Aircraft of MAAS Museum

A wander through the collection

Tom Lockley

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Introduction

Aircraft are more than just technical achievements: they are the products of enthusiasm and creativity that is characteristic of humankind. Some aircraft are on display at the Powerhouse campus of the Sydney Museum of Applied Arts and Sciences, Australia's only museum dedicated to celebrating the interface between the applied arts and sciences. Others are on display or in storage at the Castle Hill Museums Discovery Centre, and sometimes long term loans are made to other sites. I hope this little booklet captures something of the creative excitement that is embodied in this collection.

Because of its size, this booklet is light on performance and dimensions facts and figures, which are easy to find in this age where almost everyone carries a wonderful research facility in their pocket. The aim is just to give an overview, to remind people of the collection contents.

It is not a large collection: it is very eclectic. These are not problems: the mission of the museum is more to inspire creative curiosity than to be comprehensive in every regard. The spectacular display at **Ultimo** is a world treasure that provides all visitors with lasting memories, and the **MDC** display is a great backup. Other aircraft are in **MDC Storage**.

Obviously, input from the online MAAS catalogue notes is vital, but thanks must mainly go to many other sources, notably the online data bases such as *Geoff Goodall's Aviation History Site*, David Eyre's *Encyclopedia of Aircraft in Australia and New Zealand*, and *ADF-SERIALS*, which records the aircraft of Australia's military services. The *Australian Dictionary of Biography* (ADB) and Parnell and Boughton's *Flypast* are similarly vital, and *Trove* has made newspaper resources easily available for the lucky researchers of recent years.

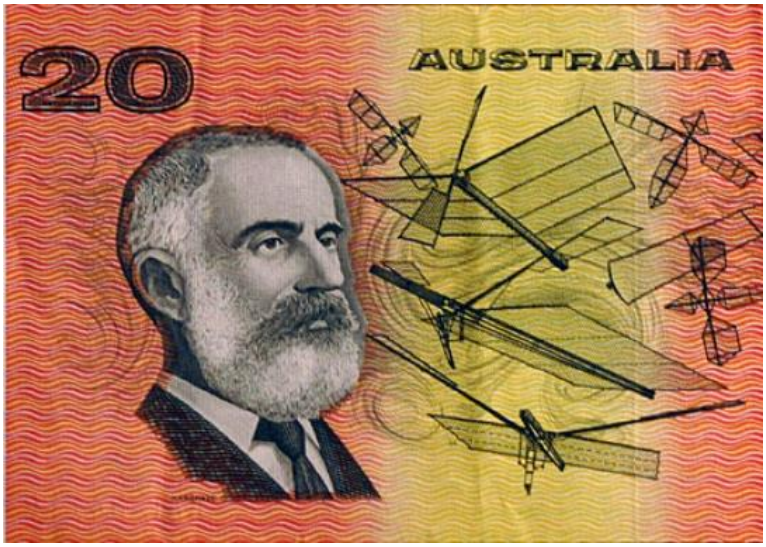
Particular thanks must go to former curator (Aviation and Maritime) Ian Debenham OAM, who has happily responded to numerous questions as I tried to ensure reasonable accuracy, and to Bob Livingstone for his unending patience in making many other suggestions and corrections.

Thank you for reading my booklet, and please visit and enjoy this wonderful collection.

Tom Lockley

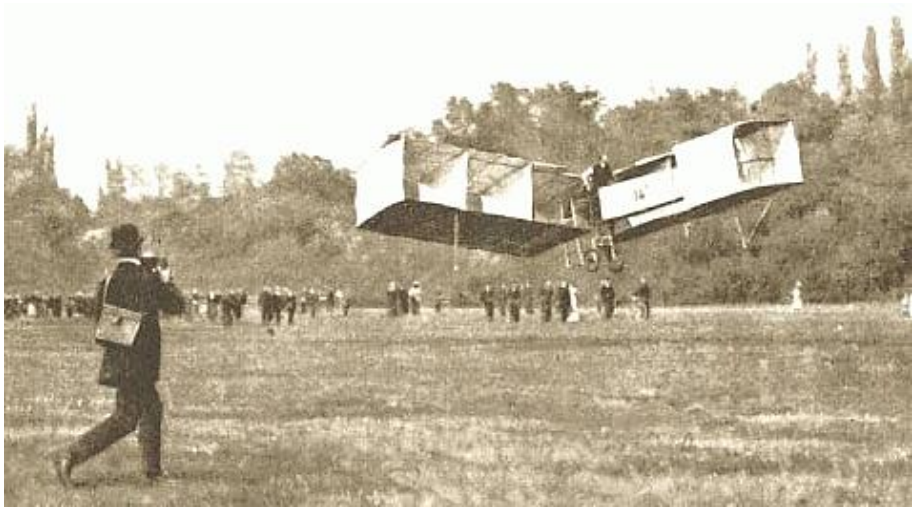
Contents

The Hargrave collection



In a format of this size, it is absolutely impossible to do justice to the work of pioneer aviator Lawrence Hargrave, to say nothing of his work in other fields: he was a true 'Renaissance Man', who, above all, shared his work generously throughout the world. All that can be done is to mention a few aspects of his work to remind ourselves of his genius.

Michael Adams' biography *Wind Beneath his Wings* demonstrates Hargrave's contribution to early flight. Wilbur Wright acknowledged the significance of five pioneers towards the ultimate development of powered flight, one of whom was Lawrence Hargrave. Alexander Graham Bell, better known as the inventor of the telephone, visited Sydney in 1911 and made similar comments. Hargrave corresponded often with French-American engineer Octave Chanute, whose biplane glider inspired the form of the Wright Brothers 1903 aircraft. Alberto Santos Dumont's *14-bis* (above), the first European Aeroplane to fly (23 October 1906), was virtually a collection of Hargrave-type box kites. Gabriel Voisin's aircraft, the first commercially available aircraft (worldwide) was also based on box kites.



Box kites can be seen in the Wran Building at Ultimo supporting Hargrave as he floats through this iconic museum space. His successful use of box kites to lift a person from the ground was in November 1894 at Stanwell Park, south

of Sydney, where he lived and worked until 1899, achieving his most significant discoveries. He was able to finance his work from profits from his family's mining ventures.

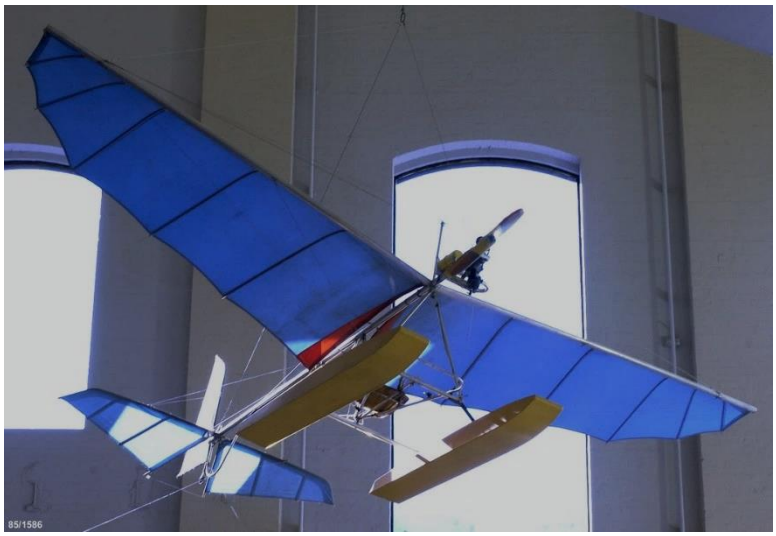
He was also a world pioneer in the use of aerofoils, basic shapes that generate lift and enable aircraft to ascend.

On his death, some of his works and the records of his research were almost lost forever but are part of the MAAs collection. Here are just a few examples of his output, typically in storage at MDC:

Far left: 'rotary' engine developed by Hargraves. Rotary engines were widely used until about 1920. Left: an aero engine driven by steam power. Hargraves was handicapped by not having a suitable engine. Below left: a mechanical calculating machine; right a solar heater.

Australia was a leader in the field of hang gliders after World War II – and indeed, Stanwell Park remains a popular place for this sport. But the problem is that after flying from the top of a hill it is always necessary to carry the kite back up the hill to fly again. The solution, to the Australian mind, was simple: put an engine in the kite. The Museum's aircraft trace the evolution of this idea. Australia was the first country in the world to create suitable regulations for this class of aircraft – Air Navigation Order 95-10.

Ultralights: #1 Wheeler Scout cat no 85/1586 (Ultimo)



The Wheeler Scout (made 1976-78) can be carried on a car roof rack, weighing only 50 kg. It can take off from still water when fitted with the floats as shown. Most importantly, it was inexpensive.

There was a basically orthodox joystick and rudder bar control, but only to elevators and rudder. Power came from a modified Victa lawnmower engine, which was called a 'Pixie 136', about 12 hp, 9 kW.

#2 STOLaero cat no B2527 (MDC)

ANO 95 covered powered aircraft with a maximum takeoff weight of 400 lb (182 kg) and a maximum wing loading at 4 lbs per square foot (19.5 kg/m^2). This allowed for more sophisticated aircraft than the very basic 'Scout', such as the STOLaero, which has ailerons as well as elevator and rudder controls. It has a 25

hp, 18 W two stroke alloy engine. It was designed and manufactured by Australian engineer Steve Cohen at Kirrawee, Sydney during the period 1975-80.

Steve Cohen continued to develop his ideas and the 'Thruster', (left), quite an advanced ultralight, first flew in 1982 and was manufactured in the UK. Another version, the T600, was built in Orange, NSW.

#3 Kimberley Sky Rider cat no 89/501-1 (MDC)

This, again, was slightly more complex. It was designed by Qantas 747 pilot Gary Kimberley. Flaps were added to the control surfaces, enabling better control at landing, and again, the engine was more powerful. It was flown and exhibited at the 1978 Schofields Air Show.

Gary Kimberley made plans available throughout the world and, thus 'Sky-Riders' have appeared in a number of countries. In 1978 the Experimental Aircraft Association in the United States recognised the aircraft with an 'Outstanding Individual Achievement Award'. It was listed in Janes *All the World's Aircraft*.

#4 Bedson Resurgam cat no 2008/4/1 (MDC storage)

Gordon Bedson (1918-1984), designer of the Resurgam, is an interesting character deserving of more attention. He was a noted automobile designer who emigrated to Australia to work on the Lightburn Zeta minicar project. He had an amazing and varied career. He remained in Australia. In 1979, living at the Northern Tablelands' township of Bundarra, he built an ultralight that was quite successful: In 1982 it won a race from Biggin Hill, Kent, to Paris. Several were built in various forms and Bedson was killed in a test flight of a two-

seater version. MAAS museum has an incomplete example of the Resurgam but no photo of this is available.

#5 CFM Shadow 'Dalgety Flyer' cat no 89/262-1 (MDC)

This English Ultralight gains its place in the museum by virtue of a remarkable flight from London to Sydney, 2 December 1987 to 29 January 1988, as Bicentennial celebrations were under way.

This was, at the time, the longest and fastest ultralight flight in history. The pilot was Brian Milton, a British TV presenter and hang glider pilot. He was sponsored by Dalgetys, an agribusiness firm with long ties to Australia. It had a 41.5 hp, 31 kW Rotax engine and had an endurance of up to 9 hours at over 100 km/hr.

#6 Clancy Skybaby cat no 87/510-1 (MDC)

The idea of ultralight aircraft is, of course, not new. Particularly during the late 1920s and 1930s attempts were made in various countries to produce a lightweight affordable aircraft.

The Clancy Skybaby was designed and built by the three Clancy brothers, William, Jack and Alan at Rosebery, Sydney, first flying in 1931. It was a single-seat parasol wing aircraft, a typical configuration for similar aircraft built overseas at this time. The aircraft was made of wood, covered by linen, as lightly as possible – the bare fuselage weighed only 16 pounds, 7.5 kg.

Engines were a problem in Australia: air-cooled motorcycle engines provided good power for their weight, but even these were not powerful enough, so a basic 4-cylinder Henderson motorcycle engine was modified by being converted from side valve to overhead valve configuration, with new finned bronze cylinder heads to improve cooling. A dual ignition system was fitted, with other 'tweaks' to increase power. It delivered 38 horsepower, (28 kW), a 50% increase with very little extra weight. The construction of the engine was a remarkable feat: parts were manufactured or adapted from other sources, the propeller hub being a turned down Model T rear wheel hub.

According to historian David Eyre, five Skybabys still exist. The museum's Skybaby (pictured) came from a very interesting source. Some enthusiasts from Michigan, USA, had read of the Skybaby and decided to build one. It was completed n 1890 and had the US registration N2115B. It was equipped with an original Henderson engine supplied by Jack Clancy, and in 1987 it was presented to the Powerhouse Museum.

Another Skybaby, VH-UMH, was fully registered until quite recently, privately owned. The clearly visible wing section – a Gottingen 426 aerofoil – shows how the thick wing provided maximum lift.

#7 Eagle-X aircraft prototype cat no L2056 (MDC)

This aircraft was intended to be the prototype for a single seater recreational aircraft that might be used for such purposes as mustering cattle. It flew well, the canard double wing arrangement making it very stable and hard to stall. Despite a setback of a forced landing in a wheat field in Western Australia

in January 1985, in 1987 it was awarded The *Australian Financial Review - AMEV Finance Ltd new product award*. ($25,000).

The aircraft did not go into production, and the prototype was acquired by the museum in November 1997. It is on display at Castle Hill. Its Rotax engine delivered 50 bhp, 37 kW.

Eagle Aircraft entered liquidation in 1989 and was purchased by the Malaysian organisation *Composites Technology Research Malaysia.*

About 20 two-seater Eagle 150s were constructed, co-produced in Australia and Malaysia about 1995 to 2000. Three variants were available: pastoral with robust interior, basic instrumentation and large tyres for rough fields; trainer for aeroclub use; and sport/executive for recreational and business use.

About 8 remain on the Australian register and there are a few more in New Zealand.

#8: Corby Starlet: (uncatalogued, MDC)

Suspended upside-down at MDC is Corby Starlet VH-UWZ, and this spectacular display position always attracts attention to the aircraft. Though the Starlet is a very small aircraft, (about 4.5 metres long, wingspan 5.6 m) it is quite a capable single seater. John Corby, a Sydney-based aero engineer, designed it in 1964, and the prototype flew in August 1967, first with a modified Augusta motorcycle engine and later with a modified Volkswagen auto engine. The Starlet was designed to meet the specifications of aircraft known as 'semi-aerobatic' with a +4.5 g load limit factor, and in 1973 a Starlet won the Australian National Aerobatic Championships.

However, present day standards for aerobatics require +7/-3g and the Starlet does not qualify. It is still widely used: about 190 have been built worldwide from kits and plans, using a variety of engines. 18 are still listed on the general Australian register and others are registered as recreational aircraft.

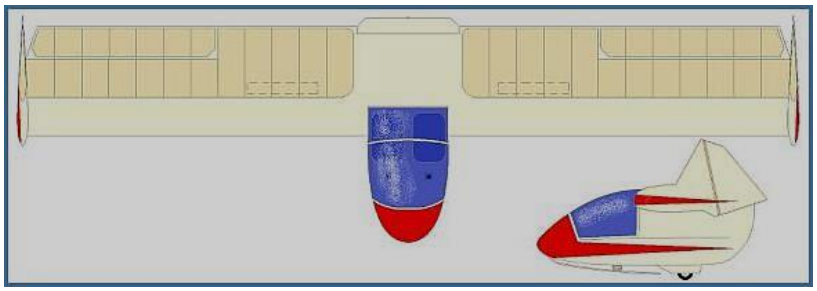
Less known aircraft #1: Todhunter Skycycle cat no 86/79 (MDC storage)

This section deals with six very interesting aircraft.

The dream of man-powered flight persists from ancient times, and during the 1960s and 1970s there was world-wide interest in aircraft powered by human muscle, partly in response to prizes offered by British industrialist Henry Kremer. The museum has one of the major Australian attempts, the 'Todhunter Skycycle', built by Reg and Ernie Todhunter of Condell Park, NSW. Work continued on the project from 1970 to 1977. It is rather damaged and is stored at Castle Hill.

#2 'Twin Plank' sailplane cat no B2422 (MDC)

Reg Todhunter was also the originator of the 'Twin Plank' tailless glider on display at MDC. It is based on a US design known as EPB, after the designers Easley, Powell and Backstrom, and about 16 have been built worldwide. The idea is simple: maximise the lift area and minimise the weight. Our example was built at Bankstown, NSW, by Glidair Sailplanes, the first firm in Sydney to solely build and repair sailplanes. Todhunter was assisted by Stephen Marton, Milton Lalas and Al Backstrom. Reg successfully flew it in 1958 and by 1967 it became the first tail-less glider to receive an Australian Certificate of Airworthiness.



Bernard Duckworth, in Australian Gliding Museum Newsletter No. 38: December 2018, has written a comprehensive study of

the Planks in Australia and their overall history. Planks did have an amazing glide ratio of 18:1, but they were not a success. The main reason for the abandonment of this idea seems to be the death of Guenter Tholl at Canberra on 31 March 1957 and another crash causing serious injury some time later. A major problem seems to have been difficulties with the centre of gravity, not surprising because of its short length. This aircraft deserves preservation because of its uniqueness and excellent workmanship using traditional wood structure with fabric covering.

#3 Human Powered Helicopter cat no 87/753 (MDC storage)

This human-powered helicopter was designed by Hermes George Celio and made by him and Patricia Bonham in his workshop in Systrum Lane, just near the Powerhouse Museum, during the 1950s. Beautifully made of plywood, it weighs just over 45 kg. The pilot used a treadle to revolve an impeller that produced an air current that was fed to the rotor tips where it pushed the rotor around. The rotor blades were three metres long, and Cielo calculated that if he could make the rotors revolve at 200 rpm it would fly. It was claimed that it rose from the floor in the workshop, but it did not succeed in competing for the big prizes then on offer for aircraft that flew by human power.

It deserves preservation because of its workmanship and as an example of individual dedication to the idea of human-powered flight. Hermes had a wide range of interests, including building a perpetual motion machine.

#4 Celio 4 glider cat no 87/709 (MDC storage)

Perhaps the cheapest way of getting into the air was by a winch- launched glider, with which Hermes had had experience in Europe before World War II. A glider which he produced in 1954 is part of the MAAS collection. Unusually, it was a two-seat aircraft, with the instructor occupying a seat behind the student. It

was used at Schofields, near Penrith, in the 1950s; descriptions exist of it being pulled into the air by a cable pulled by the elevated rear wheel of a 1926 Hupmobile motor car. By this means it could reach 400 feet altitude and complete a circuit before landing. Its glide ratio was about 1 in 12. It was damaged by being hit by a car and has not flown since and was acquired by the museum in 1987.

#5 The Butler Bat ABA-2 (MDC storage)

Arthur Butler (1902-1980) is a legendary figure in Australian aviation history, with far too long a story to cover here. His amazing initiatives as aviation pioneer and air line owner included the construction of this rather elegant aircraft, built in his Cootamundra workshops in 1937. After the war it was sold to war hero Robert H 'Bobby' Gibbes (of Gibbes Sepik Airways) who used it in Australia and New Guinea. In 1948 it was resold and eventually dismantled and stored. It suffered major damage in a bushfire at Oberon. Eventually the remains came to the museum, where it is listed as 'Aircraft, full size'. No museum pictures are available, but the remains are certainly well worth preserving as a reminder of this remarkable person.

#6 Yeoman Cropmaster (uncatalogued, under restoration)

The museum has a Cropmaster, undergoing restoration. About 20 of these agricultural aircraft were made by Kingsford-Smith Aerial Services at Bankstown during the years 1960-66.

They used many parts from the Australian-designed and built Wackett Trainer of World War II. An excellent example of 'swords into ploughshares'!

De Havilland and Australia: Cirrus Moth DH60X cat no B1571 (Ultimo)

Geoffrey de Havilland (1882-1963), was a brilliant British aircraft designer whose career extended from World War I to the jet age. His early aircraft – nicely streamlined for their times – can be distinguished by their rudders, which have a smooth 'butterfly wing' shape, and his choice of variations of the 'moth' name is another indication of his interest in lepidoptery.

Page 13 indicates something of the remarkable influence that his aircraft had on Australia. The DH-4 and DH-9 aircraft were precursors of such aircraft as the four-passenger DH-50, 16 of which were actually built in Australia.

Also, in the 1920s DH began to build light aircraft, less than half the unladen weight of the DH-9 with correspondingly smaller engines. The first really successful of these was the DH-60, weighing about half a tonne. These largely replaced the wartime Avro 504s and Curtis JN-4D 'Jennies' as basic trainers, and were far more stable and far easier to fly. Over the period 1925-35 nearly 1200 were made, in various versions, and about 166 of these were used in Australia, including 32 built by Larkin aircraft in Melbourne.

Though it is hard to believe, they were capable aircraft for long-distance flights, and famous aviators such as the Australian Lores Bonney, Francis Chichester, Amy Johnson and CWA Scott flew routes such as England to Australia, continually lowering the record.

Nancy Bird established a commercial operation in her DH-60G.

She moved on to the larger Leopard Moth after she began to fly the baby health nurse around north west New South Wales.

Sydney's new airport at Badgery's Creek has been named in her honour.

In 1933 Lores Bonney was the first woman to fly solo from Australia to Britain, 1933.

The DH-60 was used for basic training both within the RAAF and in civilian aero clubs, and others were imported privately. The Government paid a bounty to the aero clubs for each pilot they trained who gained a licence, so that there would be a supply of pilots for times of war. VH-UAU, the museum aircraft, was received by the RAAF in May 1928 as A7-13, the 13th of a total of about 69 delivered between 1926 and 1936. It became a seaplane training aircraft at Point Cook. It passed to the care of the Tasmanian Aero Club in 1932, registered as VH-UAU. By 1937 it had been superseded, and its C of A lapsed. This probably saved it from being reacquired by the RAAF when war broke out. It was used rarely during and after the war, usually from isolated rural airstrips, and after 1951 was stored in a shed at a farm in Deniliquin. The famous museum identity Norm Harwood acquired it for the MAAS in 1964. It was restored to original condition between 1982 and 1983 by museum employees and has been on display in the Transport Hall since 1988.

Some interesting de Havilland aircraft in Australia:

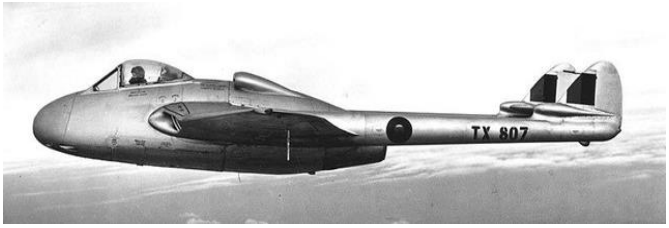
Parer and Mcintosh, second aircraft to fly from England to Australia, 1919-20 in their DH-9.

First Flying Doctor service, 1929; the aircraft is a DH-50 built at Longreach in 1926!

In 1941 RAAF No 1 Air Ambuance unit flew their two DH-86 aircraft to Africa to assist with war casualties. 1940,

Over 1000 DH-82 Tiger Moths were manufactured in Australia to train Australians, largely for the European war. Engines were made by General Motors in Melbourne.

(left) De Havilland manufactured over 200 DH-98 Mosquito aircraft during World War II at its Bankstown factory.



(above right) Post-war, a total of 115 Vampire fighters and trainers were built at Bankstown for the RAAF.

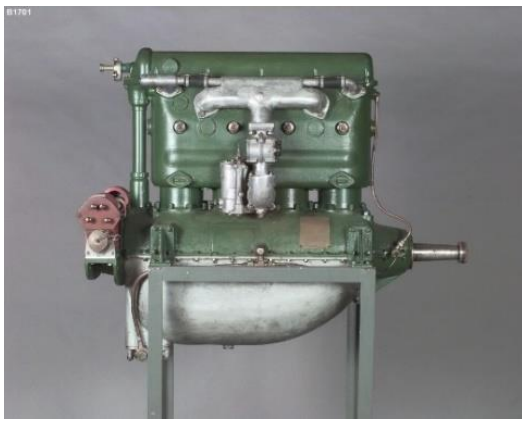
De Havilland ceased operating under that name sixty years ago but there are still 378 de Havilland aircraft on the general aircraft register in Australia.

Australian enterprise: #1 Genairco cat no 2007/143/1 (MDC)

Pilots Albert Royal and 'Jerry' Pentland, with engineer George Beohm, formed the General Aircraft Company (Genairco) with a capital of £10,000, at Mascot in early 1929. They mainly performed maintenance for private operators and the RAAF. They worked on the Southern Cross, rebuilt six DH-60s for the RAAF and built two DH-60s from scratch.

From the outset they intended to meet a particular need: a 'three-seater of the Moth type'. Flying in DH-60s in New Guinea, Beohm had been frustrated by its narrow fuselage – 'not wide enough to fit a box of biscuits'. Also, a two-passenger aircraft held out the prospect of doubling income from joy flights and charters.

The fuselage was a 'fattened' – sone said 'pregnant' – Moth design. The wings resembled those of the Avro Avian, competitor of the Moth, and the first aircraft flew by the end of the year. Ten aircraft were built, and they were widely used. Just about every famous Australian airman of the time flew a Genairco at some time, even if only for a test flight. It was a great engineering feat.



The sixth Genairco had the most interesting story. For the first three months, it was the flying test bed for the Harkness-Hornet aero engine, built in Sydney by the Harkness and Hillier company, which also made the Australian Six automobile Both were brave adventures in Australian manufacturing. The automobile performed well, but because of lack of economies of scale, could not compete

with overseas-made vehicles, and though the aero engine was well designed and reliable, it was too heavy for its power output.

VH-UOG was re-engined with a 130 horsepower DH Gipsy II engine and had a chequered early career including a bad crash at Bourke. In October 1935 it was acquired by Dr T J Henry of Sydney. The pilot was his son, Goya Henry, who was already well known as a reckless airman: he had an artificial leg as the result of a crash in a Junkers Junior aircraft in July 1930, caused by flying in appalling weather. Goya – named by his father after the famous Spanish painter – named the aircraft *Jolly Roger* and painted it red with a skull and crossbones on the rudder.

Over the years, he was constantly in the public eye. He had 13 spectacular crashes or forced landings. His air display acts and participation in air races were always adventurous and spectacular. He was prominent in establishing aerial shark patrols and meteorological flights, usually with wide publicity. He sometimes flew with two large pet carpet snakes in his cockpit. He was involved in social affairs, notably an attempted coup at the prestigious Royal Aero Club of Sydney.

He was often in legal trouble, both civil and criminal. In these situations he was greatly assisted by family legal experts, notably his brother Alfred Henry, MLA for Clarence, and he often obtained acquittals on appeals to original guilty findings in lower courts.

In 1936 it seems clear that he was the first pilot to fly (illegally) under the newly built Sydney Harbour Bridge. He had been reported for dangerous flying around Mascot airfield as early as September 1931, and a very complicated series of events ensued. He claimed that the Federal Government had no legal jurisdiction in civil aviaton matters, and ignored the legal actions. This matter was finally settled (after a Federal referendum was held and new laws were passed) in July 1938. Lawyers may read the implications in *R V Burgess; Ex Parte Henry (1936).*

By the time this was settled, Goya had other problems. His supportive solicitor brother Alfred was killed in a car crash in September 1938. In October 1938 Goya was made bankrupt after paying damages for a collision while taking off from Mascot. The bankruptcy was not discharged until September 1940. He tried to join the RAAF at the outset of the war but was not accepted. He joined the small ships unit of the United States Army in 1943.

After the war he remained in New Guinea working as master of small ships, returning to Sydney in 1963. By this time he had lost touch with the flying world, and he died in 1974, not even having an obituary in the press.

VH-UOG was sold on 28 July 1945 for £390. It was repaired and used by various owners until it was stuck off the register in February 1952. Both VH-UOD and VH-UOG were in very poor condition when acquired by grazier Bill Campbell-Hicks of Tottenham, NSW.

Aircraft collector Joe Drage built new wings for VH-UOD and in return acquired VH-UOG which he restored. It was displayed in Drage's air museum at Wangaratta when it opened in 1984. The museum closed eventually in 2002 and Genairco VH-UOG was purchased by Roy Fox. It was acquired for the MAAS collection on 1 July 2007 and is on display at MDC Castle Hill.

(VH-UOD is airworthy, registered and is now owned by Charles Morris of Caboolture, Queensland).

#2 Transavia Airtruk cat no 89/1451 (MDC storage)

In the period after World War II the generation and distribution of electricity was revolutionised. Instead of bringing coal to the major cities, where electricity was generated in large power stations such as that at Ultimo, the electricity was generated near the source of power, then reticulated through the state by a high-tension grid.

In 1956, Franco Belgiorno-Nettis, an Italian electrical engineer, came to Australia. Over the next few decades his company Transfield played a big part in this process, very profitable for the firm.

Another Italian had reached Australia in 1952. Luigi Pellarini was an aircraft designer who had become famous for creating 'flying cars' in post-war Italy.

He soon began work on a new type of agricultural aircraft. In September 1955 the PL-7 (above) first flew, made by KSAS at Bankstown.

It had a war-surplus Cheetah engine as used in the Avro Anson. Its design was rugged, innovative and functional: the aircraft flew well, carried a good load, and above all could be quickly refilled with fertiliser in comparison with more orthodox aircraft.

This attracted the attention of Jack Worthington, owner of Northern Air Services in New Zealand, and the enterprising engineer 'Snow' Bennett. They invited Pellarini to come to New Zealand and work on the idea. 'Snow' acquired a large quantity of war surplus Harvard trainers, and Pellarini designed the PL-11, using as many Harvard parts as possible. Two aircraft

were made. They were the first modern commercial aircraft to be built in New Zealand, and the design worked well. But there was not enough money available to set up proper production.

At this stage Luigi Pellarini met Franco Belgiorno-Nettis, who agreed to establish a factory in the outer Sydney suburb of Seven Hills to produce the PL-12 Airtruk. For the first time in this process, Luigi was not constrained by the need to use war-surplus parts, and a new variant was produced – the PL-12. The museum's example is VH-TRN, the first PL-12 to be flown – at Bankstown airfield on 15 April 1965.

Between then and when production finished in 1993, 117 aircraft had been made, some of which were air ambulances or transport aircraft. About 71% of the production was exported – largely to New Zealand but also to many other countries. Eight are still registered in Australia, and there are other preserved examples in Denmark, New Zealand and Thailand.

The Belgiorno-Nettis family and Transfield have been big supporters of MAAS museum. They presented the aircraft to the museum in 1988 and until 2018 the Airtruk was suspended from the roof of the Turbine Hall, when it was removed to allow for the installation of a temporary artwork.

The Airtruk deserves its place in the museum because of its innovative design and its success as an aircraft designed and built in Australia and exported to other countries.

Rotary wings #1 Cierva Autogiro cat no B2361 (MDC storage)

The museum's Autogiro (In temporary storage) is a favourite of the Spanish Australian community. Its designer was Juan de la Cierva Cordorniu (1895-1936), eldest son of a wealthy and distinguished Spanish family. In 1912 he began research into rotary winged aircraft, mainly for safety reasons: rotary winged aircraft would land safely if the engine failed. He made two vital discoveries: the need for the rotor blades to have an airfoil section and, most important, that if the rotor blades were connected to the rotating axle with hinges that allowed some horizontal and vertical movement, lift would be evenly generated. These ideas were essential to the success of autogyros and, indeed, helicopters. (Incidentally, Autog**i**ro is the name registered to Cierva and autog**y**ro is the generic term for this type of aircraft).

He took his ideas to Britain in 1925, and in 1933 the C30 was announced, the first really successful autogyro. It featured steering by direct control of the rotor rather than by ailerons and rudder. Avro built 78 machines, some of which were exported, including four to Australia.

To fly an autogyro, power was first sent to the top rotor, causing huge vibration and noise! Then the power was transferred to the front propeller and the aircraft lurched into the air after a short take-off run. The C30 was then steered by a heavy control stick that hung down from the rotor and was relatively easy to direct.

Sun *newspaper 13 June 1936; report of first flight in Australia.*

Wingless Autogiro.

Though it was imported a year ago, the first wingless autogiro in Sydney was in the air for the first time a few days ago, when it was successfully tested at Mascot by its owner, Mr. A. Thyne Reid. It is designed to take off almost vertically, within 30 yards, and to descend direct to a landing.

Four C30s came to Australia in the mid-1930s. The surviving example, VH-USR, was imported in March 1935 by Andrew Thyne Reid (1901-1964).

He thought that the Autogiro might become the long sought-for 'flying car'. Its rotor blades, for example, could all be folded parallel to the fuselage so it could be parked in an ordinary domestic garage.

His aircraft first flew in Australia in June 1936. It created a sensation. He flew it to his relative's property near Yass and to other country towns. He even commuted from his home in Thornleigh to Mascot in the Autogiro.

During World War II VH-USR was used by the military for experimental purposes. It was returned to Thyne Reid after the war, but was not used a great deal: Thyne and his wife preferred to use their de Havilland Dragon aeroplane, bought 1945 and then a de Havilland Drover after January 1955.

The Reids were a wealthy and enterprising Australian family. In later life Thyne was very generous with his wealth: he and his wife had no children. For example, Sydney University's veterinary science was well supported, and he gave money to CSIRO to help finance the Parkes radio telescope. The Reids donated VH-USR to MAAS museum in 1980.

#2 Bell JetRanger III cat no 90-816 (Ultimo)

On 27 August 1990 Dick Smith flew his JetRanger helicopter into the lower forecourt of the Powerhouse Museum to donate it to the Museum of Applied Arts and Sciences. It was received by the Director, Terence Measham

Dick Smith had established a chain of electronics stores which he sold in 1980 (at the age of 36) for about $25 million. He became an aviator, explorer and adventurer, his major feat being his 'round the world' solo helicopter flight. He chose to use a helicopter because of the suitability for film making and photography for his *Australian Geographic* magazine.

He began the world flight from the Bell helicopter plant at Fort Worth, Texas, on Thursday, 5 August 1982. The first stage was USA to Canada, then on to Greenland and Iceland, battling rain, fog, sleet, severe turbulence and extreme fatigue. He was also mysteriously shot at over Canada, leaving bullet holes in his aircraft.

By 18 August he had made the first solo helicopter flight over the North Atlantic.

He landed on the golf course at Balmoral Castle in Scotland, fifty years to the day after James Mollison had made the first solo east-west crossing of the Atlantic in a fixed wing aircraft. He flew on to London. This stage of 11,752 km was covered in 60 hours 52 minutes spread over 11 days, averaging 104 knots (192 km/hr).

During the three-week stay in London the helicopter was serviced and put-on display at the Farnborough air show.

The helicopter is a permanent feature of the award-winning 1988 Wran building at the Powerhouse Museum. Behind it is Hargraves' kite display, and beneath it is Australia's first train.

The second stage was London to Sydney, beginning on Monday 13 September 1982. He planned to emulate the 1928 solo flight of the great Australian aviator Bert Hinkler and reach Darwin in 15 days. He achieved this, despite the problems of flying through the tropics in a helicopter. He landed at Darwin on the appropriate day, and flew on to Sydney. En route, he called at Hinkler's hometown of Bundaberg, one of many tributes made to famous airmen over the whole flight. On his arrival at Sydney on October 2, he was given special permission to fly under the Harbour Bridge and landed at the Darling Harbour heliport. This ended the second leg of his journey in which he had covered a total of over 30,000 km.

On 25 May 1983, after the northern winter was over, the third leg began. He flew to Japan, then had to refuel on the deck of a bulk carrier midway between Japan and the Aleutian Islands.

From there he flew back to Fort Worth, arriving on Friday, 22 July 1983, becoming the first person to fly solo around the world in a helicopter.

He made other successful flights, including a solo flight in the helicopter to the North Pole, landing on 28 April 1987, finally succeeding on his third attempt, twelve months before presenting the helicopter to MAAS museum.

Dick Smith and his helicopter on Ball's Pyramid, Lord Howe Island, 1983,

Health from the air: Introduction

In 1919-20 two aircraft flew across Australia. From the south, Lieutenant Wrigley and Sergeant Murphy flew an antiquated BE2 of the Australian Flying Corps from Point Cook to Darwin. They surveyed the route to be followed by the second aircraft (the Vickers Vimy of Ross and Keith Smith, Jim Bennett and Wally Shiers) flew from Darwin to Adelaide, having flown from England.

Their route across central Australia passed through Cloncurry, Longreach and Charleville. The Smith flight was assisted by ground support work by Hudson Fysh and Paul McGinness, who were important figures in the foundation of QANTAS less than a year later. Australia had become 'air minded'.

Only seven years later, Australia embarked on a world-leading project to use aircraft to bring health services to remote areas of Australia. The Royal Flying Doctor Service, then known as the Aerial Medical Service, under the control of the Australian Inland Mission, became operational on May 15, 1928, operating from Cloncurry.

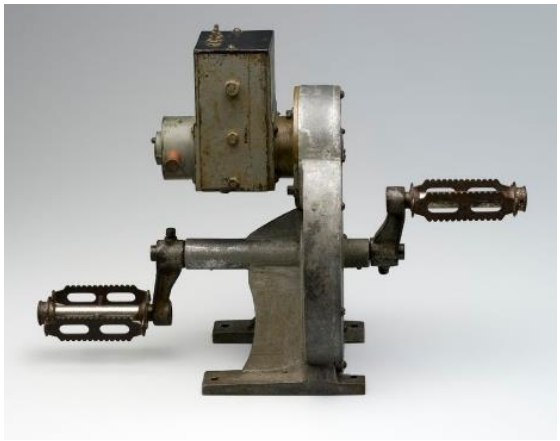
The first flying doctor of the service was Dr K St Vincent Welch and the first flying doctor pilot was Arthur Affleck of Qantas.

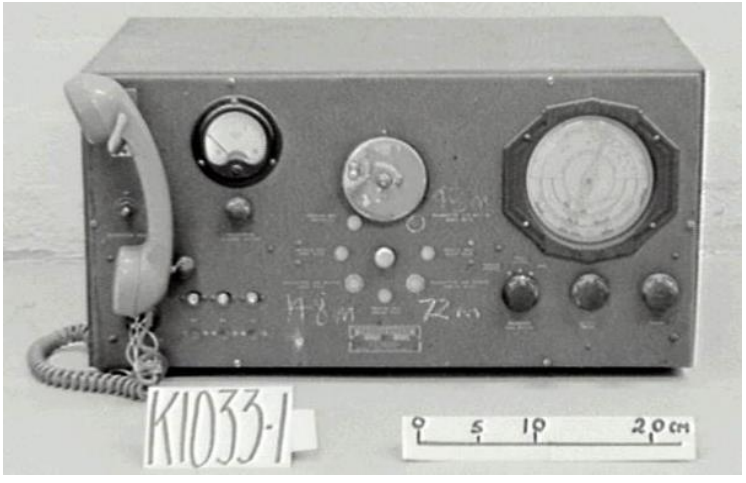
The first aircraft to be used was a de Havilland DH-50A; a small picture is on page 13.

Communication was a huge problem, and this was solved by a clever young engineer, Alfred Traeger. He designed a transmitter powered by a generator using bicycle pedals, and users were taught to use Morse code.

The tyranny of distance had just taken a big blow.

From the MAAS collection





#K1033 generator for Pedal Radio; #B2125 1950s transceiver.

#1 de Havilland Drover cat no 89/1451 (on loan)

At the end of the war, current small passenger aircraft were largely obsolete, for example the de Haviland DH-50, DH-83 Fox Moth and the DH-84 Dragon, which had all been used by the Royal Flying Doctor Service. De Havilland at Bankstown designed and built a small airliner that could be used by the RFDS. Though of similar size as the British de Havilland Dove, it was a completely Australian design. There were many war surplus Gipsy Major engines of 145 horsepower – three were needed, as the Dove had two 400 horsepower engines, so weight saving was also important: a fixed tailwheel undercarriage replaced the retractable tricycle undercarriage, and this also reduced maintenance needs. The prototype first flew on 23 January 1948 and is seen over the Bankstown de Havilland factory.

Twenty Drovers were built. There were several early problems: the original propellers had failures in flight, and were replaced, but the aircraft still lacked power, particularly in hot conditions. Continuing modifications were made over the years, the most successful beginning in 1960 when in some aircraft the DH engines were replaced with Lycoming O-360 horizontally opposed engines driving Hartzell feathering constant-speed propellers. The Drovers had varied careers, with some aircraft performing commercial flights until the mid-1980s, often on short-haul ‘island-hopping’ tasks.

The Museum's Drover was #19 of the twenty produced aircraft and first flew at Bankstown in June 1956. RFDS was unhappy with the performance and three years later it was re-engined with Lycoming engines. Sold by RFDS in June 1967, it was in use until 1970. In 1993 it was acquired by the Powerhouse Museum, thanks largely to the efforts of Peter Collins, then arts Minister. Mr Collins has recently been appointed as President of Trustees of the museum. The aircraft was on display at the Australian Aviation Museum, Bankstown, until the museum was destroyed in 2018. It has been refurbished and is on display at Broken Hill, as below.

Top to bottom: Early RFDS PR photos; VH-DRC with original DH engines and Lycoming replacements, 1968; the museum's Drover at RFDS, Broken Hill.

#3 Beechcraft Queen Air air ambulance cat no 85/2551 (Ultimo)

By 1967 the Flying Doctor 'Drover' era was ending. The American Beechcraft company produced suitable replacements, and Queensland RFDS were among the first purchasers of Beech Queen Air aircraft from the US.

The Flying Doctor provides medical services to isolated areas. Typically, the regular flights may carry baby heath experts and other paramedical workers. The transport of injured and sick people was relatively a secondary task.

The needs of the NSW Ambulance service, which served the more settled areas, were different. Increasing complexity of medical treatment resulted in specialist centres being concentrated in Sydney and the big cities, and air travel was a much better transport option than travel by road. Apart being four times as fast, the relative steadiness of the aircraft made it easier to employ life support measures en route.

Korean War veteran Phillip Zupp often flew VH-AMB and its sister aircraft. He was the last person to fly the aircraft, 26 June 1986.

Nancy Bird and Arthur Butler were strong supporters of the fundraising, flying a de Havilland Dragon Rapide around the state.

Arthur Butler and Nancy Bird Walton to visit Bourke

Two famous Australian aviators, Mr. Arthur Butler, O.B.E. and Nancy Bird Walton, will visit Bourke soon to aid the Air Ambulance Appeal.

They will be flying a type of plane used by Mr. Butler for air ambulance work in 1935.

There was some opposition to the project. The larger country centres feared that the larger country towns might lose facilities. But nevertheless, there was a lot of support, particularly from the more remote areas, for the idea and over £87,000 was raised to support the project. The aircraft cost about $150,000 USD and the amount raised covered almost all the cost of the aircraft and its equipment. At the time, all ambulance services were supported by locally raised funds.

This was essentially 'an intensive care ward on wings' and set a standard of care that, as far as I can see, was a world leader at the time. Most similar air ambulances, eg in the USA, trace their origins from about 1985. VH-AMB ended its career at that time. It had been in the air 24,500 hours, flying over seven million kilometres, and the wing spar had reached the end of its safe life. Repair was impracticable, and the museum acquired the aircraft on 23 December 1985.

The present NSW Air Ambulance service consists of five modern Beechcraft aircraft, the main advantage over VH-AMB being pressurisation, which means that the aircraft can fly at high altitudes, much smoother for the patient. There are also eight Augusta helicopters throughout the state. The ambulance service is now Government funded and remains of unsurpassed standard worldwide.

Catalina flying boat, cat no 85/2551 (Ultimo)

Over recent years the Catalina has become a major symbol of the museum, its preservation being perhaps the one common factor in the bitter 'move' debate. Its preservation celebrates the career of Australian pioneer airman **P G Taylor,** the role of the **Catalina in Australia's World War II**, and the **Pacific flight Australia to Chile** and return, March / April 1951. This section also includes a note on **the other crew members**.

Patrick Gordon Taylor (1896-1966), usually known as 'Bill', born in Mosman, Sydney, with an upper-middle class background. In 1915 he joined the British Royal Flying Corps. As a fighter pilot, he became disgusted with 'the killing and all the other evils of war'.

After the war he studied engineering and worked in the family business. He operated a Gipsy Moth seaplane from Sydney Harbour (1928-32) leading to a wide career in aviaton, including pioneer flights with Charles Kingsford-Smith.

He is famous for an amazing act of heroism in the air. On 15 May 1935 the three-engined *Southern Cross* was flying from Australia to New Zealand, heavily laden with air mail. The starboard propeller broke, and the aircraft could only stay airborne if the other two engines were at full throttle. The port engine began to run out of oil, so Taylor climbed out on the wing strut of the aircraft in flight, drained oil from the starboard engine and refilled the port engine, enabling the aircraft to return to Sydney.

In June 1939, as navigator in the Catalina *Guba II* belonging to US adventurer Richard Archbold, Taylor made pioneering exploratory flights across the Indian Ocean. For much of the war, he ferried aircraft across the oceans. He flew RAF Catalina *Frigate Bird* in September-October 1944 on a pioneer Pacific Ocean survey flight from Bermuda to Mexico, Clipperton Island, New Zealand and Sydney. His Australia – Chile and return flight in 1951 is discussed separately, on page 30.

After this, he maintained an interest in aviation, operating the Sandringham 7 flying-boat *Frigate Bird III* from Sydney on Pacific island cruises in 1954-58. He wrote eight books related to his flying career.

'As a pilot and navigator, Taylor was a perfectionist, fastidious, demanding, sharp and candid. Yet, his character was complex. Those with the patience to come to know him discovered a man of immense sensitivity, intelligence and courage' (ADB).

The Catalina.

At the time of Pearl Harbor, the RAAF had less than 400 aircraft ready to defend Australia. Wirraways (advanced trainers with a few light machine guns) and Hudson bombers could not withstand the experienced Japanese. But because they could operate at night and had huge range, the 19 slow and lumbering Catalina flying boats could operate against the Japanese with some hope of surviving.

Catalinas assisted in the withdrawal of people from the areas the Japanese captured. They rescued many people caught behind enemy lines and carried out supply operations for the coastwatchers who gave early warning of airborne attacks in New Guinea. In the early months of the war Catalinas bombed occupied Rabaul as soon as it was taken – using incendiary bombs dropped by hand. Later, Catalinas carried the fight to the Japanese by laying anti-shipping mines in the approaches to enemy-occupied ports.

QANTAS Catalina landing at Lake Koggala, Sri Lanka.

The most amazing feat of the wartime Catalinas were the flights from Perth to Sri Lanka (then Ceylon), enabling communication with Britain when the Japanese occupation was at its greatest extent. Beginning 29 July 1943, five aircraft, operated by QANTAS, made a total of 271 such flights. Flight duration was between 27 and 33 hours and the distance was 3,580 nautical miles (6,630 km, 4,120 miles). In terms of time duration, this will never be beaten as the longest scheduled flight of any airline.

VH-ASA and the South American flight: 14 March-20 April 1951 .

At the end of the war, P G Taylor suggested that a Catalina should fly from Australia to Chile to explore the route. The idea was supported by Prime Minister R G Menzies, Sir Thomas White (Air Minister), and R G Casey, Minister for External Affairs and an enthusiastic amateur aviator. Taylor chose his aircraft from a selection of new Catalinas delivered as the war ended. The aircraft was fitted with JATO booster rockets to enable it to take off from Easter Island with enough fuel to reach Valparaiso.

This was the last of the great exploratory flights, and the risks were great. At several stops, the aircraft had to land in the open ocean (on the lee side of the island) to be refuelled. Bad weather at this stage was a constant threat. On the outward journey, at Easter Island, they were prevented from taking off quickly, and overnight a huge storm developed. The aircraft lost its anchor, and the crew battled to save the aircraft by starting engines and navigating around the island, tacking across the waves in epic of skill and endurance. They took off in near-impossible conditions, the JATO rockets being the essential factor in their survival. This is but one of many dangerous situations that the aviators found themselves, in a saga of events that would never be tolerated today.

The Chileans' welcome was huge: Taylor was awarded the highest decoration that the Chileans can award: *Al Merito Bernado O'Higgins, Grande Commendator*.

The return journey was slightly less dramatic, but still the journey was far too perilous to think of having a flying boat airline service to South America.

Indeed, one of the tasks of the return journey was to make an aerial survey of Easter Island to seek a site for a major airfield.

Thousands of people gathered to watch the return of the Catalina to Australia on Sunday 20 April 1951. The Prime Minister, 'Bob' Menzies (left) and the Premier of New South Wales, 'Jim' McGirr were on hand to greet the crew in a widely reported return home.

Ambitious hopes were held for the establishment of an airline service to South America. This did not happen as planned, but the world airline network expanded in size and efficiency far more than the most optimistic person could have imagined in 1951. Within twenty years it was possible to fly to Chile via the US in a few days, and early this century there were direct flights from South America to Australia, one hop, in less than 20 hours.

Crew members for the South American flight.

Taylor chose his companions from people with whom he had a long association. Radio operator was Angus Allison, and flight engineer was E D 'Blue' L'Huillier. In his book *The Sky Beyond*, Taylor devotes over 100 pages to the return flight, and there are many examples of their skill and courage.

L-R: Percival, Purvis, Taylor, Allison and L'Huiller.

Legendary airman **'Harry' Purvis** (1909-80) was second pilot of the south

American flight. Inspired by Kingsford-Smith, he had purchased an Avro Avian aircraft in 1931 for £500 and began an exciting career in aviation. He was a barnstorming pilot and mechanic with Kingsford-Smith, pioneered geophysical surveys in remote areas, and operated aerial services throughout the continent. He also flew regular passenger and airmail services throughout the country. He flew Lockheed 12 aircraft, precursor to the Hudson, with Royal Netherlands Indies Airways (KNILM).

On the outbreak of war he joined the RAAF, training pilots. When the Pacific war began, he organised the 'biscuit bombers' – aircraft that dropped supplies to troops in isolated jungle areas, which gave the allied troops a vital advantage. At the end of the war he flew into Bali, not knowing his was the first plane to arrive, and bluffed the Japanese commander into surrendering himself and 10,000 troops.

After the war, he took part in many activities including some routine daily aerial dropping of newspapers throughout New South Wales from war-surplus Hudson aircraft purchased for £200 each – hardly likely to pass OH&S today!

'Jack' Percival was a *Sydney Morning Herald* reporter with a long involvement in aviaton, notably with Charles Kingsford-Smith. Percival organised the mail flight referred to on page 28, his involvement even including helping with a major overhaul of the only engine not to give trouble on that flight! He had often worked with Taylor, for example in the flights made to carry news photographs of the Melbourne Cup to Sydney for publication in the next day's newspapers.

He was in the Philippines when invaded by the Japanese, and he, his wife and baby son remained prisoners for three years, barely escaping death from starvation. He quickly returned to his reporting career and was reporting the war in Korea when invited by Taylor to take part in the flight. There is no doubt that his public relations and organisational skills were a great asset.

Blériot XI monoplane cat no L611 (Ultimo)

Less than 30 aircraft made before the outbreak of World War I still survive. Of these, the most significant is certainly the Wright Flyer, and the second is probably the Blériot XI 'on' which Louis Blériot crossed the English Channel on July 25 1909. It was immediately preserved in the *Musée des arts et métiers* in Paris where it still hangs in a disused church.

I submit that the third most significant of these aircraft is the Powerhouse's 1914 Blériot XI. Most of the other preserved aircraft survived because they were not used much, but this aircraft was one of the most famous aircraft of its time because of its remarkable exploits.

When Blériot crossed the English Channel, he became instantly famous, and orders flooded in for his aircraft. Over 500 aircraft were built in the next five years, and Blériots were also produced in other countries, including the US. By 1913 the company was able to tailor lift, drag and speed characteristics with a great deal of precision. They even had a wind tunnel.

Our Bleriot was not the first aircraft to come to Australia – it was about the twentieth. But for its time it was an outright leader in technology: it did not just fly but gave aerobatic displays that even today would attract attention – it looped, rolled, flew upside down, made power dives that pulled out feet above the ground. and captured the attention of the nation as it toured the south-east corner of Australia during the period April-October 1914.

Maurice Guillaux, the pilot, was a French celebrity, an airman who was taking his aircraft on a world tour. He came to Australia at the suggestion of his associate Lucien Maistre, son of a former French Consul in Australia. The aircraft was assembled at in central Sydney and made its first flight at Victoria Park, Zetland (now Green Square). At Newcastle (where it was the first

aircraft to be seen) the first of many public displays were given that brought the city to a near standstill. This was repeated in many venues throughout south-eastern Australia.

It needs to be remembered that the Blériot was still a very difficult aircraft to fly. The pilot sat **on** the aircraft, behind the propeller, and was constantly sprayed with the castor oil that lubricated the engine. There were no ailerons or flaps: the aircraft was steered by warping the wings from the joystick. The precision with which Guillaux flew is quite amazing – and his displays would never be tolerated under modern safety regulations!

Sydney was the destination for Australia's first airmail flight (Melbourne / Sydney) in July 1914, the longest such flight at that time. It attracted world-wide attention. In 2014 the centenary of this flight was celebrated with a re-enactment involving over twenty historic aircraft. Aviation author and famous pilot Owen Zupp (son of Phillip Zupp, page 26) led the flight, in an Australian-made Jabiru, carrying commemorative mail, as did Guillaux. Australia Post issued special postage stamps in 1964 and 2014 to mark the anniversaries of his great flight. The event was conducted by the Aviation Historical Society of Australia (NSW), an affiliated society of the Museum of Applied Arts and Sciences. The mail was received at the Powerhouse in a Bastille Day commemoration that was the largest for many years.

Guillaux, his exploits and his aircraft remain very relevant to the modern world.

14 aircraft, including a seventy-year-old Avro Cadet, landed at Harden as part of the centenary flight celebrations, 13 July 2014.

Afterword

Visitors to the Louvre, no matter how many times they have been before, typically try to catch a glimpse of Mona Lisa. At the London Museum people similarly revisit the Rosetta Stone. It's good for the soul to see these wonderful things, like putting on a comfortable and familiar pair of mental slippers.

During the pandemic, the Transport Hall was closed for a time. I was in the museum the first weekend it was reopened. There was not a big crowd, but I was struck by the way people were responding. Small groups were wandering around, making happy reacquaintance with the traditional exhibits. Parents were telling stories to their children and in many cases the children were leading their parents to their own favourites. I found it very moving.

The Transport Hall is the 'wow factor' of this museum. The soaring gallery and its display is an integral part of this unique, world class building, and cannot be replicated elsewhere.

In my view, the Airtruk and the Cierva autogiro, removed from the Turbine Hall in 2018 to permit the installation of a temporary artwork, should be returned. Perhaps the Genairco could be added. It would also be nice to have a Jabiru, a Nomad / Mahindra and Victa Airtourer in the collection. But this is not a specialist aviation museum such as HARS at Albion Park or the Queensland Aviation Museum. Thus, the idea of having a small, but representative collection in Australia's only museum devoted to the interface between the applied arts and sciences has merit. Its wonderful array of early aircraft engines, underpinned by the Barraclough collection, shows the engineering aspects of early aviation. The museum also has a wide range of other historical artefacts – uniforms, airmail paraphernalia, posters, photographs, and, especially, models and toys that make a magnificent resource for presenting great displays on aviation-related themes.

The museum has suffered a near-death experience. Its supporters are relieved, but are now conscious of its vulnerability. Survival is not enough: the emphasis must be on regaining its former vitality and pushing on into the future. Please make an effort to visit, and continually support, the collection both at the Powerhouse and Castle Hill.

Thank you for reading my booklet,

Tom Lockley