



Aces and Innovators of the RAAF

Our series of articles on Aces & Innovators looks at those trailblazers who helped to shape the RAAF not only in the air but also on the ground.

Sir Lawrence James Wackett KBE, DFC, AFC (1896 –1982)

In this article, AFA Victoria Communications Director Chris Hudnott looks at the life of Sir Lawrence Wackett (1896 – 1982) - "Father of the Australian aircraft industry".



Early Life and Army Career

Lawrence James Wackett was born in Townsville, Queensland, on 2 January 1896. As a small boy he attended a private school and learned to fish with his father who also taught him to fire a rifle at the age of five. His father, a general merchant, had a fundamental effect on his interest in engineering by giving him a small model working steamboat which he played with for many years. His life changed dramatically when his father, suffering from depression over business matters, suicided when Wackett was only six years old leaving his mother to raise him and his younger brother and sister. Wackett always had the greatest admiration for his mother struggling with bringing up the young family and to save money, he was moved to a government school to continue his education.

It was at this school that Wackett was introduced to military training in the cadet corps and soon rose to the position of sergeant in his platoon and sergeant-major when his school joined with other local school detachments. Wackett resolved to further his secondary education by successfully earning a scholarship to Townsville Grammar School. The scholarship was limited to 3 years but after only 18

months he was dissatisfied with the school and the lack of teachers in maths and science, so he relinquished his scholarship, gained employment in the local ice works and attended a series of lectures at the local technical school in order to qualify for an engineering cadetship in Queensland Railways. Soon after starting the technical course, his teacher suggested that he apply for a cadetship at the newly formed Royal Military College at Duntroon which would undoubtedly lead to a better technical career than the railways. Lawrence was successful in the entrance examination – the only Queenslander to win one of only 30 places at the College.

The RMC had only been established in 1911 and arriving on 13 March 1913, he joined the third course. As he observes in his autobiography, the training at Duntroon was somewhat dated and reliant on military experiences in the Boer War with no anticipation of strategic changes that would soon apply to the First World War and later conflicts. No consideration was given to the role of aircraft and even motor transport, soon to replace horses, was not included in the curriculum.

Wackett found that when he expressed an opinion about the impact of aviation, he “was silenced for daring to entertain such heresy”. His interest in innovation was apparent to the college staff during artillery training. He was struck by the inefficiency in calculating the fuse setting for shells using a slide rule and using a ring spanner to set the fuse on the shell. Wackett designed an automatic fuse setter and made a model in the carpentry shop. His idea was followed up through the college and Army channels all the way to the War Office in England but was rejected as it was impossible to proceed with such a device at that stage of the war.

This episode did, however, have a positive impact on his life as after the war, Wackett was encouraged by the professor of engineering at Melbourne University (who had been involved in the assessment of the fuse setting design), to undertake a 3-year Science degree course at Melbourne University.

With the declaration of war in August 1914, the two senior courses at Duntroon cadets were graduated early and the College Commandant, Major General Bridges persuaded the Australian Government to send a complete Australian Division rather than individual brigades to be split up within the British army. This led to the Bridges being appointed to command the contingent which he named ‘The Australian Imperial Force’ (AIF). Wackett could see that his course would also be hastily graduated and rather than be assigned to an infantry or cavalry unit, he stood his ground and successfully volunteered to serve in one of the technical services (in this instance Artillery). As he mentions in his autobiography ‘I am proud to have been a Duntrooner, but I am as far from being a typical Duntrooner as it would be possible to find’.

Upon leaving Duntroon, Wackett reported to an artillery battery at Maribyrnong for training before posting to one of the new AIF artillery brigades. However, soon after arrival, he saw a notice about the Australian Flying Corps – a new branch of the army- that was offering pilot training at Point Cook. He immediately applied, was accepted and joined the third flying course in 1915. Basic training was given on Bristol Box-kites flying straight and level, turning to execute a figure of eight, gliding and landing. Once proficient, students were entitled to wear the pilot’s badge. Further training was given on the B.E. tractor biplane (similar to that used by the Royal Flying Corps at the beginning of World War 1) before the students were considered fully trained and graduated as pilots.

Wackett now joined the small contingent of about 12 qualified pilots which formed No 1 SQN, Australian Flying Corps in January 1916 and sailed almost immediately for service in Egypt. One of his close personal friends in those very early years (and remained so for the remainder of both their lives) was Captain Richard Williams who had been appointed B Flight Commander.



Service with the Australian Flying Corps

Arriving in Egypt, pilots were given training on Avro biplanes and Wackett started carrying out reconnaissance over the Sinai Peninsula and Suez Canal. The hot conditions made flying in slow and low powered aircraft hazardous and they were easy targets for ground fire as they carried out machine gun and bombing of enemy positions. Enemy aircraft were also fitted with forward firing machine guns synchronised to fire through the propeller arc.

As the British aircraft were not expected to be fitted with such a device for some time, Wackett applied his basic engineering skills to modify the aircraft within a week and although the CO was not impressed with the first trial when every bullet hit the propeller blades, Wackett explained that all that was necessary was to adjust the position of the propeller on the hub to correct this deficiency. Wackett also manufactured an elementary form of gun turret providing all-round fire for the observer standing on his seat with his head and shoulders above the upper wing – a

rather exposed position for the poor observer but effective against attacks from the rear.

Prior to the offensive on Gaza, Wackett was given the special task of arranging for repair of a dozen damaged aircraft in Cairo and was given the manpower (over a hundred men and NCOs) and facilities. Wackett coordinated and supervised the project and carried out test flying on each aircraft. The project was completed a few days before the battle of Gaza and for his work, Wackett was not only awarded a "Mentioned in Dispatches" but was also posted to England with a recommendation to the Head of the Air Ministry that he be given work in the leading technical establishments of the Royal Flying Corps.

In England, Wackett was assigned to the Orfordness Experimental Station which was responsible for testing of new aircraft types and aeronautical equipment and armament. The staff were mainly university scientists and Wackett was able to provide a practical assessment of the ideas that were developed by the staff. One project involved testing the feasibility of long-range attacks on German night bombers from behind and below.

Wackett was assigned the task of devising the scheme and piloting the attacking aircraft firing at a banner towed 500 yards behind the tow aircraft. After firing some 1000 rounds at the banner, Wackett found that he needed to descend through a small hole in the cloud layer with fog and darkness closing in and successfully landed in a small field. The tow aircraft was not able to use the same field and crashed some distance away although the crew survived. The banner was found a few days later with some 270 holes and the experiment was declared successful.

Wackett was then assigned to apply the technique to German aircraft carrying out bombing attacks on London and carried out many hours of night flights over London but without ground-based radar and totally reliant in the searchlight illumination of enemy aircraft, night attacks on enemy aircraft proved impossible and the experiment was eventually abandoned – an unfortunate anticlimax to one of Wackett's innovative developments during his year in England.

At the end of Wackett's year in England, he was posted to France as a flight commander in No 3 SQN Australian Flying Corps which had been assigned to artillery observation duties. This task of locating

enemy artillery was hazardous with constant anti-aircraft ground fire and attacks from enemy fighter aircraft. Having located the enemy batteries, the pilots were then involved in directing the allied artillery onto the enemy positions. Wackett was involved in this assignment for several weeks and was fortunate to survive being shot down.

Wackett's successes at innovation had come to the attention of General Monash and during preparation for the Battle of Hamel, Wackett was tasked with developing air delivery of ammunition to front line troops. A practical demonstration in front of Monash proved successful and Wackett was given a month to modify two squadrons of aircraft with the necessary equipment for parachute delivery of ammunition. The Battle of Hamel was General Monash's first great success as corps commander and Wackett received Monash's congratulations for the part that he had played in the battle (Monash also recommended to the British Government that a grant be paid to inventors and for his innovation at Hamel, Wackett received 300 pounds!).

In mid-September 1918, preparations were being made for the assault on the Hindenburg line and Wackett was assigned the hazardous task of photographing the entire 12 mile enemy support line some 10 miles behind the Hindenburg line. The mission was to be carried out by a single aircraft at 500 feet relying on speed and manoeuvre to avoid ground fire. High level cover by fighter aircraft was to be provided to minimise attack by enemy fighters. Once Wackett's aircraft was detected during the run, he was subjected to intense ground fire during the entire run of 15 minutes and anti-aircraft during the subsequent climb out. The aircraft had been severely damaged by ground fire during the low-level run and with 80 bullet holes was declared a 'write-off' after landing.

The photographs were most successful and Wackett was awarded an immediate Distinguished Flying Cross for his action. He was to proceed on leave to England, promoted to Major and given command of one of the Australian training squadrons. However, the war ceased within a few weeks and this posting never eventuated. However, for his earlier work in Orfordness, Wackett was awarded the Air Force Cross. He had only just turned 23 years of age and only 6 years since he had left Townsville for the Royal Military College. As he suggests in his autobiography, *"I had some reason to be satisfied with the progress I had made towards building a career in aviation"*.



AUSTRALIAN WAR MEMORIAL

A05340

Above: C flight No.1 Squadron, Egypt (1917) in front of a Martinsyde aircraft: Lawrence Wackett is pictured far right with Captain Richard (Dickie) Williams (later Air Marshal Sir Richard) the OC, in the centre.

Early Work in Aircraft Design

Although the AFC was repatriated to Australia at Easter 1919, Wackett remained in England for familiarisation with piloting large aircraft and seaplanes/flying boats. He was also able to take a month's leave so arranged for his fiancée to travel to England for the wedding where Colonel Richard Williams accompanied the bride to the altar. On return to Australia, and with the assistance of Colonel Williams, he was posted to Point Cook as a Captain to take charge of the technical facilities and a dozen obsolete aircraft.

In the mid-1920s, the British Government offered Australia the gift of one hundred aircraft and spares from surplus war stock which provided sufficient equipment to establish an embryonic air force and Wackett was promoted to SQNLDR and transferred to Victoria Barracks as the first technical staff officer. He also made time to undertake one year of compressed study for a Science Degree at Melbourne University. To add to his technical training, he worked with Frank Barnwell, designer of the Bristol Fighter in World War 1 and the Bristol Beaufighter of World War II who had travelled to Australia for a holiday but was seconded to the Air Force for two years and was able to provide a post graduate course in aircraft design for Wackett.

At the end of his appointment, he told the Air Board that Wackett was fully capable of designing aircraft. (Barnwell was tragically killed in an aircraft accident in England in 1936 – his three sons all served in the RAF as fighter pilots in World War II and within two years, all had been killed in action.)

Wackett now had a vision of designing his own aircraft and wasted no time in convincing authorities that this would be of benefit to Australia. He became aware of a run-down war surplus workshop at Randwick being sold and although his plan was supported by the Air Board, Wackett personally arranged for an interview with the Defence Minister who approved the site being transferred to the Air Force. Wackett then sought permission to design and build an aircraft which would initiate aircraft design and construction in Australia. This was only supported by Air Force if Wackett were to obtain funding from elsewhere. Wackett, in turn, persuaded the Controller of Civil Aviation to fund the design and construction of a small flying boat which might be of service along the coasts. After 18 months, the 'Widgeon 1' was produced and Wackett, being the only pilot with flying boat experience, arranged for the first trial flight in Botany Bay.

Wackett, unfortunately, permitted the Controller of Aviation and his chief mechanic to be carried and the extra weight prolonged the take-off run. The aircraft struck an abnormally high ocean swell and crashed. Although his companions quickly escaped, Wackett almost drowned. The press was highly critical of the incident but Wackett had the aircraft repaired and the second flight (without passengers) was successfully executed several months later. The Minister for Defence and the Air Board congratulated Wackett and more favourable headlines appeared in the media.

Work also began on designing and producing the Widgeon II, another amphibian aircraft with a more powerful engine and crew of three and range of 1,000 miles. When the aircraft was complete, Wackett was asked to complete a 9,000 NM flight across and around Australia which was successful although Wackett needed to regularly repair the wooden propeller (damaged by salt-water spray) and the wheels (which were repeatedly damaged during landing on rough landing strips).

Wackett's success in developing a local design and construction industry was viewed with concern by British aircraft manufacturers who were concerned about their own profitability and were able to

influence the findings of the Sir John Salmond, retiring Chief of the RAF who was invited by the Australian Government to report on the Australian Air Force. One of the few recommendations of this report accepted by the Government was the closure of the Randwick Experimental Station.

Humiliated by this decision, Wackett resigned from the RAAF. He was fortunate in being offered employment at the Cockatoo Dockyard on the basis that the Air Force would transfer some overhaul of aircraft to the Dockyard. However, three years later the Great Depression led to the closure of the Dockyard and for a time Wackett was unemployed.

He continued design work on a small commercial aeroplane and was able to arrange funding for this project and was also supported by Group Captain Williams (by then Chief of the Air Force) who agreed to purchase the aircraft for the RAAF provided it received a Certificate of Airworthiness. Three aircraft were produced and sold for a profit before the threat war in Europe led to England advising the Australian Government that the Empire needed to re-arm and that England could not spare any aircraft for the Dominions. The Australian Minister for Defence sought advice on whether aircraft could be made in Australia.

Wackett recalls in his autobiography that *“Someone suggested the name of Wackett and I was sent for.”*

Commonwealth Aircraft Corporation

Wackett was soon to meet with Executives of BHP, GMH and Broken Hill Associated Smelters and this syndicate tasked him with leading a small mission to Europe and America in 1936 and report on how best to develop an aircraft industry in Australia. In the UK, the mission visited numerous aircraft factories and organisations producing equipment and materials and held discussion with Air Ministry officials.

The mission visited Holland, France and Czechoslovakia but Wackett was particularly worried by the transport aircraft Junkers production facility at Dessau in Germany. He estimated that the group at Dessau alone was equivalent to the entire British aircraft industry and that Germany would be ready for war in 2 years.

Wackett’s mission then visited the USA where the team were impressed by the enormity of the aircraft industry and the production of all metal aircraft with retractable landing gear, variable pitch propellers, flaps and efficient wheel brakes. It soon became clear that a new Australian industry would need to be based on the American developments and the mission determined that the Pratt and Whitney Wasp radial engine and the North American NA 33 two-seat general purpose aircraft was within Australian manufacturing capability and the mission was successful in negotiating proposals to purchase licence agreements. Wackett prepared and presented his report which was accepted by the syndicate and which decided to form the Commonwealth Aircraft Corporation, based at Fishermen’s Bend in Melbourne, and this in turn was accepted by the Air Board.

Despite considerable resistance from the British Air Ministry which was concerned about the effect of an independent aircraft industry in Australia on its own aircraft sales, the report was eventually accepted in its entirety by the Australian Government, Wackett was appointed manager / chief designer and after selecting a team to assist him, he returned to the United States to complete the licensing arrangements and purchase the necessary tools and equipment.

CAC and WWII

The factory at Fishermen's Bend started on a small scale with two large factory buildings and an administrative building and the entire workforce from Wackett's small factory in Mascot transferred to Melbourne. Machine tools began to arrive from overseas together with engineering drawings and samples of airframe and engine parts of the NA 33 aircraft.

Wackett was aware that the aircraft to be constructed was an advanced trainer rather than an up-to-date fighter aircraft but was limited by the capability of the aircraft manufacturing industry in Australia which, as he points out in his autobiography, was primarily due to official hesitation and delay – 'had we started two years sooner, we would have had Spitfires to oppose the Japanese Zero'. He goes on to detail that on one of his visits to the United States, the Vought Company had missed out on winning a contract for production of a fighter for the US Navy and had offered him the aircraft, complete with experimental drawings for \$50,000. The team had considered this to be too much to be undertaken with the NA 33 and the aircraft was offered to the Japanese company Mitsubishi.

Years later, Wackett examined the wreckage of a Japanese Zero from the Pacific War and realised that the Zero was almost an exact copy of the Vought fighter. If Australia had been a little more advanced in 1937, perhaps it may have been in a position to have purchased and produced a first-rate fighter at the beginning of the war rather than in 1945 when CAC assembled 80 North American Mustang aircraft.

The first flight of the Wirraway (the NA 33 modified for Australian conditions) took place on 27 March 1939 (six months before war broke out in Europe) and three months later, the first five Wirraways were handed over to the RAAF. The order for Wirraways and engines was progressively increased to 800 and enabled the Empire Air Training Scheme (EATS) to carry out the flying training of Australian personnel in Australia throughout the war. Wackett also arranged for the CAC design department to work on production of a new trainer (named the Wackett Trainer) which first flew in May 1941 with 200 aircraft built and used in the EATS.

With the bombing of Pearl Harbour, the entry of Japan into the war caused great concern within the Australian Government. Wackett and his team proposed to the Air Board that CAC design and build a fighter aircraft using a 1,200 HP engine that the company was already building. Wackett knew that any fighter aircraft would not be as good as the mark of Spitfire then being built but his proposed aircraft would be useful against Japanese bombers. A rapid decision to proceed was made and using parts of the Wirraway to the maximum, the first Boomerang single-seat fighter was wheeled out by CAC within 13 weeks of placement of the order. By 1945 250 Boomerang aircraft had been produced.

To carry the war to Japan, an Australian delegation (including Wackett) was sent to the UK and USA to select a suitable fighter and bomber. Despite opposition from the other members of the delegation, Wackett maintained his opinion that the Mustang should be selected over the Spitfire. It took a meeting with the technical head of the British Air Ministry (Air Marshall Sir Ralph Sorley) whose opinion was that the Mustang fitted with a Merlin engine was the current outstanding fighter ('the Mustang has its future before it, whereas the Spitfire is past its prime'). The delegation reported to the Australian Government that the Mustang had been selected. The new project involved a major modernisation of the CAC factories and import of aircraft parts in advance of the elaborate tooling needed. Merlin engines were initially purchased from Detroit pending local production. The original order from the RAAF was for 350 aircraft but this was reduced to 200 after the war ended. Many of first Australian produced Mustangs took part in operations in the South-West Pacific; they were used by 77 SQN in Korea and the type was the principal fighter aircraft for the RAAF until 1950.

Post War Period

With the cessation of hostilities in 1945, Wackett found himself in charge of a large organisation with a declining number of contracts for military aircraft. Mustang production was reduced to two aircraft per month for 5 years although a large engine overhaul section was established, and other avenues of engineering were explored including investigation of jet engine production and fabrication of bus bodies and building materials.

An important development was the sale of CAC shares held by General Motors-Holden (who were becoming involved in an Australian motor vehicle) to the English company Rolls Royce which Wackett thought was a great compliment. CAC had been producing the Nene jet engine for the Vampire aircraft being built by de Havilland in Sydney and with the purchase of 50 Canberra aircraft (powered by the RR Avon engine) being built by the government aircraft factory, CAC's licence for the Nene engine was extended to include the Avon. This, in turn would have a major influence on the selection of a fighter aircraft for the RAAF.

In 1949, RAAF advised CAC that the Hawker P1081 had been selected for production under licence and that CAC had been assigned for its construction. Wackett's engineers were concerned that essential information required under the licence was not forthcoming which resulted in Wackett and an officer from the Department of Supply (Victor Letcher) were sent to the UK to meet with the Hawker management where Wackett bluntly told the company that 'they had sold the Australian Government a pup'. After a few days' consideration, Hawker provided a 'most courteous' reply agreeing with Wackett's contention and agreed to refund the deposit suggesting that the P1081 had been superseded by a later model, the F3 (forerunner of the Hawker Hunter) and hoped that Australia would consider taking a licence for this aircraft. Wackett agreed to consider this but for some time had a preference for the North American Sabre aircraft which had proven its capability in the Korean war.

Whilst in Britain, Wackett discussed his thoughts about CAC building a Sabre aircraft powered by an Avon engine with the head of Rolls Royce (Lord Hives) who (naturally enough) agreed with such a proposal and offered to send engineers to Australia to assist with aircraft modification to incorporate the more powerful engine. Wackett also used his previous contact with General Kenny (wartime commander of Allied Air Forces in the South West Pacific) to arrange a meeting in Washington for himself and Letcher with the US Air Staff. The proposal had the support of the US Air Force on the basis that due to a shortage of engines in the US, CAC would need to procure engines from elsewhere!

On arrival back in Australia, Wackett and Letcher presented their findings and constructive proposals to the Air Board which were accepted with the only difficulty being that the Minister for Air had been sponsoring the initial Hawker offer and was therefore embarrassed that this had fallen through. Wackett persuaded the Chief of Air Staff to challenge the Minister to ring the head of Rolls Royce (Lord Hives) who supported the proposal and offered to allocate 20 Avon engines to accelerate production in Australia.

The Minister for Air then approved proposal and as Wackett mentions in his autobiography, there was some suggestion by other commentators that "the decision to install the Avon engine in the North American Sabre was that of Sir Thomas White and his Chief of Air Staff". Wackett makes the point that such a decision would not have been possible if there had not been prior negotiations between Wackett and Lord Hives.

To build the Avon Sabre, CAC had to entirely reorganise its factory and the resultant premises, modelled on Rolls Royce and North American Aviation was a great advance on the World War II factory. The new aircraft with considerable changes to the fuselage, enlarged air intake ducting and fitment of 30 mm cannon armament first flew on 3 August 1953 in front of top executives at CAC and arrangements were made to stage an official demonstration on 23 August. Wackett writes that “by the time the function concluded at 5 pm, I was satisfied that after 30 years of pioneering the aircraft industry in Australia, I had reached the climax of my ambition”.

In the 1954 New Year honours list Wackett was honoured with the award of Knight Commander of the Order of the British Empire (the same honour was awarded to Richard Williams in the same list).

Wackett relinquished his executive office on 22 December 1959 and as a final gesture of appreciation, the CAC board elected him as a director for the following five years.

Final Days

Life was not always kind to Wackett. His son, Squadron Leader Wilbur Lawrence Wackett, was killed in 1944 while serving as a Beaufighter pilot with No. 31 Squadron RAAF. In November 1970, just one month after completing his autobiography, Wackett fell ten feet from a roof ledge and fractured his spine which left him completely paralysed below the waist and confined to a wheelchair for the next 12 years. Ever the innovator, Wackett was not impressed with the aids available to the disabled and set about making engineering improvements to the equipment both for himself and the wider disabled community.

He died on 18 March 1982 aged 86. Lawrence Wackett was President of AFA -Victoria in 1943 and 1944 and his name is perpetuated at RMIT in the Sir Lawrence Wackett Defence and Aerospace Centre, <https://www.rmit.edu.au/defence-aerospace>.



The Sir Lawrence Wackett Defence and Aerospace Centre, at RMIT University, supports the transformation and growth of Australia's defence, aerospace and transport systems industries.

Article researched and written by Chris Hudnott, Communications Director – Air Force Association Victoria

Source: *Aircraft Pioneer – an autobiography by Lawrence James Wackett.*
Images: *Australian War Memorial, Department of Defence, National Portrait Gallery, Sir Lawrence Wackett Centre RMIT.*