, p. 403; ABS, *Year book Australia 1980*, p. 533; ABS, *Year book Australia 1985*, p. 457; ABS, *Year book Australia 1989*, p. 643.
[40] Job, *Aircrash: The story of how Australia's airways were made safe*, p. 199.

not necessarily fully utilise or require.'[42] At the time airlines paid in proportion to their numerical usage, rather than through calculations based on other valid indicators of their effect on airport infrastructure, such as weight.

Airline company concerns included the financial burden of regulation. In 1974 they complained that there was little genuine cost reduction by the civil aviation section of the DOT. They argued that if the need for cost recovery was as necessary as implied, then the regulator should abolish regional offices and 'reduce the size of the departmental fleet, which stood at twenty aircraft.'[43] This suggestion did not appear to have been seriously considered at the time.

The administration of aviation was returned temporarily to a single, dedicated department under a Liberal/National Party coalition in May 1982 when the Department of Aviation (DOA) was created. This body subsequently was abolished under a Labor government in June 1987, aviation activity regulation being located for a short time thereafter within the Department of Transport and Communication (DOTAC).

In 1986 the Hawke Labor Government announced its intention to split the administration of aviation. From 1 January 1988 the Federal Airports Corporation (FAC), a government business organisation, was responsible for the management of all capital city airports as well as those at Coolangatta and Launceston, in all seventeen of the largest and most lucrative of the airports in the system. Both Eagle Farm and Archerfield Airports would be operated by the FAC. The Civil Aviation Authority (CAA) retained responsibility for aircraft and pilot-related activities such as air traffic control, navigation aids and the licensing of aircrew and aircraft maintenance personnel.[44]

A clear lack of infrastructure development on Eagle Farm and Archerfield Airports between 1950 and the beginning of the 1980s was one result of these political and economic influences. After primary operations moved to Eagle Farm, few major improvements were made on Archerfield. Accepted policy seemed to be that even with the increased number of training aircraft, the established structure of the airfield, either of civil or wartime origin, needed little other than ongoing maintenance.

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[41] Stanley Brogden, 'Air transport policy in Australia,', (1968), p. 6.
[42] Painter and Sanders, 'Reshaping Australian aviation and airports administration', pp. 29-30.
[43] Poulton, *Law, history and politics of the Australian Two Airline system*, p. 191.
[44] Davis, History of Australian aerodromes, pp. 26-7.

By 1953 maintenance costs on the runways constructed at Eagle Farm during the Second World War had accelerated to between £25 000 and £50 000 per year. A new, re-aligned runway was completed in 1958 at a cost of approximately £1 750 000. The airline companies remained in the airport's former wartime igloos, which were periodically refurbished at company expense. With a view to reducing waiting time and improving facilities for both passengers and staff, TAA modernised its terminal in the early 1970s at a cost of $563 700.[45]

International terminal improvements, funded by the government and estimated to cost between £20 000 and £40 000, were announced by the Civil Aviation Minister in February 1966. A new, but temporary international terminal was constructed at Eagle Farm in 1976 and extended before the Commonwealth Games which were held in Brisbane in 1982. Other expenditure was restricted after a 1970 investigation of Brisbane's airport needs identified the advantages of constructing an entirely new airport on a site closer to the mouth of the Brisbane River. The decision to proceed with the new airport construction was made in 1977.[46]

In his 1987 article on the social processes involved in technological change, Donald Mackenzie observed that systems are constructs and hold together only so long as the correct conditions apply.[47] In Australia from the early 1970s the correct conditions required for the air transport and aerodrome systems to continue in the style into which they had developed, one of subsidised airline companies controlled and regulated by the Commonwealth, were gradually withdrawn. The reasons were essentially economic. The nation's leaders decided the country could no longer afford to support aviation to the extent that it had since the 1920s.

At the conclusion of this period the government's management of the system, expensive and unwieldy as it had become, was split to form two administrative bodies more efficient, accountable and capable of change. It was not, however, the end of turmoil in the Australian aviation industry.

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[45] Draft statement on Brisbane Airport dated 30 December 1953, Major airports – Brisbane no. 1 1949–72, CAHS, Melbourne; Report on Eagle Farm dated 3 February 1960, Major airports – Brisbane no. 1 1949–72, CAHS, Melbourne; *Information TAA*, no date, Major airports – Brisbane no. 1 1949–72, CAHS, Melbourne.

[46] *CM*, 8 February 1966, p. 3; Text for DOA press kit, File 3, Airports and buildings – Brisbane, CAHS, Melbourne.

[47] Donald MacKenzie, 'Missile accuracy: A case study in the social processes of technological change', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 197.

Chapter 22

'The airport is nobody's friend.'[1]

Along with having been a pariah, the modern airport is a social paradox. On the one hand people have grown accustomed to a fast, cheap and relatively comfortable means of travel by air; on the other they are concerned about the noise, the environment and their personal safety. To achieve the first, an air transport system must be economically profitable and disembark its passengers relatively close to centres of population. Those goals cannot be attained without enormous capital expense and at the price of environmental disadvantage for some. This period reveals how what was technologically possible in air transport confronted what was financially and socially realistic, at the most obvious air transport venue, the airport.

The standard jet airliner as it has come to be accepted today consists of many small design components which, when combined, make a vehicle capable of carrying passengers safely across longer distances over the worst of the weather at an economical rate per seat mile. The two most significant advances introduced into the design of airliners in the postwar years were the swept back wing and the jet engine. The use of sweep back in main plane (wing) design allowed for greater speed in cruise at high altitude, though at the expense of control problems at low speed. Additional aerodynamic devices on the leading and trailing edges of wings solved the latter.

The development of the jet engine can be traced back to experimental designers in Britain and Germany prior to the Second World War. Postwar development of the basic jet design in Britain and the United States produced a series of propulsion units capable of pushing military and civilian aircraft at subsonic and supersonic speeds through the sky. In the early 1950s the first commercial jet airliner, the DH106 Comet 1 from de Havilland, weighed 47 627 kgs, flew at 788 kph and could carry thirty-six passengers over a comfortable range of 2 800 kms.[2] Though the momentum of production in Britain faltered after the crash of three Comet 1 aircraft, production of a similar style of airliner continued in the United States.

Naturally the introduction of jet aircraft placed pressure on existing airports accustomed to handling aircraft such as the Douglas DC3, which weighed only 12 000 kgs. Airport

[1] David Woolley, 'The embattled airport', *Flight International*, 24 November 1979, p. 1,781.

terminal buildings designed to cater for load capacities of twenty to thirty passengers per arriving aircraft proved inadequate when the number of departures and disembarkations per flight doubled or trebled.

The problem is revealed through a comparison of two Douglas models of the same decade. The propeller-driven DC7 had a maximum take-off weight (MTOW) of 64 864 kgs and could carry between sixty and ninety-five passengers, depending on seat configuration. The first DC7 went into service in the US in November 1953 with the requirement for a runway length of 7 250 feet (2 210 metres). The prototype of the jet-powered DC8 first flew on 30 May 1958. It required a runway of 9 100 feet (2 774 metres), could carry 176 passenger and had a MTOW of 158 760 kgs.[3] The first postwar extension to Kingsford Smith Airport, completed in the same decade, brought that city's busiest north-south strip length to 1 676 metres, far too short for safe operations by fully-loaded versions of either aircraft.[4]

Thomas P. Hughes believed that if the characteristics of a component in the system are changed, then the other artefacts in the system should alter accordingly. In terms of their strengthening, the new runways constructed in Australia in the 1950s were designed to carry approximately twenty times the loading expected on a concrete highway. The technology used in their construction originated in the US, evidence again of the ongoing transfer of technology from overseas. According to a contemporary superintendent of airports, the calculations of the 1950s were based on specifications of the USA's Corps of Engineers, influenced by Westergaards' theories of concrete pavements and adapted to suit Australia's drier conditions. A Porter Super Compactor roller requiring three large crawler tractors to haul it was imported from the US to compact the sand subgrades under the new runways at Kingsford Smith Airport during what was the first of Australia's postwar airport upgrades.[5]

QANTAS placed its order for seven Boeing 707s (MTOW 151 315 kgs) in September 1956 on the expectation that another runway lengthening and strengthening of Kingsford Smith Airport and planned improvements to Perth, Darwin and Brisbane

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[2] Michael J. H. Taylor, ed., *Jane's encyclopedia of aviation*, vol. 3 (Danbury, Conn.: Grolier Educational, 1980), pp. 469-70.

[3] Ronald Miller and David Sawers, *The technical development of modern aviation* (London: Routledge & Kegan Paul, 1968), p. 188. McDonnell Douglas produced the DC8. The stretch version of the DC8 was capable of carrying 259 passengers.

[4] Jack L. Davis, History of Australian aerodromes, manuscript, 1988, p. 10.

[5] Thomas P. Hughes, 'The evolution of large technological systems', in Wieba E. Bijker, Thomas P. Hughes and Trevor J. Pinch, eds, *The social construction of technological systems: New directions in the sociology and history of technology*, (Cambridge, Mass.: MIT Press, 1987), p. 51; Davis, History of Australian aerodromes, pp. 10-11.

airports would be completed prior to their introduction in 1959. Serving the city that generated approximately one third of the nation's international air traffic, Melbourne's Essendon Airport was unable to accept either the Boeing 707 or McDonnell Douglas DC8 due to 'insufficient runway lengths and the serious increase in noise levels for the nearby community.'[6] Restrictions on the operation of jets into Melbourne lasted five years.

Fortunate in that its wartime runways had deteriorated to the extent that their maintenance costs were excessive, Brisbane received a completely new runway at a cost of £2.037 million in 1958. With these initial improvements made to cater for international traffic at a few airports, the government then used its regulatory power to delay the introduction of jets on domestic trunk routes. The next five years were used to execute the major and costly improvements needed on all airports to be served by the Boeing 727 and McDonnell Douglas DC9 from the mid-1960s.[7]

Australia was not the only country ill prepared for the introduction of jets. In a 1956 investigation of fifty-eight of the world's major airports, only one was found to be suitable for the Boeing 707 and the McDonnell Douglas DC8. Thirty had a deficiency in either length or strength, while twenty-five had deficiencies in both those areas.[8]

The other area where countries were unprepared for the introduction of jet aircraft was in the nature of their terminals. *Flight* magazine considered the state of airports on the QANTAS route to London in 1958, the year before the introduction of jets. It discovered a need for better runway and approach lighting as well as 'reasonably efficient terminal buildings, capable of offering rest and restaurant facilities to passengers not by the score but by the hundred.'[9]

Though airport terminals obviously needed to be larger, Koos Bosma believed they did not have to lack architectural style. He understood the modern airport architect's role was one of reinforcement of the desire for speed, light, air and adaptability, achievable through the use of 'plenty of glass, muted colours, comfortable furniture, and perfect

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[6] Davis, History of Australian aerodromes, p. 16.
[7] John Gunn, *Contested skies: Trans-Australia Airlines, Australian Airlines, 1946–92* (St Lucia, Qld: UQP, 1999), p. 245; Report on money spent on Australian airports since 1949, Major airports – Brisbane no. 1 1949–72, CAHS, Melbourne; Davis, History of Australian aerodromes, p. 17.
[8] J. L. Ramsden, 'Impact of the heavy jets: How the world's airports will match up to the DC8 and the Boeing 707', *Flight*, 4 May 1956, pp. 524-8.
[9] Neil Collen, 'Concrete considerations', *Flight*, 24 October 1958, p. 6,534.

treatment of the passenger.'[10] These features would outweigh the 'socio-economic disruptions caused by air traffic – dangers, disasters, pollution, noise, smell, traffic jams, jet lags' and the overwhelming size of the airport megastructure.[11]

From a background working in the British aviation industry, BEA traffic director E. P. Whitfield argued that, in terminal design, functionality was more important than aesthetics. Terminals, he also acknowledged, needed to be constructed to handle the estimated passenger traffic without the dislocation caused by additional construction or major alterations for at least 10 years ahead. Of the building's internal layout he singled out the importance of passenger and baggage flows that were 'as short as possible and unimpeded by any form of obstruction.'[12]

Such a comment may have been in response to the problem which had developed with what Bosma refers to as the fourth or frontal generation of airport. In this design 'aircraft stood out on the aprons, separate from the terminals, and the passenger had to walk out across the tarmac to the planes.'[13] That physical problem of mass movement on aprons had been resolved in part by shuttle buses and mobile lounges. The introduction of jets, however, meant an increased number of passengers who had to be shielded from exposure to high noise levels and the dangers of jet engines, even if only for a short period.

Terminal extension seemed to be the solution to this and the emerging problem of greater numbers of airliners requiring more ramp space. With the introduction of finger and star terminals, passengers could be brought together in a central area and then conveyed up into arrival and departure lounges right beside their aircraft standing next to the pier. The means of achieving quiet and safe transfer of passengers from terminal to aircraft was achieved through aerobridges, key features of what Bosma has classified as the fifth generation of airport. In this configuration, passenger loading occurred on the second level of the terminal through any of a multitude of loading bridge designs that kept the passenger clear of danger and extremes of temperature or precipitation. The distance then travelled by the passenger between landside and airside was kept to a minimum.

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[10] Koos Bosma, 'European airports 1945–95', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Art Institute of New York & Prestel-Verlag, 1996), p. 61.
[11] Bosma, 'European airports 1945–95', p. 61.
[12] E. P. Whitfield, 'Terminal design for the jet age', *The Aeroplane*, 13 June 1958, pp. 810-1.
[13] Bosma, 'European airports 1945–95', p. 53.

The predecessor to most loading bridges was a telescopic passage first used at London's Gatwick Airport in the 1940s. Though running out at ground level, it still guided passengers 'without the aid of traffic staff and irrespective of weather to the correct aircraft.'[14] Lockheed Air Terminals introduced its second-level telescoping aerobridge at Chicago's O'Hare Airport in the late 1950s.[15]

For this entire period, however, Brisbane's primary airport at Eagle Farm remained a fourth-generation airport, still projecting the 'socially constructed characteristics acquired in the past' when it was designed.[16] Until its closure in 1988, Eagle Farm's passengers continued to make their way across the tarmac guided by airline company attendants and, if it were raining, their umbrellas.

Land-based flights were not the only ones conducted into and out of Brisbane. Flying boat operations used stretches of the lower reaches of the Brisbane River throughout the 1940s and into the 1950s. The wartime Colmslie Base on the south side of the river provided facilities, as did the DCA's Hamilton base on the river's north side. In 1951 and 1952 the dangers to aircraft using what were essentially shipping lanes were highlighted by a number of accidents and incidents. In June 1953 a new base was opened at Redland Bay, forty-three kilometres from Brisbane's CBD. Fewer aircraft needed its alighting and mooring facilities as landplanes replaced flying boat completely by 1974, after which time the facility was decommissioned.[17]

The attitude of people to air travel changed during this period as the sense of adventure associated with air travel diminished and aircraft became more utilitarian. With the introduction of second-class seating at reduced rates and larger aircraft capable of carrying more passengers, flying became more accessible to ordinary Australians.[18] Contemporaneously the problem of aircraft noise became a social issue worldwide, one which challenged the momentum of the air transport industry.

Indications of the impacts to the community of the expansion of air transport were evident even in the years prior to the introduction of jets. Aerodrome engineer Dr K. N. E. (Bill) Bradfield warned town planners of the potential problems of propeller-driven aircraft in 1946 when he advised they should locate the runways 'so that the approach

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[14] A. C. (Morris) Jackaman, 'Some thoughts on aerodrome development in Australia', *Aircraft*, March 1946, p. 22.
[15] M. J. Hardy, 'Can we make our airports pay?' *Flight*, 9 December 1960, p. 13.
[16] Hughes, 'The evolution of large technological systems', p. 77.
[17] John Wilson, 'Civil Flying Boat Operations: Hamilton Reach and Redland Bay 1946–74', *AHSA Aviation Heritage*, 28 (1997), pp. 107-31.

paths lie over parklands, playing fields and other open areas, where these exist adjacent to the boundaries of the airport.'[19] In the USA, urban planners moved airports out into the periphery and zoned for the construction of industrial parks in their near vicinity.[20]

Aircraft noise became a more controversial matter in Australia's capital cities after the introduction of jets. Prior to the completion of extensions of the Sydney's north-south runway, QANTAS' Boeing 707s only were able to use the east-west runway with reduced load and at a 'significant increase in noise levels in the heavily populated areas to the east and west of the airport.'[21] A progress association located near Brisbane's Eagle Farm airport expressed its concerns over noise to the DCA Queensland regional director in February 1959, suggesting the airport might be better located at Strathpine, north of the city. In response, Strathpine residents were equally concerned about their tranquillity. As a solution, a curfew on operations was applied between 11:00 p.m. and 6:00 a.m. Airlines which preferred to maximise usage of their capital equipment considered this a financial disadvantage.[22]

The Boeing 747 jumbo jet, with its weight of 380 000 kgs and tyre pressures of up to 1 560 kgs, became the flagship of the QANTAS fleet in the late 1960s. Although its introduction required some upgrading of the airport runways to provide wider shoulders to runways and taxiways as well as enlarged aprons, a greater impact occurred with the introduction of wide-bodied jets in the early 1980s. TAA's four A300 Airbus aircraft costing $260 million were delivered in 1981. The company also operated twelve Boeing 737s. Ansett's fleet consisted of five Boeing 767s, each of which was capable of carrying 200 passengers, and twelve Boeing 737s. The total fleet cost for Ansett was $530 million. Their aircraft were delivered in 1981–82.[23] When these larger capacity, invariably quieter jets replaced their noisier predecessors, the pressure for improvement which had focused on runways and the surrounding environment shifted across to the domestic terminal.[24]

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[18] Leigh Edmonds, 'How Australians were made airminded', *Australian Journal of Media & Culture*, 7 (1993), pp. 202-3.
[19] K. N. E. Bradfield, *Airport design in relation to town planning* (Melbourne: Town and Country Planning Association, Vic., 1946), p. 4.
[20] Robert Bruegmann, 'Airport city', in John Zukowsky, ed., *Building for air travel: Architecture and design for commercial aviation*, (Munich & New York: The Air Institute of Chicago & Prestel-Verlag, 1996), p. 200.
[21] Davis, History of Australian aerodromes, p. 17.
[22] *CM*, 6 July 1979, p. 1; RD (Qld) to PR officer DCA Melbourne, letter dated 19 February 1959, Major airports – Brisbane no. 1 1949–72, CAHS, Melbourne.
[23] Davis, History of Australian aerodromes, p. 20.
[24] Woolley, 'The embattled airport', pp. 1,783-4.

In Brisbane the airline companies still occupied the airport's igloo buildings at Eagle Farm. This and the debate on aircraft noise kept the issue of Brisbane's need for a modern, relocated airport simmered until 1970 when a joint Commonwealth-State Advisory Committee finally declared that the current facilities were inadequate. A site three kilometres north-east of the existing airport was proposed in 1971 and approval for the acquisition of land given in 1973. The decision to go ahead was made in 1977. The first stage of the project, essentially to correct drainage, was approved in November 1979. The second stage raised the elevation of the area by five metres using over 24 million tonnes of sand from Middle Banks in Moreton Bay. Construction of buildings commenced in 1984, and though intended for completion in 1986, Brisbane's new airport finally opened on 20 March 1988 to cater for the tourists expected in conjunction with Expo 88.[25]

Over 275 000 cubic metres of concrete was used in the construction of the runway and taxiway pavements, which were designed for future aircraft with all-up weights of 450 tonnes and individual wheel loads of 27 tonnes. Tolerances were such that 'when checked with a three metre straight-edge, no part of the runway surface (which is 60 metres wide and often over 3 000 m long) shall be more than 3 mm above or below the designed level of one eighth of an inch (3.1 cm) in 10 feet (3 metres).'[26]

The environmental impact on the site was lessened by the planting of over 50 000 mangroves to replace those which were lost in converting the swampy estuarine land. The project cost $480 million to complete.[27]

Brisbane advanced overnight from tolerating an outmoded, fourth generation airport to possessing an airport Koos Bosma would describe as sixth generation. A key feature of this most current generation of airport is the strict division between the 'secure' areas and the 'open' areas of the complex. Incorporated into the Brisbane design were scanners and other security devices, passenger safety features introduced after the rise of international air terrorism. The domestic terminal was designed to handle 7 million passengers a year and a peak hour loading of 10 000 people, including passengers and their friends.[28]

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[25] *CM*, 21 March 1988, Airport 88 Supplement, p. 2; *Aviation Institute Journal*, November 1985, pp. 5-9.
[26] *CM*, 21 March 1988, Airport 88 Supplement, p. 2; Davis, History of Australian aerodromes, p. 24.
[27] *CM*, 21 March 1988, Airport 88 Supplement, p. 2.
[28] SM, 14 November 1993, p. 40; *Aviation Institute Journal*, November 1985, p. 7; Bosma, 'European airports 1945–95', p. 57.

While airline companies between 1950 and 1988 coped with the least up-to-date primary airport in Australia at Eagle Farm, an over supply of space was available, for a price, to light aircraft businesses at Archerfield. Throughout the period, tenancy changes were common as small companies tried to make a profit from postwar aviation and often did not.

An inspection of the RAAF base in 1951 recorded, 'The airfield is probably the best light aircraft field in Australia... Traffic is light on week days, medium at weekends, and some congestion occurs during CAF camp weekends.'[29] Only one tenth of the air traffic at the time was in radio contact with the control tower. Even allowing for some exaggeration, Archerfield in the 1950s was comparable to other capital-city secondary aerodromes that were, likewise, grassy airfields on the outskirts of the city.

The continued military activity on Archerfield in the 1950s centred on RAAF's South Camp. In 1947 the government had approved the establishment nationwide of sixteen RAAF squadrons, four of which were Citizen Air Force (CAF) squadrons. No. 23 (City of Brisbane) Squadron CAF was formed on 1 April 1948 and located at Archerfield. Aircraft flown included Tiger Moths, Wirraways and Mustangs. Some of the wartime South Camp buildings were renovated to accommodate the up to eight officers and sixty-four airmen in the squadron, as well as members of the University Squadron. A move to Amberley Air Force Base was necessary after plans were made to re-equip No. 23 Squadron in 1955 with De Havilland Vampires—jet aircraft which required a better landing surface than Archerfield provided.[30]

With the introduction in 1950 of the National Service Training Scheme (NSTS), eighteen year-old Australian males were required to undergo six months of basic compulsory military training. Some were chosen to train as pilots in courses conducted by aero clubs. On Archerfield these young men were accommodated in huts on the southern side of Mortimer Road. Barry Arentz, a trainee in 1954 and still a pilot in 2003, recalled a military regime that allowed him time to swim in Oxley Creek when not otherwise occupied.[31]

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[29] S/L H. F. Moore, report on inspection of Archerfield 1 & 2 November 1951, DWB RAAF Archerfield Qld – Post war airfield – Buildings and services, 171/16/261 Part 2, A705/1, NAA (ACT). The same inspector noted that in a previous month non-radio arrivals and departures had numbered over 3 000 each, while radio-controlled arrivals and departures had amounted to only 300 each. The requirement to use radio in a controlled area such as Archerfield was not introduced until 1957.

[30] Alex Freeleagus, interview with author, 11 March 2001; Doug Hurst, *The part-timers: A history of the RAAF Reserves 1948–98* (Canberra, ACT: Department of Defence, 1999), pp. 13-15; Plan dated 18 August 1950, Archerfield – RAAF Station – Proposed layout of living quarters, QA2055, J2698/1, NAA (Qld).

[31] Barry Arentz, interview with author, 1 December 2002.

After the NSTS was disbanded and No. 23 Squadron departed, many of the huts they had occupied were sold for removal. Some were purchased by church trusts. Others became halls for local Girl Guide groups. The CO's residence, the house that had been originally the Grenier homestead, later Elizabeth Beatty's home and the aerodrome caretaker's house, was sold for removal at public auction on 16 July 1960 for £275.[32] Research has yet to establish its destination. By 1970 all that remained in the South Camp area of the aerodrome were two of the Bellman hangars, both leased and accommodating private aircraft. Two of the last remaining huts had been relocated to the civil aviation section of the airport in 1965. Flying training organisations still occupy these buildings in 2003.[33]

For Harold Kenny, working as an aero club instructor, the NSTS of the 1950s was a bonus for an employee paid for the hours he flew. Although financially advantaged by the scheme, he also understood the growing body of public opinion which saw no reason 'why the government of the day should squander the taxpayer's hard-earned money on the extravagant tastes in fun or sport of a fortunate few.'[34]

His employer, RQAC, continued to expand postwar, occupying hangar no. 1 until 1952 then hangar no. 5, the larger of the former QANTAS hangars. In 1961 RQAC's offices were located on a monthly tenancy on the ground floor of the control building in rooms once designed to accommodate airline offices and travellers. By 1964, conditions were cramped. Manager Allan Luckman explained his concerns in a letter to the DCA: 'The flight office in the main club room will have to be somewhat enlarged to permit two girls to work in this area... This, of course, must encroach on the club room area, but there is no alternative.'[35] The club room was the terminal's former open waiting room.

As early as 1963 RQAC discussed with the DCA possible sites for a new, permanent building containing club rooms and lecture rooms. Thanks to a healthy financial

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[32] Schedule of buildings sold at auction on 16 July 1960, DWB – Property – Archerfield Qld – Aerodrome – Dispersal areas – Camp site – Sewerage works – Dispersal of assets, 171/106/727 Part 3, A705/1, NAA (ACT).

[33] Plan BS3983 dated 14 July 1969, Note on minute sheet dated 9 December 1969, Note on minute sheet dated 29 January 1970, Archerfield buildings, 1959/384 Part 6, J23/P11, NAA (Qld).

[34] Barry Arentz, interview with author, 1 December 2002; Harold Kenny, 'Living to fly' might well become 'flying to live', Part 1, manuscript, 1994, pp. 121-2; Geoffrey Bolton, *The middle way*, ed. Geoffrey Bolton, *The Oxford History of Australia* (Melbourne: OUP, 1990), p. 79. The NSTS flying training scheme was abandoned in 1954.

[35] Allan Luckman to RD DCA, letter dated 19 June 1964, Plan dated 17 December 1964, Archerfield – Control building, 1961/1127 Part 2, J23, NAA (Qld).

position, a new two-storey brick building was under construction by 1966. Plans for a motel for students and itinerant pilots, as well as a new hangar, did not eventuate.[36]

General aviation (GA) companies on Archerfield came and went throughout this period. Queensland Aerial Ambulance and Taxi Service (QAATS) operated a fleet of red aircraft from offices near the Bellman hangar no. 71. At various times Queensland Flying Services occupied hangar no. 2, a corrugated iron shed on the field's northern boundary and the former QANTAS instrument shop. In 1959 the list of companies on Archerfield included Agricultural Aviation Pty Ltd, Air Express (Holdings) Ltd, Air Spray Corporation (Qld) Pty Ltd, Airwork Co Pty Ltd, Queensland Aviation Service, Wilmor Pty Ltd and Ian A. Wilson Pty Ltd. The last two companies provided spare parts and pilot supplies, fulfilling the needs of more pilots as flying training requirements increased. Like all secondary airports, Archerfield served the postwar safety-based need to keep general aviation and training aircraft separate from airline traffic. With its GA client base, Archerfield was not self-supporting. The revenue returned to the government from leases and concessions held by commercial companies on Archerfield in the mid-1960s amounted to only £8 000 on a capital investment of £384 114, barely 2% return and considerably less than operating costs.[37]

Yet in 1956 Archerfield was the nation's second busiest secondary airport. (See Table 20.) By 1965 movements had increased to an estimated 121 000 per annum.[38]

Some GA companies on Archerfield provided aircraft maintenance only. Aircraft repair and servicing company Carswell and Dalgliesh in the early 1950s occupied hangars no. 2, 7 and 72. In a letter to the DCA the company's principals stated their belief that 'hangar rentals are too high for the amount of aircraft work available and either we obtain some relief or cease business.'[39] What eventuated was the latter.

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[36] *Australian Flying*, October 1963, p. 48; J. F. Blair for RD to DG DCA, memo dated 28 January 1966, Archerfield – Aerodrome – General, 1964/144 Part 8, J23/36, NAA (Qld).
[37] *Australian Flying*, May 1964, p. 56; Schedule dated 19 March 1959, Archerfield – General extension, QL718 Part 3, J56/11, NAA (Qld); Synopsis of Archerfield circa 1966, Second – Archerfield 1962–78, CAHS, Melbourne.
[38] Synopsis of Archerfield circa 1966, Second – Archerfield 1962–78, CAHS, Melbourne.
[39] Carswell & Dalgliesh to S&PO, letter dated 29 June 1951, Archerfield – lease of hangar allotment to W. Rankin, QL312, J56/11, NAA (Qld).

Table 20: Comparison of GA activity on Australian secondary aerodromes in 1956.[40]

SITE	AIRCRAFT MOVEMENTS (MONTHLY AVERAGE)	AIRCRAFT BASED ON THE AERODROME
Bankstown	8 000	80
Archerfield	6 000	61
Moorabbin	5 500	72
Parafield	2 300	40

Former QANTAS engineer George Ditchmen was successful through specialisation. Having trained on Archerfield as an apprentice in the 1930s, he returned there in 1947. After his first war-surplus building between hangar no. 3 and hangar no. 4 was destroyed shortly after in a storm, he relocated to south of the cemetery. There he established a small aeronautical workshop which still operated in 2003.[41]

Some GA companies expanded. Air Express (Holdings) Ltd was established with two employees and one DH84 Dragon in 1952. They delivered newspapers to Bundaberg, Maryborough and Rockhampton, back-loading with meat, fruit and general freight. In 1960 Air Express purchased two Bristol Freighters and commenced operations between Sydney and Tasmania. By the end of that decade the company occupied three of Archerfield's maintenance hangars and employed sixty-five people.[42]

Air Express lost its momentum after it was unable to obtain government permission to import enough of the right type of aircraft to make operations more profitable. Operations were scaled down and the company taken over in the 1970s. The larger IPEC Air Pty Ltd also had tried to import freighter aircraft for interstate operations in 1964–65, was refused and loss its subsequent High Court case. Like IPEC Air Pty Ltd, Air Express found that the Customs (Prohibited Import) Regulations worked against the introduction of competition for the two major airlines, even if only for the carriage of freight.[43]

General aviation and Archerfield both profited from the boom in light aircraft flying that occurred in the 1960s. In 1964 GA nationwide employed 1 700 people. By 1974–75

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[40] W. H. Pickford for RD Qld to DG DCA, memo dated 27 September 1956, Clerical organisation – Eagle Farm and Archerfield Airports, 1954/393 Part 1, J23/P11, NAA (Qld).

[41] George Ditchmen, interview with author, 23 December 1996; Les Robinson, interview with author, 11 January 2001. George Ditchmen was awarded the Medal of the Order of Australia in 1993.

[42] Air Express (Holdings) Ltd, Submission to the Min. for Civil Aviation for Import permits for replacement and additional aircraft to extend existing pure-freight services & company promotional documents, Andy Houselander Collection.

[43] H. W. Poulton, *Law, history and politics of the Australian Two Airline system* (Parkville, Vic.: H. W. Poulton, 1981), pp. 44-6.

that number had increased to 4 115.[44] Nationwide, aviation figures show the same trend. Registered aircraft in Australia increased over 50% between 1955 and 1960, increasing again over 260% before the end of the decade. The number of licensed private and commercial pilots increased over 300% between 1960 and 1969. In that same bracket of years the ratio of pilots to registered aircraft, increased from 2.9:1 to 3.8:1. Table 21 indicates the general growth that occurred.

Table 21: Registered aircraft and pilot numbers for Australia for selected years between 1948 and 1987.[45]

YEAR	REGISTERED AIRCRAFT	PRIVATE PILOTS	COMMERCIAL PILOTS	STUDENT PILOTS
1948	670	614	495	1 114
1950	779	872	469	1 778
1953	821	1 677	518	2 639
1955	887	2 245	582	3 193
1960	1 360	3 001	948	3 696
1969	3 559	10 218	3 357	10 512
1975	4 269	15 312	3 470	12 542
1979	5 997	21 937	7 653	20 724
1984 (fixed wing only)	6 801	27 381	5 705	23 977
1987 (fixed wing only)	7 435	29 779	5 528	12 618

Although subsidisation of aero clubs continued until June 1965, in the financial year 1962–63 the Commonwealth commenced the Australian Flying Scholarship scheme to further encourage the training of career pilots. Applicants needed to have logged a minimum of thirty hours flying experience and be between 17 and 30 years of age. In its first year, 147 scholarships were awarded. Included amongst the recipients were five women. The funding provided approximately 70% of the cost of training to a commercial pilot's licence with an instructor rating, qualifications which were in demand as more of the general public undertook pilot training.[46]

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[44] CBCS, *Official year book of the Commonwealth of Australia*, vol. 51 (Canberra: CGP, 1965), p. 580; ABS, *Official year book of Australia 1975 & 1976*, vol. 61 (Canberra: A/CGP, 1977), p. 405.
[45] CBCS, *Official year book of the Commonwealth of Australia*, vol. 38 (Canberra: CGP, 1951), p. 203; CBCS, *Official year book of the Commonwealth of Australia*, vol. 41 (Canberra: CGP, 1955), p. 179; CBCS, *Official year book of the Commonwealth of Australia*, vol. 46 (Canberra: CGP, 1960), p. 554; CBCS, *Year book Australia 1965*, p. 582; CBCS, *Official year book of the Commonwealth of Australia*, vol. 56 (Canberra: CGP, 1970), p. 376; ABS, *Year book Australia 1975 & 1976*, p. 405; ABS, *Year book Australia 1980*, vol. 64 (Canberra: CGP, 1980), p. 534; ABS, *Year book Australia 1985*, vol. 69 (Canberra: CGP, 1985), p. 458; ABS, *Year book Australia 1989*, vol. 79 (Canberra: CGP, 1989), p. 644. In December 1987 the total number of helicopter pilots was 2 284. Some of this number also held a fixed-wing licence.
[46] *Australian Flying*, March 1963, p. 11 & p. 50.

One of the companies to benefit from this renewed interest in light aircraft flying was Rex Aviation, which commenced the importation of Cessna light aircraft into Australia in 1954. By 1961 the company was selling three aircraft a week and had opened its second Australian office at Eagle Farm Airport. Stanley Brogden reported the firm's policy was 'to see that service can be given to buyers of Cessnas who want to use the main airports and to be where the light aircraft traffic is thickest now and in the future.'[47] By the mid-1960s the company also occupied three buildings on Archerfield, one of which was hangar no. 3 where it ran a flying school and maintenance facility. The introduction in the late 1950s of the all-metal Cessna C150 and C172 models aided Rex Aviation's success. Both featured a tricycle undercarriage, referred to in publicity documents as 'Land-O-Matic' gear. These sturdy, modern designs were easier to manoeuvre on the ground and held a greater attraction for pilots than the open-cockpit, fabric DH82 Tiger Moths which had been used commonly as trainers until then.[48]

Whether for training or other private or commercial operations, Archerfield in the 1960s was a grass airfield with four designated, graded landing strips. Night flying could only be conducted if arrangements were made with the DCA caretaker to set out a path of kerosene flares. Wet weather made operations difficult for the charter companies that, from the 1950s, operated instrument-equipped, twin-engine aircraft. Boggy conditions in 1954 stopped both RQAC and Air Express from operating as the airfield had been closed.[49] In 1963 the Queensland branch secretary of the Association of Commercial Flying Organisations of Australia (ACFO) argued for improvements to what was an on-going and expensive problem. He wrote: 'Accepting the fact that Archerfield should not have to be closed to all operations due to an unserviceable surface alone, it is felt that the Department must now take steps to investigate this problem which exists.'[50]

In 1965 one of the airfield's four landing strips (096°M/276°M, later referred to as10/28) was upgraded by a light surface regrading and gravelling of a section 4 000 feet (1 220 metres) in length. The standard of regrading was sufficient to take aircraft in the light twin category in wet weather. The estimated cost of the work was £7 500. A second strip (043°M/223°M, later referred to as 04/22) was improved to less stringent specifications. The remainder of the airfield allowed for 3 000 feet (914 metres) runs in various directions. No further work was undertaken because 'heavy capital expenditure

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[47] Stanley Brogden, 'Rex is a real success story', *Aircraft*, April 1961, p. 30. Rex Aviation was originally a New Zealand company.
[48] *Australian Flying*, October 1963, pp. 21-5. The four-seat Cessna C172 went into production in 1956. The two-seat Cessna C150 was first produced from August 1958.
[49] Minute paper dated 18 February 1954, Archerfield Aerodrome – General, 1954/2484 Part 6, J23/36, NAA (Qld).

and excessive earthworks would be needed.'[51] Being a minor site in such a large system had reduced Archerfield's capacity to accommodate even the comparatively small improvements in light aircraft technology.

As industrial building development made demands on its boundaries, Archerfield's strips were reduced in number to three so that height restrictions would apply to fewer dedicated approach paths. After the changeover date of 1 November 1968, the 040°M (04/22), 096°M (10/28) and 134°M (13/31) strips were the only directions in which landing approaches would be protected against industrial buildings of any height. Within eighteen months electrically operated landing lights were installed on the gravel 10/28 landing strip, allowing for virtually twenty-four hour a day operations.[52]

Few new buildings were constructed on Archerfield during this period. In line with Commonwealth policy to protect the safety of operations on all secondary aerodromes, a fire tender shelter was erected to the north of the control building in 1956. An extension to this was constructed in 1957.[53] After the completion of the RQAC clubhouse in the mid-1960s, additional land was opened up for the construction of private hangars on the northern edge of the building area.

Residential land use increased to Archerfield's south after 1953 when the Queensland Housing Commission developed the former Camp Muckley site into the suburb of Acacia Ridge. The HF/DF site at the corner of Beatty and Mortimer Roads was decommissioned in 1955, that location subsequently acquired by the Queensland Government for £10 650 in 1963. Statistics indicated Acacia Ridge would soon require the new high school for which this site was earmarked.[54]

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[50] Sec. Association of Commercial Flying Organisations of Australia Qld branch to RD DCA, letter dated 2 September 1963, Archerfield Aerodrome – General, 1956/1257 Part 7, J23/36, NAA (Qld).
[51] J. G. Mowbray for RD DCA to DG of CA, memo dated 1 May 1964, Archerfield – Aerodrome – General, 1964/144 Part 8, J23/36, NAA (Qld); Synopsis of Archerfield circa 1966, Second – Archerfield 1962–78, CAHS, Melbourne.
[52] Press release dated 22 April 1969, Airports – Major – Second – Archerfield 1962–78, CAHS, Melbourne; Method of working plan for AF aerodrome – installation of runway lighting runway 10/28, Archerfield Aerodrome, 1970/6762 Part 1, J23/35, NAA (Qld). The lighting still needed to be switched on by a DCA employee. Pilot activated lighting (PAL) was not introduced until the 1980s.
[53] Plan BS658Z, H. White for DG DCA to Sec. Dept of Treasury, memo dated 24 September 1957, Archerfield fire tender and ambulance shelter, 1956/554 Part 1, J23/11, NAA (Qld).
[54] CPO to Sec. QHC, letter dated 16 February 1955, Archerfield RAAF Married Quarters; Dept of Air, QL718/23 Part 1, J56/11, NAA (Qld); DG of Education (Qld) to CPO, letters dated 27 April 1961 and 11 June 1963, Archerfield – General extension, QL718 Part 3, J56/11, NAA (Qld).
Archerfield – HF/DF station – surveys, QL718/319, J56/11, NAA (Qld).

General aviation activity continued to grow into the 1980s. In 1986–87 the hours flown by GA nationwide amounted to 1.7 million.[55] Cost recovery measures were pursued more energetically in GA in the early 1980s. The cost of flying training increased. Changes in attitude to a career in aviation and increased opportunities for spending leisure dollars elsewhere resulted in a 50% reduction in the number of student pilots between 1984 and 1987. (See Table 20.)

Archerfield's runway format was developed in the 1970s into a system of three parallel landing strips (left-centre-right) for each of the three predominant wind directions. Only one of the nine landing strips, now generally called runways, was bitumen. When General Aviation Airport Procedures (GAAP) and contra-rotating circuits were introduced in the early 1980s, the Archerfield runway layout was reduced to two parallel runways each for the 10/28 and 04/22 directions. Like the old Boundary Road which had disappeared in 1942, the 13/31 runways were decommissioned and returned to grass. Despite this rationalisation of runways, complaints about the noise generated by aircraft continued, particularly after any accident occurred.[56]

Throughout this period Archerfield Airport remained a place of employment for pilots, engineers and clerical staff. Even if the liquidity of some employers was precarious, determined people were still able to find employment within aviation. The working life of Les Robinson provides an example. As a trainee apprentice for Airlines of Australia, Robinson commenced work in hangar no. 6 in 1939. After the war he worked for a year for APL before moving across to Air Repair. When that company ceased its operations in 1948 he found employment with Barrier Reef Airways at Colmslie. When this flying-boat company was taken over by Ansett Airways he returned to Archerfield, working for five years for George Ditchmen, then four years for Carswell and Dalgliesh in hangar no. 2. He was back working again for George Ditchmen in 1965 when he was asked to set up the propeller overhaul shop for Rex Aviation. Robinson then remained there until his retirement in 1983.[57]

What was technologically possible in air transport and airport development had led by 1988 to the establishment of a modern, $480 million airport complex for Brisbane just a short distance from where in February 1922 Edgar Johnston had decided the city's first aerodrome would be located. The roles played in the intervening years by Brisbane's airports have been, as Hughes noted of large technological systems, both socially

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[55] ABS, *Year book Australia 1989*, p. 643.
[56] *SM*, 1 October 1978, p. 16; *SM*, 8 October 1978, p. 6; Southern Star, 1 March 1989, n. p.; Both parallel 10/28 runways are now bitumen surfaced.
[57] Les Robinson, interviews with author, 11 and 22 January 2001.

constructed and society shaping. The new site was only one in a mature system which encompassed capital-city and regional airports capable of catering for society's need for safe, efficient and moderately priced transport by air. When completed, the airport was integral to the expansion of tourist operations into Queensland and along with the introduction of quieter jet engine technology removed aircraft noise problems from the agendas of many inner-city suburbs.

The decades of delay before the construction of Brisbane's new primary airport were the consequence of political and economic factors prevalent in a centralised, bureaucratic federal form of governance. As one pragmatic journalist wrote in 1987, 'Brisbane had experienced worse at the hands of distant administrators.'[58]

[58] *CM*, 2 July 1978, p. 9; Hughes, 'The evolution of large technological systems', p. 51.

Chapter 23

'The indications are that the world today is entering upon an air age. Australia is attempting to play its part, and the Commonwealth government intends to spare no reasonable effort to develop air transport to the advantage and benefit of the community.'[1]

Thomas P. Hughes published his history of electrification in 1983.[2] Since then historians of technology generally have agreed that his broad approach, which allows for an exploration of technical matters, scientific laws, economic principles, political forces and social concerns, is appropriate to the study of large-scale, technology-based systems. It has proved a suitable base model for a study of the relationship between the development of air transport in Australia, the establishment of airports nationwide and the case-study site, Archerfield Aerodrome.

The primary advantage of the Hughes model is that it allows order to be imposed on complex issues. Australian air transport is a complicated industry. To date there have been many interpretations of sectors of the industry, but few which attempt to encompass all that complexity. Hughes' model provides a structural approach for this thesis, but also allows for space within its framework to answer the first of three broad remits which historian Willie Thompson considers are the role of the historian, that is, where no narrative exists or where one needs revision, investigation is appropriate.[3] Although some Australian airports have been the subjects of celebratory-type histories, an analysis of how Australia's system of airports evolved has yet to be published.

Between 1920 and 1988 the air transport and airport systems in Australia developed according to the five phases identified by Hughes. The initial phase of invention came about as people in the 1920s sought to exploit the capabilities of aircraft. As air-service companies established routes they hoped would be financially rewarding, both systems proceeded into the second phase, one dominated by development.

A steady interchange of people, ideas and means of administering aviation between Australia and trading partners Britain and the USA led to varied levels of technology

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[1] *CM*, 11 December 1934, p. 15. Quoted is part of the speech made by Minister for Defence Archdale Parkhill at Archerfield on 10 December 1934 for the inauguration of the Empire Air Mail service.
[2] Thomas P. Hughes, *Networks of power: Electrification in western society, 1880–1930* (Baltimore and London: The Johns Hopkins University Press, 1983).
[3] Willie Thompson, *What happened to history?* (London: Pluto Press, 2000), p. 173.

transfer regarding aircraft engineering and components, aerodrome design and regulatory procedure. System managers were selective during this phase, adapting what worked overseas to Australia's distinct geography and smaller population base, creating a system different from that of Canada, Britain or the USA.

An example of innovation—according to Hughes a phase that can occur at any point in the sequence—was the subsidisation of air services to remote areas where surface transport was slow and where there was no conflict with state-owned railways. As a consequence of this and some home-grown input, Australia developed a system of airports that was highly influenced by politics, geography and historical experience. The Second World War exerted a strong influence. During those six years, aviation advanced dramatically. Australians flew more up-to-date military aircraft; runways were constructed at specific sites to cater for them.

Postwar the system moved into the growth, competition and consolidation phase as Trans-Australia Airways (TAA), Australian National Airways Pty Ltd and Ansett Airways jostled to increase their load factors and each obtain a bigger segment of the steadily increasing air-travel market. Greater expense was necessary at capital-city airports to accommodate larger passenger airliners. In an innovation which was undertaken in parallel with increased investment in the city sites, the Commonwealth sought to divest itself of regional aerodromes, in essence consolidating its position as the controller of key, rather than all, components of the system.

From the 1970s the more strenuous pursuit of cost recovery in aviation changed the style of the system yet again. This resulted in 1988 in the formation of government business organisations, the Civil Aviation Authority and Federal Airports Corporation, which were meant to reduce the federal government's financial obligations in aviation while at the same time retain the momentum of growth in air transport.

Hughes' five-phase system model explains the evolution of the Australian airport system on a large scale, as well as problems peculiar to individual sites. These latter features he identified as reverse salients, components that have fallen behind or are out of phase with other parts of the system. In late 1920s Brisbane, above-average rainfall forced scheduled air services from Sydney to find alternate landing grounds to the boggy Eagle Farm. Wet seasons exposed Brisbane's first aerodrome site as a reverse salient which was retarding the development of air services into the city. Other problem features can be identified in other decades.

Hughes' publications took the broad view of technological systems, examining the influencing factors by comparing systems in different countries and different parts of one country. In Australia, the existence of a single regulatory authority meant that through one city's aerodrome facilities the entire technological system could be evaluated. Unfortunately, the Civil Aviation Branch was subject to annual budgetary limitations that slowed the introduction of new technology. Because it was a centralised administrative body, however, improvements such as aerodrome-based radio navigation aids could be introduced nationwide. Archerfield, Brisbane's capital-city aerodrome of the 1930s and 1940s, provides the evidence of both the slow and systematic changes.

Others using the system approach already had varied Hughes' framework to suit the nature of their subject matter. Deborah Douglas restricted her 1996 study of the US airports system to the years between 1919 and 1939. Douglas considered the history of a range of key sites, making sharp divisions between matters related to politics, economics and airport technology. That three-part structure provided the starting framework for this thesis. To suit the nature of the case-study site, however, a consideration of social factors and an analysis of the built fabric were added.

Aviation technology provided the reason for this thesis. Without its invention and application there would be no airport system to study. An analysis of political factors established the chronological framework. Although the aeroplane was a new technology for which many could see a future, it was the actions of the Commonwealth which sought to direct that future and monitor its pace. In 1920 the Commonwealth legislated to regulate aircraft, aerodromes and pilots, effectively setting the rules within which the system would operate. System builders within the bureaucracy undertook the tasks of providing the organisational and architectural structures needed. Though well intentioned, at times these public servants were restricted by their administrative placement within the Department of Defence.

A closely related factor, the lack of adequate funding, influenced the speed of system growth. In choosing to be responsible for the system, the Commonwealth was obliged to pay the costs of what became an increasingly expensive system. In the early 1920s the Commonwealth could afford to subsidise only a few air services. Many other small operations struggled to remain in business. Considerable corporate investment, usually in the form of shareholders' funds, was needed by airlines to ensure growth and air route expansion. In the 1930s, as air transport developed, this was more common. Postwar, the Commonwealth's entry into airline ownership to ensure competition created a duopoly, a style of air transport system unique to Australia.

Hughes' system model acknowledges the importance of social factors in the development of technology. This thesis, however, concludes that a system study can be greatly enhanced by a more detailed investigation of social factors. Considering the role of key people also satisfies the second of Willie Thompson's remits, that historians need to be committed 'to interpret and explain the relationships and mutual interactions between individuals, institutions and processes.'[4]

In placing a stronger emphasis on the role of social factors, this study moved towards the social constructivist approach advocated by Edward W. Constant. That was achieved through an examination of the organisational groups related to the case-study site, in particular the civil aviation administration after 1920, the aviation companies based on Archerfield Aerodrome and the Royal Queensland Aero Club. Especially important were the system builders Horace Brinsmead and Edgar Johnston, along with professional technicians such as A. R. (Roley) McComb and K. N. E. (Bill) Bradfield. Further extended research on these engineers and administrators would reveal the important and largely unacknowledged role each played in planning for system development.

In the corporate sphere the actions of pilots Hudson Fysh and Lester Brian of QANTAS showed how necessary to the successful growth of the air transport system were well-administered aviation companies. Fortunately after his retirement Fysh published three volumes of the history of his company. The role of Lester Brain, in international transport as a pilot for QANTAS and in domestic air transport administration as the manager of TAA, is less a matter of public record. Both though were strong system builders, as were Ivan Holyman of Australian National Airways Pty Ltd, Reginald Ansett of Ansett Airways, Arthur Butler of Butler Airways and Ron Adair of Aircrafts Proprietary Ltd.

Aviation widened its appeal as throughout the period under study a growth in airmindedness occurred. Because of its novelty, people were interested in aircraft, pilots, aerodromes and all to do with aviation. As observed by historian Leigh Edmonds, this positive attitude changed cultural attitudes and encouraged community acceptance and the growth of an aviation industry which included pilots, engineers, controllers and workers in air-service and airline companies. A growing professionalism was evident as competition forced operators to provide an edge over rival, sometimes duplicate services.

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[4] Thompson, *What happened to history?* p. 173.

Through his examination of the finance and economics of early aviation company operations, defence, airmindedness, the influence of politics and the role of communication, Edmonds has been prolific in his contribution to Australian aviation history. While acknowledging the value of these studies, using a system approach has provided the opportunity to examine all themes as and when they affected Archerfield Aerodrome.

Order can be imposed on the nebulous topic of Australian aviation history by adapting the system approach introduced in 1983 by Hughes to include the existing built fabric of a particular site. This study was enhanced by being able to study a chronological range of buildings, some of which were only a few years younger than the system itself. In so doing it has reached the third of Willie Thompson's broad remits—an obligation to try to enter the consciousness of the objects of their historical study.[5] Archerfield's hangars and other specialist buildings are the material result of decisions made by either directors of air-service companies or civil aviation public servants. In conjunction with the documentary and archival evidence, examining why and how these buildings reached their stabilised form has revealed the political, economic, technological and social influences on the system's key decision makers at specific times and avoided the standard empiricist view of technology, about which social constructivists Trevor Pinch and Wieba Bijker have expressed their concerns.[6]

In its detailed exploration of the built fabric of an interwar capital-city aerodrome, this thesis in turn provides a model for studies of other technology-based cultural artefacts still in existence, not necessarily aviation-based. Melbourne's Essendon and Adelaide's Parafield airports could be studied in this manner. Interwar sections of the former have been preserved because postwar progress led to the erection of a new terminal on another part of the aerodrome. Passenger operations then decreased dramatically in the 1970s when a new airport at Tullamarine on the city's edge took over the role of primary airport for Melbourne. Essendon's buildings though, have remained. In other ways the history of Parafield Airport resembles that of Archerfield—in the architecture of its buildings, and its former wartime usage, as well as in its current role as a secondary facility for a capital city.

Applying Hughes' model to air transport has avoided what James Hansen referred to as the 'gee-whiz' factor. This is the fascination with aircraft types that at times captures and holds the minds of historians with the belief that it is the flying machines that make

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[5] Thompson, *What happened to history?* p. 173.
[6] Trevor J. Pinch and Wieba E. Bijker, 'SCOT answers, other questions: A reply to Nick Clayton', *Technology and Culture*, 43 (2002), p. 366.

history and not the people, ideologies and organisations involved.[7] In Australian aviation history the feats of the long-distance aviators have been studied in great detail. While the 1928 trans-Pacific flight of Charles Kingsford Smith and Charles Ulm in the *Southern Cross* seventy-five years ago was a heroic flight deserving of recognition, the failure of these two pioneers to sustain the operations of Australian National Airways Ltd (ANA) is more important to the history of air transport. Their unsuccessful efforts in 1930–31 provide a marker as to how essential was the need for steady corporate management, government subsidies and sheer good luck if even the then largest airways company in the nation was to survive beyond eighteen months, something this first ANA could not do. The right conditions had to prevail else the company, like the system it was a part of, could not find the stability needed to grow and consolidate.

Those historians who since have chosen to adopt Hughes' model agree on its helpfulness in establishing order on complex and rich technological matters by viewing the enterprise of technology through their political, economic and social aspects. That usefulness explains why Archerfield Airport is a time capsule for the historian, as much as it does the reasons why Sydney does not have a third airport.

[7] James R. Hansen, 'Aviation history in the wider view', *Technology and Culture*, 30 (1989), p. 648.

Appendix 1

Land acquired to the west and north of existing Archerfield Aerodrome formally acquired on 12 November 1942[1]

OWNER/S	ACQUISITION DETAILS	LAND DESCRIPTION[2]
William A. & Florence A. Brown	Compensation: £300 Interest: £5 6s 6d interest Finalised: 19 February 1943	Sub. 1 of portion 74 Area: 8 acres 3 rood 13 perches (3.57 ha)
Frank T. Fenton	Compensation:£1 300 Interest: £30 17s 7d Finalised: 4 March 1943	Subs 43 to 48 of portions 68 & 69 Area: 20 acres (8 ha)
William Field	Compensation: £80 Interest: 1s 1d Finalised: 30 October 1942	Resubs 2, 3 and 4 of sub. 2 of portion 46 Area: 1 acre 3 roods 39.5 perches (0.6 ha)
Robert A. Flood	Compensation: £1 750 Interest: £4 3s 5d Finalised: 30 December 1942	Subs 44, 44a to 47 of portions 69 & 70 Area: 25 acres 9.3 perches (10.14 ha)
Charles Franklin	Compensation: £7 000 Interest: £83 10s 4d	Sub. 2 and resub. 3 of sub. 3 of portion 18 Area: 162 acres 1 rood 19 perches (65.7 ha)
William H. Harris (estate of)	Compensation: £360 Interest: £7 15s 6d Finalised: 19 March 1943	Sub. 20 of portion 60 Area: 5 acres 3.2 perches (2.03 ha)
John L. Irwin Jnr	Compensation: £400 Interest: £98 8s 8d Finalised: 20 February 1951	Subs 21 & 22 of portion 60 Area: 9 acres 3 roods 21 perches (4 ha)
Thomas I. L. Perkins	Compensation: £125 Interest: £4 19s 5d Finalised: 12 November 1943	Sub. 16 of portion 62 Area: 4 acres 34.1 perches (1.7 ha)
Royal Queensland Aero Club – building only	Compensation: £1 500 Interest: Nil Finalised: 13 January 1943	Land leased from Commonwealth
William Sinnamon	Compensation: £390 Interest: £36 2s 6d Finalised: 29 June 1945	Sub. 27 of portion 20 Area: 5 acres (2 ha)
Rachel Stiles (Estate of)	Compensation: £950 Interest: £97 18s 9d Finalised: 14 August 1947	Subs 17 & 18 of portions 61 & 62 Area: 10 acres 6.4 perches (4.06 ha)
Stephen J. Stiles	Compensation: £210 Interest: £5 9s 5d Finalised: 27 April 1943	Sub. 19 of portions 60 & 61 Area: 5 acres 3.2 perches (2.03 ha)
Hugh W. Wotley	Compensation: £900 Interest: £80 11s 1d Finalised: 23 October 1944	Subs 23 to 26 and part sub. 27 of portions 60, 61 & 62 Area: 24 acres 1 rood 6.7 perches (9.8 ha)

[1] *CGG*, 12 November 1942, pp. 2,621-2; WD to Hirings Officer, Northern Command, memo dated 18 July 1942, Archerfield Aerodrome, QL718 Part 1, J56/11, NAA (Qld); Form 334 dated 20 February 1951, Archerfield –General extension, QL718 Part 2, J56/11, NAA (Qld).

[2] All the land is situated in the Parish of Yeerongpilly, Country of Stanley.

Appendix 2

Land acquired to the east of existing Archerfield Aerodrome on 3 December 1942, 13 May 1943 and 9 February 1944 (not gazetted)[3]

OWNER/S	ACQUISITION DETAILS	LAND DESCRIPTION[4]
H. A. Brazil	Compensation: £15 Interest: 9s Finalised: 21 February 1945	Sub. 1 of resub. 2 of sub. 4 of portions 22 and 23 Area: 34.1 perches (0.08 ha)
Jeannetta Freney (house removed)	Compensation: £135 Finalised: 13 November 1945	Resub. 1 of sub. 15 of portion 21 Area: 1 rood 27.4 perches (0.17 ha)
John Irwin Snr	Compensation: £1 300 Interest: £273 10s 8d Finalised: 5 February 1951	Sub. 1 of portion 19 (part of) Area: 13 acres 2 perches (5.26 ha)
D. R. Lowe	Compensation: £25 Interest: Nil Finalised: 16 January 1950	Resub. 2 of sub. 3 of portions 20 and 22 Area: 2 acres 14.5 perches (0.84 ha)
Philip P. Marshall (Estate of)	Compensation: £300 Interest: £28 12s 7d Finalised: 9 April 1953	Sub. 3 of portion 11 Area: 4.2 acres (1.6 ha)
Servanus Otterspoor (two houses acquired)	Compensation: £2 617 Interest: £16 19s 10d Finalised: 25 February 1944	Subs 13, 14, 16 and 18 of resub. 3 of sub. 15 of portions 20 and 21 and part sub. 19 of portions 20 and 21 Resub. 2 of sub. 15 of portion 21 included house Resub. 2 of sub. 19 of portions 20 & 21 Total area: 39 acres 26 perches (15.8 ha)
QEA	Compensation: £350 Interest: £13 8s 2d Finalised: 12 January 1945	Sub. 17 of portions 20 and 21 Area: 5 acres (2 ha)
Shell Company of Australia (house acquired)	Compensation: £800 Interest: £16 6s 7d Finalised: 18 August 1944	Resub. 2 of sub. 28 of portion 20 Area: 32 perches (0.08 ha)
Oliver & Jane Shelley (house acquired)	Compensation: £1 400 Interest: £90 18s 3d Finalised: 16 May 1945	Resubs 1 and 4 of sub. 28 portion 20 Area: 1 rood 8 perches (0.12 ha)
Cyril Sims – land on the southern side of Kerry Road used for ARU	Compensation: £570 Interest: £14 7s 2d Finalised: 22 December 1944	Sub. 22 of portion 20 Area: 10 acres (4 ha)
R. Roger (Estate of)	Compensation: £150 Interest: £1 2s 0d Finalised: 30 November 1942	Sub. 30 of portion 24
George Sims – land used for ARU (house moved to Boniface Street)	Compensation: £400 Interest: £4 1s 4d Finalised: 14 June 1944	Sub. 23 of portion 20 Area: 10 acres (4 ha)
Alexander and Edna Spring (house removed)	Compensation: £120 Interest: £5 13s 7d Finalised: 8 August 1944	Resub. 1 of sub. 26 of portion 20 Area: 2 acres (0.80 ha)

[3] Plan of Archerfield dated 12 October 1955, Archerfield survey plan, LS3406C, J1018/2, NAA (Qld); Form 335 dated 20 February 1951, Archerfield – General extension, QL718 Part 2, J56/11, NAA (Qld).
[4] All the land is situated in the Parish of Yeerongpilly, Country of Stanley.

OWNER/S	ACQUISITION DETAILS	LAND DESCRIPTION[5]
Tom and Annie Spring	Compensation: of £1 750 Interest: £2 6s 8d Finalised: 13 March 1944	Resub. 2 of sub. 26 and subs 24 and 25 of portion 20 Area: 28 acres (11.33 ha)
Tom and Annie Spring	Compensation: of £1 000 Interest: £2 6s 8d Finalised: 31 May 1944	Sub. 2 of portion 19 Area: 40 acres (16.2 ha)
Tom and Annie Spring	Compensation: of £400 Interest: included above Finalised: 31 May 1944	Sub. 20 of portions 20 and 21 Area: 10 acres (4 ha)
J. H. Todd	Compensation: £260 Interest: £3 15s 8d Finalised: 5 November 1943	Sub. 29 of portion 42 Area: 4 acres 1 rood 14 perches (1.75 ha)
Robert Wood (house acquired)	Compensation: £873 Interest: £25 15s 1d Finalised: 29 November 1944	Resub. 3 of sub. 28 of portion 20 Area: 4 acres 2 roods (1.8 ha)

[5] All the land is situated in the Parish of Yeerongpilly, Country of Stanley.

Appendix 3:

Key to Buildings on RAAF Archerfield Aerodrome Station Plan dated 21 May 1943. Buildings in italics are still on site.

NO.	BUILDING USE	COMMENT
R71	*RAAF Bellman hangar*	*Retained for DCA use*
R72	*RAAF Bellman hangar*	*Retained for DCA use*
R77	*Hangar no. 7*	*Purchased by DCA*
R78	Store	Removed
R79	Store	Removed
80	*Hangar no. 5*	*Purchased by DCA*
81	*Hangar no. 4*	*Purchased by DCA*
85	*Control Building*	*DCA property*
86	Office building	Removed
87	Control hut	Removed
88	Electrical store	Removed
89	*Shell office*	*Remained property of Shell*
90	*Dynamo shed*	*DCA property*
91	Radio beacon	DCA property
92	*Ladies lavatory*	*DCA property*
93	Gents lavatory	DCA property
94	ARC canteen	Sold
95	*Hangar no. 6*	*Purchased by DCA*
97	Dressing room	Sold
98	Wireless mast	DCA property
99	Lavatory	Removed
R100	Existing building	Removed
R101	Existing building	Removed
103	Guard hut	Removed
107	A. I. D. hut	Removed
109	Inflammable store	Purchased by DCA – removed 2002
R149 to R154	Sleeping huts	Removed
R155	Mess hut	Removed
R156	Canteen & recreation	Removed
R157	Sleeping hut	Removed
R158	Kitchen	Removed
R159	Ablutions (all ranks)	Removed
R160	Sleeping hut	Removed
R161	Canteen & recreation (officers)	Removed
R162 to R164	Sleeping huts	Removed
R165	Hydraulic department	Removed
R166	Carpenter's shop and dope room	Removed
R167	Latrines (all ranks)	Removed
R168	Unused room	Removed
R169	Motor transport	Removed
R170	Store – searchlights & sandbags	Removed
R171	Wireless workshop	Removed
R172	Woodworking shop	Removed
R173	Paint shop & machine & sheet-metal shop	Removed
R174	Meteorological building	Purchased by DCA
175	*Meteorological building*	*DCA property (now Canteen)*

NO.	BUILDING USE	COMMENT
176	*Dope shop*	*Purchased by DCA*
177	Engine shed	Removed
178	Qantas office	Purchased by DCA – removed 2000
184	Gents lavatory	DCA property
186	Transportation office	Removed
R205 to R210	Sleeping huts	Removed

Appendix 4:

Key to Buildings on RAAF Archerfield Aerodrome Station Plan dated 21 May 1943

NO.	BUILDING OR AREA USE	NO.	BUILDING OR AREA USE
1	Parade ground	R49	Officers and Sergeants' mess and recreation
R2 to R4	Trainees' sleeping quarters	R50	Boiler house
R5	Guard room & store	R51 to R52	Officers' sleeping hut
R6	Headquarters	R53 to R56	Sergeants' sleeping huts
R7	Instructional headquarters	R57	Officers' latrines & ablutions
R8	Lecture hut	R58	Sergeants' ablutions
R9	Navigation lecture hut	R59	Sergeants' latrines
R10	Rigging & engine instruction	R60	Boiler
R11	Laundry	R62	Flagpole and saluting base
R12 to R13	Airmen's ablutions	R65	Sentry box
R14	Airmen's sleeping hut	R66	Incinerator and compound
R15	Airmen's writing & mess hut	R70	Bellman hangar
R16	Trainees ablution	R73	Bellman hangar
R17	Trainees' latrine	R108	Prophylactic hut
R18 to R19	Airmen's mess hut	R111	Chaplain's hut
R20	Trainees' mess hut	R112	Dishwashing annexe
R21	Airmen's kitchen	R113	Straw store
R22 to R24	Airmen's sleeping hut	R117	Squadron & flight office
R25	Recreation & canteen	R118	Flight offices
R26	Boiler	R119	10 000 gallon (45 460 litre) petrol underground tank
R27	Wireless instruction & link trainer	R120	Compressor room
R28	Trainees' sleeping hut	R121	Airmen's & trainees' latrines
R29	Store & parachute hut	R122	Motor transport
R30	Airmen's sleeping hut	R123	Airmen's sleeping hut
R31	Airmen's latrine	R124	Gymnasium
R32	25 yard range and gun turret workshop	R125	Motor transport car wash
R33	Armoury	R126	Motor transport petrol pump
R34	CO's quarters (formerly home of aerodrome caretaker)	R127	Equipment store
R35 to R40	Sergeants' sleeping quarters	R128	Covered way
R41 to R43	Trainees' sleeping quarters	R129	Lavatory
R44	Barracks office & store	R135	Vegetable store & preparation
R45	Department of Interior & Barracks workshop	R136	Bellman hangar
R46	Sick quarters	R137	Electrical workshop
R47	Boiler house	R138	Store
R48	Dental clinic		

Appendix 5:

Archerfield buildings, March 2003[1]

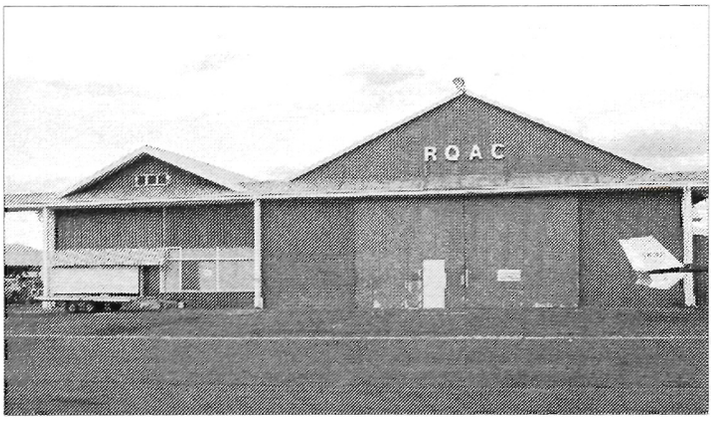

Figure 62: Airside view of Hangar no. 1. The smaller (left-hand) gable is the hangar attached to the original building in 1939.

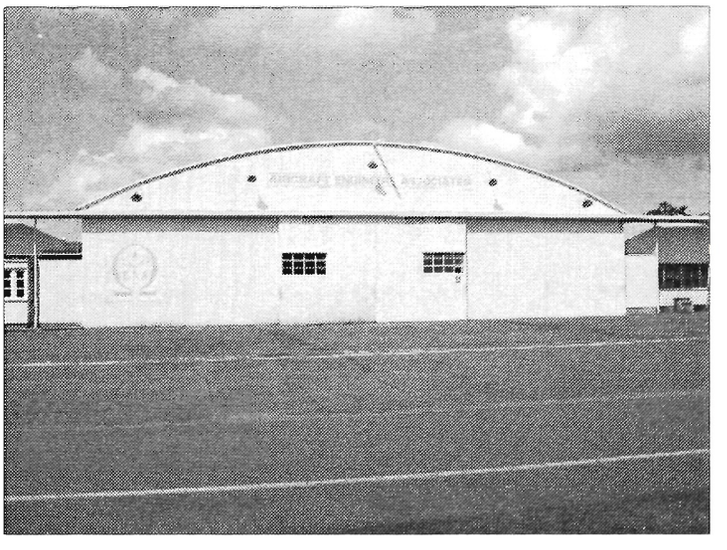

Figure 63: Airside view of Hangar no. 2. The windows and apron lights are as they were in the 1930s.

Figure 64: Airside view of Hangar no. 3. The windows above the hangar doors were exposed in a recent re-paint.

[1] All photographs taken by author on 29 March 2003.

Appendix 5

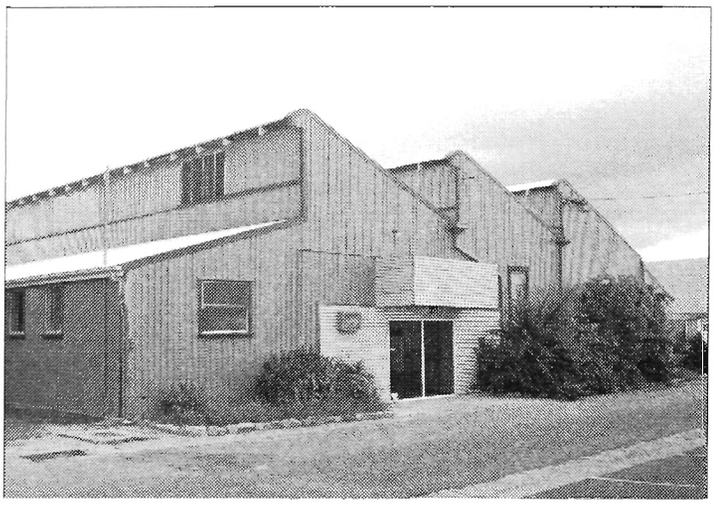

Figure 65: DAP extension to street-side of Hangar no. 3. Compare with Figure 43.

Figure 66: Hangar no. 4, the original QANTAS 1927 hangar from Eagle Farm Aerodrome. Lean-to extensions were constructed on northern and southern sides.

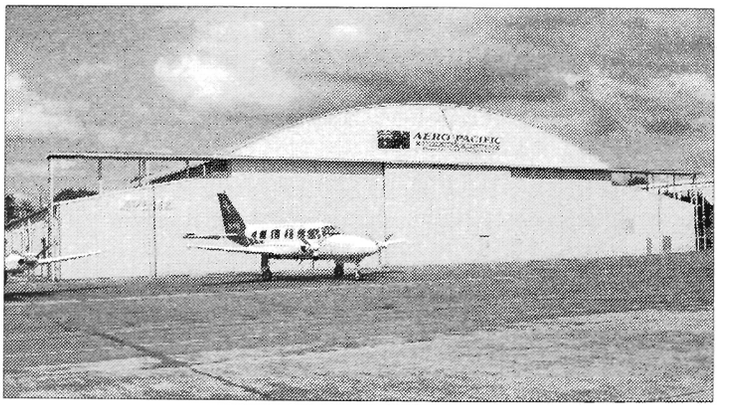

Figure 67: Air-side view of Hangar no. 5, constructed by QANTAS in 1931.

Appendix 5

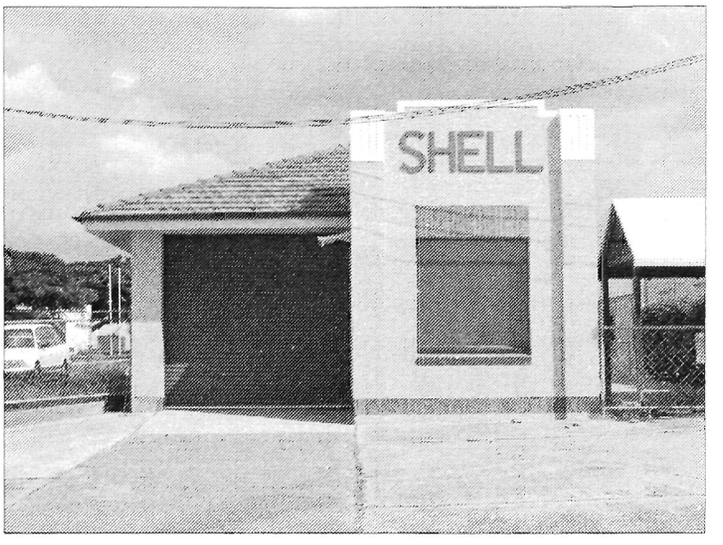

Figure 68: Shell kiosk built in 1935 to house the company's refuelling truck. The building has been restored recently.

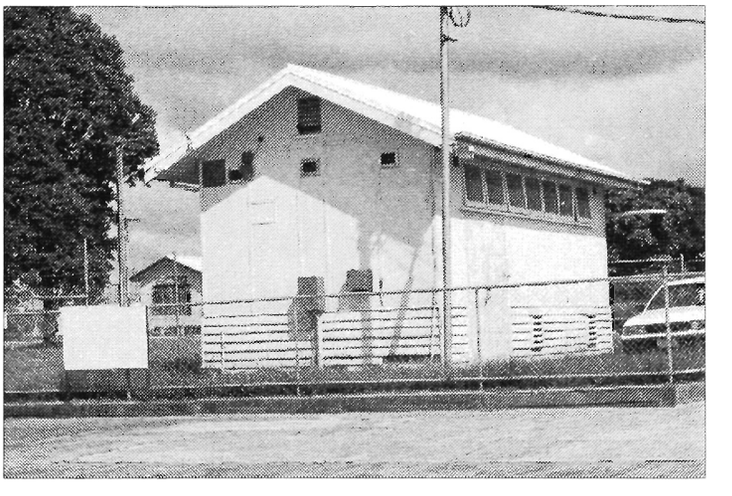

Figure 69: Shed constructed to house the lighting generator, still used in emergency situations.

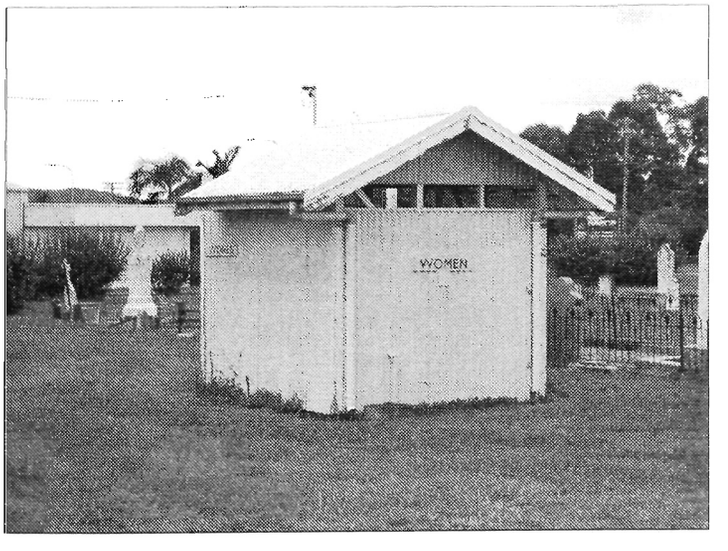

Figure 70: Toilet facility constructed in the 1930s, still in use today. God's Acre cemetery in background.

Appendix 5

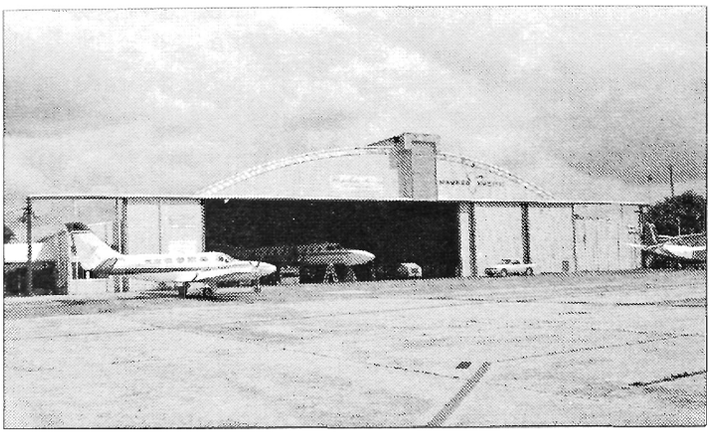

Figure 71: Hangar no. 6, constructed in 1939.

Figure 72: View of hangar no. 6 from the south-east, showing the extension made during the Second World War.

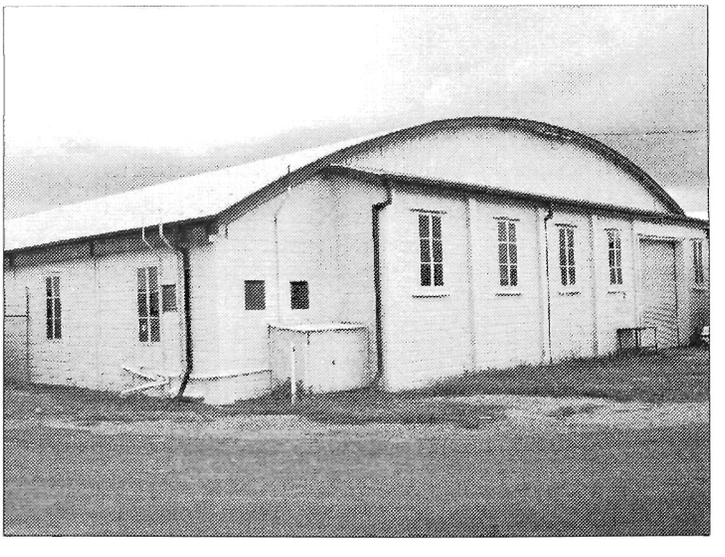

Figure 73: Hangar no. 7, constructed in concrete in 1938–39.

Appendix 5

Figure 74: Air-side view of Archerfield's original Control Building, constructed in 1941. Compare with Figure 50.

Figure 75: View of former Control Building as approached from Beatty Road. The control cabin was removed in the 1970s.

Figures 76 and 77: Detail of the clock and DCA motif on the air side of the building, above the passenger waiting room.

Appendix 5

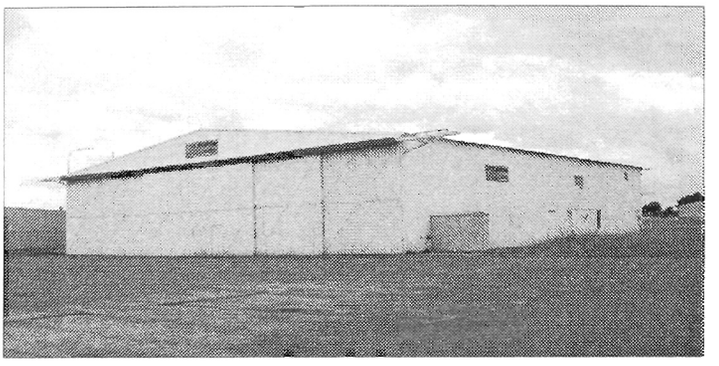

Figure 78: Bellman hangar no. 71 constructed for No. 23 Squadron in 1939. Compare with Figure 47.

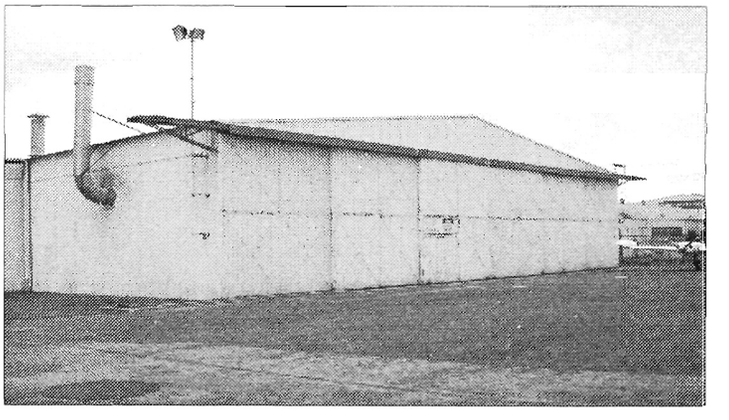

Figure 79: Bellman hangar no. 72 constructed for No. 23 Squadron in 1939.

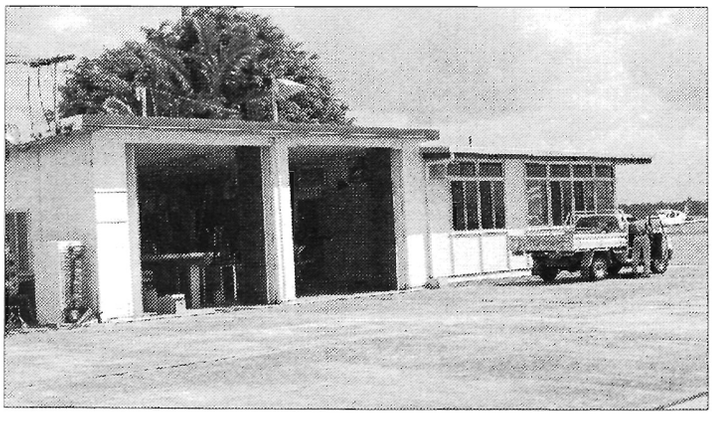

Figure 80: Former fire station constructed in the late 1950s.

Abbreviations

AA & E Co.	Australian Aircraft and Engineering Co. Ltd
AAC	Australian Aero Club
ABA	Aktiebolaget Aerotransport (Sweden)
ABJQ	*Architectural and Building Journal of Queensland*
ABS	Australian Bureau of Statistics
ACFO	Association of Commercial Flying Organisations of Australia
ADAT	Allied Directorate of Air Transport
A/DG	Acting director-general
AFC	Australian Flying Corps
AGM	Annual general meeting
AHSA	Aviation Historical Society of Australia
AIF	Australian Imperial Forces
ALOP	Aerodrome Local Ownership Plan
AMF	Australian Military Forces
AMOE	Air Member for Organisation and Equipment
ANA(1)	Australian National Airways Ltd (founded by Kingsford Smith and Ulm)
ANA(2)	Australian National Airways Pty Ltd
ANRs	Air Navigation Regulations
AOA	Airlines of Australia
AOPA	Aircraft Owners and Pilots' Association
APC	Aircraft Production Commission
APL	Aircrafts Proprietary Ltd
ARU	Aircraft Repair Unit
ATC	Air traffic control
AVIAT	Telegraphic address of DCA in Melbourne
AWM	Australian War Memorial
AWC	Allied Works Council
BA	British Airways
BAT	Butler Air Transport
BEA	British European Airways
BC	*Brisbane Courier*
BCC	Brisbane City Council
BHG	Brisbane History Group
BNE	Brisbane
BOAC	British Overseas Airways Corporation
CA	Civil aviation
CAF	Citizen Air Force
CAHS	Civil Aviation Historical Society
CBCS	Commonwealth Bureau of Census & Statistics
CCA	Controller of Civil Aviation
CCC	Civil Construction Corps
CCS	Commonwealth Crown Solicitor
CDC	Commonwealth Disposals Commission
CEDA	Committee for Economic Development of Australia

CGG	*Commonwealth Government Gazette*
CM	Courier-Mail
CO	Commanding officer
CPD	*Commonwealth Parliamentary Debates*
CPLHG	Coopers Plains Local History Group
CSG	Commonwealth Surveyor General
CUP	Cambridge University Press
CWA	Civil Works Administration (USA)
DAP	Department of Aircraft Production
DDG	Deputy director-general
DG	Director-general
DOD	Department of Defence
DCA	Department of Civil Aviation
DCS	Deputy Crown Solicitor
DDG	Deputy director-general
DH	De Havilland
DND	Department of National Defence (Canada)
DWB	Director of Works and Buildings
DW&R	Director of Works and Railways
EATS	Empire Air Training Scheme
EFTS	Elementary Flying Training School
ELG	Emergency landing ground
EWA	East-West Airlines
FEAF	Far East Air Forces – (part of the 13th Air Force integrated with 5th Air Force to form the FEAF.)
HF DF	High frequency direction finding
HQ	Headquarters
IA	Imperial Airways
IATA	International Airline Transport Association
ICAN	International Convention on Air Navigation
ICAO	International Civil Aviation Organisation
JOL	John Oxley Library
KLM	Koninklijke Luchtvaart Maatschappij (Royal Dutch Airlines)
KLIMN	Koninklijke Nederlandsch-Indische Luchtvaart Maatschappij (Netherlands East Indies Airways)
LASCO	Larkin Aircraft Supply Co. Ltd
L of C	Lines of Communication
MIT	Massachusetts Institute of Technology
ML	Mitchell Library
MMA	MacRobertson Miller Airways Ltd
NAA	National Australian Archives
NEA	New England Airways
NEMS	New England Motor Service
NEI	Netherlands East Indies
NEITS	Netherlands East Indies Transport Squadron
NQA	North Queensland Airlines Pty Ltd

NQR	*North Queensland Register*
NS(G)R	National Security (General) Regulations
OUP	Oxford University Press
Pax.	Passengers
PMG	Postmaster-General
QAC	Queensland Aero Club (prior to 1936)
QAN	Queensland Air Navigation
QANTAS	Queensland and Northern Territory Aerial Service Ltd
QEA	Qantas Empire Airways
QHC	Queensland Housing Commission
QMRC	Queensland Main Roads Commission
RAAF	Royal Australian Air Force
RCC	Rockhampton City Council
RD	Regional director
RFC	Royal Flying Corps
RLG	Relief landing ground
RNAS	Royal Naval Air Service
RNNAA	Royal Navy Naval Air Arm
RQAC	Royal Queensland Aero Club
RVAC	Royal Victorian Aero Club
SAA	South African Airways
SABENA	Société Anonyme Belge D'Exploration de la Navigation Aérienne
SCOT	Social construction of technology
SEC	State Employment Council
SG & CPO	Surveyor-general and chief property officer
SHOT	Society for the history of technology
SMH	*Sydney Morning Herald*
S& PO	Surveyor and property officer
SWPA	South-West Pacific area
TAA	Trans-Australia Airways
TAMY	Transportable Aircraft Maintenance Yard
UAP	United Australia Party
UQP	University of Queensland Press
USAAC	United States Army Air Corps
USAAF	United States Army Air Forces
USAFIA	United States Army Forces in Australia
USASOS	United States Army Services of Supply
WAAAF	Women's Australian Auxiliary Air Force
WAA	Western Australian Airways Ltd (later West Australian Airways)
WAG	Wireless air gunner
WD	Works director
WPA	Works Progress Administration (USA)
W/T	Wireless transmitter

1. *Official manuscript and archival sources*

Bureau of Meteorology, Queensland
National Archives of Australia, Australian Capital Territory
National Archives of Australia, New South Wales
National Archives of Australia, Queensland
National Archives of Australia, Victoria
National Library of Australia
Queensland State Archives
State Library of New South Wales, Mitchell Library
State Library of Queensland, John Oxley Library

2. *Official publications*

Official published sources
Official internet sources
Legislation and other legal references

3. *Private and other archival sources*

4. *Interviews, personal and telephone*

5. *Books and chapters in books*

Primary books
Secondary books
Secondary chapters in books

6. *Articles*

Primary articles
Secondary articles in journals

7. *Serials, newspapers and miscellaneous items*

Primary magazine and newspaper sources
Secondary magazine and newspaper sources
Brochures and programmes

8. *Unpublished work*

Theses
Other unpublished work

1. *Official manuscript and archival sources*

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Australian Data Archives of Meteorology.

National Archives of Australia (ACT)
Civil Aviation Branch (CA2432)
Commercial Pilot Licence Register [1 to 4740]. A8909, NN.

Department of Air Central Office (CA35)
Accident to Douglas Aircraft C47 near Archerfield on 27.3.1943 – Court of Inquiry, A705/1, 32/18/154.
AMOE (Organisation) – Number 23 Squadron, Archerfield, A705/1, 231/9/318 Part 1A.
DWB Eagle Farm Queensland – First extension to aerodrome – Hiring of property in Schneider Road, A705/1, 7/1/1398.
DWB – Muckley Qld – Mortimer Road – Disposal of surplus assets, A705/1, 171/106/577.
DWB – Property – Archerfield Qld – Acquisition of DAP buildings – Kerry Road, A705/1, 171/16/200 Part 1.
DWB – Property – Archerfield Qld – Acquisition of site for off-station married quarters, A705/1, 171/16/333.
DWB – Property – Archerfield Qld – Aerodrome – Dispersal areas – Camp site – Sewerage works – Dispersal of assets, A705/1, 171/106/727 Part 1.
DWB – Property – Archerfield Qld – Aerodrome – Dispersal areas – Camp site – Sewerage works – Dispersal of assets, A705/1, 171/106/727 Part 3.
DWB – Property – Archerfield Qld – Extension to drome – Hiring of site, A705/1, 171/16/184.
DWB – Property – Archerfield Qld – Number 2 dispersal area – Hiring of site, A705/1, 171/16/183.
DWB – RAAF Number 2 EFTS – Archerfield Qld – Buildings and services, A705/1, 171/16/136 Part 1.
DWB – RAAF Station Archerfield – Buildings and services, A705/1, 171/16/136 Part 2.
DWB – RAAF Station Archerfield Qld – Buildings and services, A705/1, 171/16/136 Part 3.
DWB – RAAF Archerfield Qld – Post-war station – Buildings and services, A705/1, 171/16/261 Part 1.
Eagle Farm Queensland Project USA Depot, A1196, 42/501/54.
Operations Record Book, Archerfield Station Headquarters, A9186, 190.
RAAF Aerodrome – Eagle Farm Qld – Marginal area control of sites, A705/1, 7/1/1263.
RAAF Headquarters – AMOE (Organisation) – Establishment – Number 2 EFTS, Archerfield, A705/1, 231/9/324 Part 1.
RAAF No. 4 EFTS Mascot NSW, Hiring of aero club house Kingsford Smith Aerodrome, A705/1, 171/23/188.
RNNAA – Kerry Road, Archerfield Qld, Buildings and services, A705/1, 171/16/240 Part 1.
Royal Queensland Aero Club – Contract to maintain EFTS Half School at Archerfield, A705/1, 208/33/81.

Parliamentary Standing Committee on Public Works (CA707)
Terminal building, Mascot Aerodrome, A11960/1, 1938/12.

Prime Minister's Department (CA12)
Mascot Aerodrome Part 1, A461/7, M314/1/6 Part 1.

National Archives of Australia (NSW)

Lands and Survey Branch (CA737)

Mascot Aerodrome – Lease of hangar allotment to ANA, CL10996, SP228/1.

National Archives of Australia (QLD)

Chief Property Officer, Queensland (CA1062)

Re-organisation of RAAF units and elements located at Archerfield, BP374/2, 3/106/AIR Pt 1.

Department of Civil Aviation, Queensland Region (CA 2882)

Archerfield Aerodrome – General, J23/36, 1954/2484 Part 6.
Archerfield – Aerodrome – General, J23/36, 1964/144 Part 8.
Archerfield – Aerodrome – General, J23/36, 1956/1257 Part 7.
Archerfield Aerodrome, J23/35, 1970/6762 Part 1.
Archerfield buildings, J23/11, 1959/384 Part 6.
Archerfield – Control building, J23/36, 1961/1127.
Archerfield fire tender and ambulance shelter, J23/11, 1956/554 Part 1.
Archerfield property, J23/36,1960/1356 Part 4.
Archerfield – Transmitter station off Boundary Road, J23/36,1954/2701 Part 1.
Clerical organisation – Eagle Farm and Archerfield Airports, J23/P11, 1954/393 Part 1.
Sir Donald Anderson CBE – Biographical details, J23/35, 1971/863 Part 1.

Deputy Crown Solicitor, Brisbane, Queensland (CA886)

Archerfield Aerodrome – Extension to radio transmitter – Search against titles, J1889/1, BL670.

Director of Works, Queensland (CA2914)

Archerfield Aerodrome – ANA engine workshop and canteen – Site plan, J2774/1, W13288.
Archerfield Aerodrome –DAP extension to Qantas hangar no. 4, J2774/1, W13325.
Archerfield Aerodrome – Power house, J2774/1, W6287A.
AF RAAF – National Service Training Accommodation – Married Quarters – Architectural, BP881/1, AR633/1.
Archerfield RAAF Station – Additions to pump well, J2790/1, W320.
Archerfield RAAF Station – Sewerage pump house (dated 16 September 1953), J2698/1, QA8392.
Archerfield Qld – RAAF Station – Proposed layout of living quarters, J2689/1, QA2055.
Eagle Farm Aerodrome – Transfer hangar 25 AF and re-erect as hangar 8 at Eagle Farm, BP881/1, CA196/3.
Eagle Farm DCA – Erection of igloo hangar, BP881/1, CA195 Part 2.
Eagle Farm, site plan for additional hangars, J2774/1, W20679.
Eagle Farm, site plan of buildings, J2774/1, W19141.

Division of Aircraft Production, State Office, Queensland

Photographs of workers, hostels, hangars, workshops and building activities of Division of Aircraft Production, Qld (Archerfield, Moorooka, trailer bus and towing vehicle, Rocklea, Annerley, King and Kath's workshop, new igloo hangar no. 3 – Qantas, photographs of bomber plane, engine test cells Rocklea), BP34/1, NN.

Post-Master General's Department, State Administration, Queensland (CA1031)
Archerfield Aerodrome – RAAF Post office, BP13/1, A1944/529.

Property and Survey Branch, Brisbane, Queensland (CA3760)
Archerfield Aerodrome – Acquisition additional 68 acres, J56/11, QL128/2.
Archerfield – Aerodrome boundary lights, J1018/2, LS783.
Archerfield Aerodrome – CA 4/12/41 – Easement for aerodrome, J56/11, QL2097 Part 1.
Archerfield Aerodrome – Claim R. Wood acquisition, J56/11, QL718/15.
Archerfield Aerodrome – Claims of Miss I. Wood – Tuck shop, J56/11, QL718/11.
Archerfield Aerodrome – Extensions north and west, J56/11, QL718 Part 1C.
Archerfield Aerodrome HFD Site acquisition (High Frequency Direction Finding), J56/11, QL718/41.
Archerfield Aerodrome – Lease ANA Hangar no. 6, J56/11, QL278.
Archerfield Aerodrome, J56/11, QL718 Part 1.
Archerfield Aerodrome re-survey 1943, J56/11, QL3966/1/7.
Archerfield Aerodrome – Survey, J56/11, QL718/22.
Archerfield Cemetery Reserve, J56/11, QL408 Part 1A.
Archerfield DAP road intersections, J1018/2, LS1158B.
Archerfield – Acquisition Aircraft Repair Unit and operations store, J56/11, QL718 Part 1B.
Archerfield – Extension to radio transmitter site – DCA, J56/11, QL965.
Archerfield – General extension, J56/11, QL718 Part 1A.
Archerfield – General extension, J56/11, QL718 Part 2.
Archerfield – General extension, J56/11, QL718 Part 3.
Archerfield hangar no 3, J56/11, QL270.
Archerfield hangars 4 and 5, J56/11, QL128.
Archerfield – HF/DF station – Surveys, J56/11, QL718/319.
Archerfield – Layout of canteen, J1018/2, LS558.
Archerfield – Lease of hangar allotment to W. Rankin, J56/11, QL312.
Archerfield – Radio transmitter site, J56/11, QL1300.
Archerfield RAAF married quarters – Dept of Air, J56/11, QL718/23 Part 1.
Archerfield – Sewerage installation, J56/11, QL1012.
Archerfield – Sewerage installation, J56/11, QL1012 Part 2.
Archerfield – Sewerage treatment site, J1018/2, LS647.
Archerfield survey plan, J1018/2, LS3406C.
Eagle Farm Aerodrome – Extensions, J56/11, QL805 Part 1C.
Eagle Farm Aerodrome – Hirings, J56/11, QL805 Part 4.
Eagle Farm Aerodrome – Original acquisition, J56/11, QL805 Part 1B.
Eagle Farm Aerodrome, J56/11, QL805 Part 1.
Radio range site – PMG Dept, J56/11, QL988.
Rockhampton Aerodrome, J56/11, QL422 Part 1.
Toowoomba Aerodrome Part 1, J56/11, QL875.

Works and Services Branch, Queensland (CA967)
AAC Eagle Farm – Hangars erection – Also at Charleville, BP243/1, K253.
Archerfield – No 2. EFTS, BP243/1, K169.
Archerfield Aerodrome – Additions to government hangar, J2774/1, W6097.
Archerfield Aerodrome – ANA (Australian National Airways) Hangar no 1 extensions, J2774/1, W13178.

Archerfield Aerodrome Control Building – Elevation, section and site plans, J2774/1, W7421.
Archerfield Aerodrome Control Building – Site plan, J2774/1, W8929.
Archerfield Aerodrome – DAP Extension to Qantas hangar no 4, J2774/1, W13355.
Archerfield Aerodrome – DAP No 3 ANA hangar, roof details, J2774/1, W13450A.
Archerfield Aerodrome – DAP No 3 ANA hangar extensions, J2774/1, W13693.
Archerfield Aerodrome – Erection of hangar and workshop for ANA Ltd, BP243/1, S7.
Archerfield Aerodrome – Extensions to hangar No 2 for Qantas, J2774/1, W13263.
Archerfield Aerodrome – Manproof fence to radio range building, J2774/1, W17751.
Archerfield Aerodrome – Meteorological building, J2774/1, W6675.
Archerfield Aerodrome – Operations store for DAP igloo, arch roof details, J2774/1, W13205.
Archerfield Aerodrome – Operations store for DAP igloo, J2774/1, W13207.
Archerfield Aerodrome Passenger and operational building, J2774/1, W13424.
Archerfield Aerodrome – Radio and meteorological offices, J2774/1, W6167.
Archerfield Aerodrome – Radio beacon building, J2774/1, W6179.
Archerfield Aerodrome 170 ft Nailed arch igloo, foundation plan, J2774/1, W13283.
Archerfield AR Unit – Nailed arch 188ft 6 inch warehouse, foundation and floors, J2774/1, W15028.
Archerfield – Diagrammatic elevation plan of 170 ft nailed arch, J2774/1, W14030.
Archerfield – DAP bicycle stand, J2774/1, W14229.
Archerfield – DAP hangar no. 1, alterations, J2774/1, W14799.
Archerfield flying training school – Erection of buildings, BP243/1, D55.
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Archerfield RAAF – Extension of landing area N and W sides, BP243/1, K293.
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