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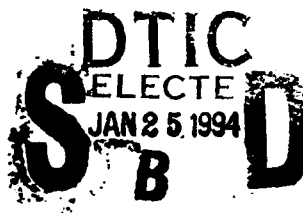
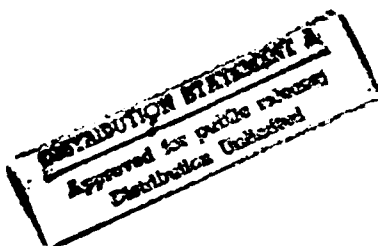
MELBOURNE, VICTORIA

General Document 39

FISHERMENS BEND - A CENTRE OF AUSTRALIAN AVIATION

by

J.L. KEPERT



Approved for public release.

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**DEPARTMENT OF DEFENCE
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General Document 39

FISHERMENS BEND - A CENTRE OF AUSTRALIAN AVIATION

by

J.L. KEPERT

SUMMARY

Since 1919 Fishermens Bend Victoria has been a major centre of Australian aviation. Many of Australia's great aviation achievements were born there. From its formation in 1939 the Aeronautical Research Laboratory, situated astride this activity at the "Bend", has provided scientific and technical support to numerous aeronautical endeavours occurring in its surrounds. This report summarises the many activities at the Bend from the first flight of an S11 Shorthorn from the Carey Airfield in 1919 to the production of the last indigenously built aircraft, the Nomad in 1984. The aerodromes have long gone, the roar of aero engines are contained within test cells, but the strong tradition of Australian aviation still lives on at the Bend today.



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POSTAL ADDRESS: Director, Aeronautical Research Laboratory,
506 Lorimer Street, Fishermens Bend,
Victoria, 3207, Australia.

PREFACE

This publication originated in a booklet prepared as a hand-out for ARL's 50th anniversary celebrations. The booklet generated a significant response, with many people volunteering additional information. In consequence, this publication represents a considerable expansion on the original.

Individual credits for photographs are not given since the origins of many of the photographs used have been lost with time. Thanks to W. Baker, R. Garrett, F. Harris, D. Pardee and the Civil Aviation Authority for permission to use photographs from their extensive collections. Special thanks are due to the Aviation Historical Society of Australia and its President, Keith Meggs, for providing much of the background material.

The era of aviation at Fishermens Bend lasted a little over 60 years. It will not be repeated. It is, perhaps, timely to record this era before it fades into oblivion.

The opinions expressed in this publication are those of the author and do not necessarily represent the views of ARL.

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1. INTRODUCTION

In 1989, the Aeronautical Research Laboratory (ARL) celebrated its 50th anniversary. Apart from the first few months of its existence, ARL has been located at Fishermens Bend in the heart of Melbourne's port area - surely an unlikely spot for an aeronautical research establishment. So why Fishermens Bend? Simply because the Bend has been, since the earliest years, a major centre of aviation in Australia specialising in aircraft design and manufacture.

2. GRAHAM STREET

Aviation first arrived at Fishermens Bend when R.G. Carey with financial backing from A. Fenton, Mayor of Essendon, purchased four Maurice Farman S.11 Shorthorns from the Defence Department, (Figs 1-4). These Airco built aircraft had been imported from the UK by the Federal Government to serve as trainers at the Central Flying School, Point Cook. Numbered CFS 16, 17, 19 and 20, they were assembled and test flown at Point Cook during September - October 1917 before entering regular service in which they were doubtless subjected to the usual number of crashes and subsequent rebuilds. Declared surplus to requirements in January 1919, and passed in at auction in March when the only bid received was for £250, they were subsequently bought by Carey and Fenton.

Graham Carey learnt to fly on a Bleriot XI monoplane (50 HP Gnome rotary) which he earlier purchased from the flying school at Ham Common, NSW, now RAAF Richmond. This was the aircraft imported by Maurice Guillaux in April 1914 and used by him to fly the first official airmail between Melbourne and Sydney. Carey moved the Bleriot to Ballarat and, after gaining his pilot's licence in November 1916, used it to operate the Ballarat Flying School. The Bleriot now resides in the Museum of Applied Arts and Sciences, Sydney.

Carey and Fenton promptly established an airstrip on waste ground immediately south of the rifle range in Graham Street (Fig 5). An old packing case (Fig 2), which had formerly housed the Bleriot, provided the only accommodation and Carey lived in this until more substantial buildings were erected. The Shorthorns were ferried from Point Cook to Fishermens Bend early in April 1919. During the first delivery flight, Carey made four forced landings, i.e. about one per 4000 yards, which gives a good indication of the state of the engine (80 HP Renault).

Joy-flights commenced on 21 April 1919 and, in 1920, the Melbourne Air Service was established 'to give instruction in the art of flying in the neighbourhood of Melbourne'. To support this artistic objective, more pretentious accommodation supplemented the packing case. A pre-owned railway signal box served as the booking office while the single hangar backed on to the butts of the pistol practice range, which must have made aircraft maintenance a fairly nerve-wracking business.

Despite the primitive conditions, the Shorthorns proved to have a remarkable longevity. Two were destroyed in a gale but, when the Australian Civil Aircraft register was established on 28 June 1921, the two surviving Shorthorns with constructor's numbers (c/n) 1505 and 1326 appeared as G-AUBC (Fig 6) and G-AUCW respectively. These continued to fly from Port Melbourne for many years making the last recorded flight on 12 May 1937. In describing this flight 'above the swamps and rubbish tips' of Fishermens Bend, the *Age* newspaper noted that 'The speed was laughable, the altitude reached was quite unremarkable, except that it often threatened the chimneys of houses and caused panic among a group of grazing horses.'

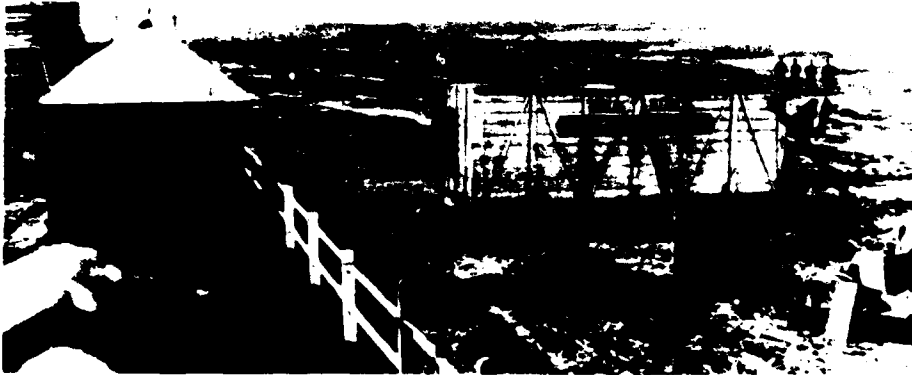


Figure 1 Carey's four Maurice Farman Shorthorns on arrival at the Graham Street Aerodrome, April 1919. The aircraft still carry their CFS serial numbers while CFS 20 also carries its original Royal Flying Corps serial B2012 on its rudders. The Bleriot packing case served as a temporary terminal building.



Figure 2 Another view of the Carey fleet at Graham Street, April 1919, with the pistol practice butts at the extreme right.



Figure 3 Shorthorn CFS 20 with a visiting DH-6 of Shaw-Ross on the Graham Street Aerodrome 1920. The West Melbourne Gasworks are visible in the distance.



Figure 4 Carey's Shorthorns eventually acquired the typical paintwork of the period.



Figure 5 Aerial view of Graham Street Aerodrome. The railway signal box, one Shorthorn, Bleriot packing case and the new hangar are in front of the fence (left to right) with the rifle club buildings behind. Note the four-masted barque berthed at 16 North Wharf.

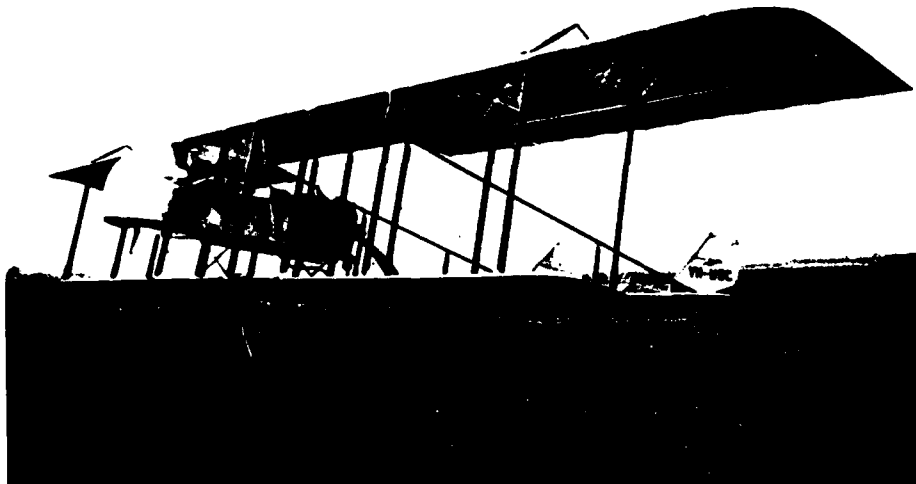


Figure 6 Maurice Farman Shorthorn VH-UBC as rebuilt in 1956, originally G-AUBC.

Still, there must be something about the Bend Air. On 11 March 1956, VH-UBC was test flown at Moorabbin following a rebuild by Fred Edwards. In 1959 it was sold to the USA and is now part of the Canadian National Aeronautical Collection. The RAAF Museum at Point Cook is currently rebuilding G-AUCW from a collection of bits and pieces. These are probably the only genuine Shorthorns still in existence anywhere in the world.

3. PORT MELBOURNE

Major H.T. Shaw was born in Terang, Victoria and enlisted in the Royal Engineers before transferring to the Royal Flying Corps. On 8 January 1920 together with Lieutenant H.G. Ross, he founded the Shaw-Ross Engineering and Aviation Co. and established the Port Melbourne Aerodrome 'behind the sand dunes' in Ferry Road, (Figs 7,8) now Williamstown Road. A hangar 70 x 50 ft was erected and advertised as adequate to accommodate four medium sized machines.

Actual operations began on 1 May 1920 using an imported Avro 504K fitted with a 110 HP Le Rhone engine. The fleet was soon augmented by the purchase of De Havilland DH-6 serial C9374 (later G-AUBW) which, in August 1919, had been imported by Treloar and Lord from RAF stocks in Egypt. With these two aircraft, Shaw-Ross quickly established a successful business based on joy-flights and charter flights to Victorian and Riverina towns. On 7 October 1920, Bill Treloar flew the DH-6 to Renmark and Loxton to deliver the third issue of the Sunraysia Daily to towns in South Australia. Subsequent delivery flights struggled against the indifferent landing grounds in the area and this notable pioneering effort was abandoned at the end of the month.

It was not all work. When the first Victorian Aerial Derby was flown from Epsom Racecourse, Mordialloc on 27 December 1920, Treloar managed to coax the lumbering DH-6 into second place on handicap (Fig 9) but Shaw was less successful in the Avro. Among the nine pilots who competed that day was a Captain H.J. Larkin of whom more later.

The company gained the agency for Farman aircraft and, early in 1921, imported a Farman Sport c/n 8 with a 60 HP Le Rhone rotary engine. When this aircraft made its test flight at Port Melbourne on 4 March 1921, it was the first aircraft of post-war manufacture to be imported and flown in Australia. It was quickly followed by two others, c/n 24 and 25, and all three were duly registered as G-AUBV, G-AUDL and G-AUDC respectively on 28 June 1921.

In 1921, the newly formed Civil Aviation Branch of the Defence Department required an aerodrome to have a clear run of 440 yards in any direction; measurements of the Abscon Aerodrome in France had shown that this was more than adequate for even the most heavily loaded aircraft. The ground slope was not to exceed 1 in 50 and 'the surface was to be such that a T Model Ford car could travel at 20 miles an hour on it without unseating the driver by more than an inch or so'. In addition 'all aerodromes were to have one wind-sock and to be marked with a circle 20 ft in diameter' thus specifying the meteorological services and navigation aids required. Since its airstrip met these precise specifications, more or less (its actual dimensions were 460 x 300 yards), Shaw-Ross applied for an aerodrome licence on 8 May 1921. On 30 May 1921, Aerodrome Licence No.1 (Fig 7) was formally issued for the Fishermens Bend Aerodrome, Port Melbourne.

This was too late for Hubert Ross. On 22 May, he took off from Port Melbourne in the Avro on a joy-flight with two passengers, Cyril Harris and Jessie Dorman. When heading towards the bay, the aircraft suddenly fell into a spin and crashed into the yard of a cottage. There were no survivors. 'I am of the opinion that the accident was due to the unfortunate jamming of the heel of Miss Dorman's shoe, thereby rendering the rudder control useless and causing the machine to dive to the ground' was the explanation offered by the Superintendent of Aerodromes, Civil Aviation Branch. This was one of the first, if not the first, official aircraft accident investigation to be conducted in Australia and it introduced such tasks to the Bend.

Aeronautical research was introduced shortly afterwards when, on 15 June 1921, Lieutenant V. Rendle flew a series of trials at the Port Melbourne Aerodrome to test the Petersen Aeroplane Magnetic Landing Platform (whatever that was). Results were inconclusive and advantages not determined - in research, some things don't change.

Despite the loss of one of its partners, the Shaw-Ross company prospered and proved highly innovative. Trial deliveries of the Herald newspaper to bayside holiday resorts began in November 1921, the Port Melbourne Flying Club was formed (membership 5/- per annum) and, in conjunction with the firm Airspy, an excellent aerial photography service was provided for the Melbourne Harbour Trust. One Farman Sport was fitted with an engine designed and built at Melbourne University; presumably the horizontally opposed air-cooled engine designed by W.E. Bassett. In recognition of his achievements, Harry Shaw was awarded the 1922 Oswald Watt medal.

There were hiccups of course. After making a forced landing in Vaughn's Paddock, Phillip Island, Shaw wrote off Farman Sport G-AUDC on 9 February 1923 when it collided with a fence during the attempted take-off. This, and lesser mishaps, were absorbed and, on 8 April 1924, Shaw-Ross became the first firm to complete the reconditioning of an Imperial Gift aircraft for the RAAF. By this time, Port Melbourne Aerodrome was being used regularly by RAAF aircraft commuting from Point Cook and the Federal Government eventually contributed the princely sum of £50 towards aerodrome improvements, including the removal of a marine navigation beacon and telephone poles on the southern boundary. However, this was only a temporary reprieve and, in June 1928, the Secretary to the Air Board advised that Port Melbourne was now considered unsuitable for RAAF use because of encroaching sand, houses, power and telephone poles, etc.

On 1 July 1928, the company changed its name to the Shaw Aviation Company and, in 1929, moved to Essendon Aerodrome. With the onset of the depression, it fell upon hard times and went into liquidation in 1931. The company finally disappeared from the aviation scene on 7 August 1931 when a fire, in dubious circumstances, destroyed its Essendon hangar, the DH-6 and the two Farmans.

A971

NO 1.

U.A. Form 16.

Class AVRO (504K).



DEPARTMENT OF DEFENCE.

AIR NAVIGATION REGULATIONS 1921.

LICENCE FOR AERODROME.

1. Situation of Aerodrome ...	Fisherman's Bend, Port Melbourne.
2. Name of Licensee ...	The Shaw Ross Engineering & Aviation Company.
3. Address of Licensee ...	320 Collins Street, Melbourne.
4. Nationality of Licensee ...	British.

The above aerodrome is hereby licensed to be used as a regular place of landing or departure for aircraft carrying passengers or goods for hire or reward for a period of twelve months from the First day of June 1921 to the Thirty-first day of May 1922 inclusive, subject to the orders made by the Minister for Defence under the Air Navigation Regulations 1921, and subject to the conditions set out below.

SPECIAL CONDITIONS.

1. Adequate first aid facilities always to be available at any licensed aerodrome where pupils are under instruction.
2. Extract from Air Navigation Regulations 1921.— Regulation 87.— Nothing in these Regulations shall be construed as conferring on any aircraft, as against the owner of any land, or any person interested in any land, the right to land on that land or as prejudicing the rights or remedies of any person in respect to any injury to persons or property caused by any aircraft.
3. Ground markings must be provided as required. (Vide Regulation 14.)
4. Use of this aerodrome restricted to Avro (504K) and similar types of machines only.

R. K. L. L. L.

Secretary to the Air Council.

Department of Defence,
Melbourne.

C.4700. Date 30.5.1921.

Figure 7a Licence for Fishermens Bend Aerodrome

A971

No. of Licenses: 1
 DEPARTMENT OF DEFENCE.
 127 2 3
 Air Navigation Regulations 1921.
 THE SHAW-WALKER ENGINE & AVIATION CO.
 GAILLARD STREET.
 MELBOURNE.
 No. of App. 1.
 Name AVRO (504, K)

APPLICATION FOR LICENCE FOR AERODROME

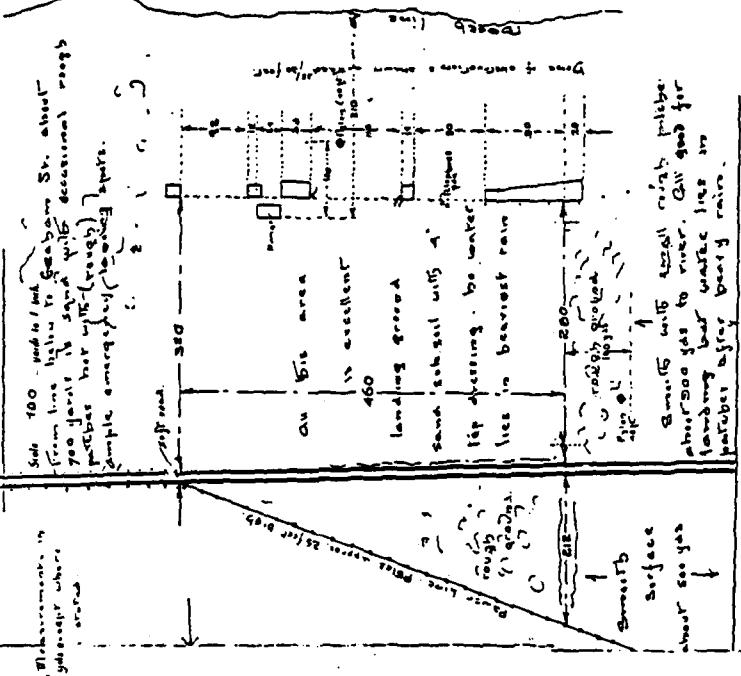
1. Full name of applicant	THE SHAW-WALKER ENGINE & AVIATION CO.								
2. Postal address of applicant	GAILLARD STREET, MELBOURNE.								
3. Nationality of applicant	British.								
4. Situation of aerodrome	Fishermans Bend Port Melbourne.								
5. Type or types of aircraft it is proposed to employ	All types aeroplanes & seaplanes.								
6. Number of aeroplanes	One 70" x 50"								
7. Details of aerodrome facilities	Doctors within one mile								
8. Nearest railway station to aerodrome with bearing, distance, and date of road	Port Melbourne, E. 4 miles (direct along beach) 1/4 mile by road (Williamstown) 1/2 mile by road (Williamstown) 1/2 mile by road (all traffic) 1/2 mile by road (all traffic)								
9. Nearest town with bearing, distance, and date of road	Port Melbourne 3 1/2 miles NE								
10. Details of public utility	<table border="1"> <tr> <th>Telephone</th> <th>Electricity</th> <th>Water Supply</th> <th>Lighting</th> </tr> <tr> <td>2064</td> <td>2064</td> <td>2064</td> <td>2064</td> </tr> </table>	Telephone	Electricity	Water Supply	Lighting	2064	2064	2064	2064
Telephone	Electricity	Water Supply	Lighting						
2064	2064	2064	2064						
11. Any proposed extensions, alterations, or improvements	Additional banger in contemplation of extension at many be required.								

I HEREBY DECLARE that the particulars on this Form are true in every respect.
 Signature of Applicant: *Richardson*
 Date: 8 May 1921.
 (This form when filled up and accompanied by documents for which the fee is payable, should be submitted to the Secretary for General Regulations of Air Navigation, Melbourne.)

Figure 7b

A971

SKETCH OF AERODROME



GENERAL INSTRUCTIONS.

1. An authentic map must be attached, showing clearly the location of the proposed aerodrome.
2. The aerodrome must be given clearly showing clearly the shape, size, and dimensions.
3. It is essential to show the location of the aerodrome in relation to the surrounding area.
4. It is essential to show the location of the aerodrome in relation to the surrounding area.
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Figure 7c

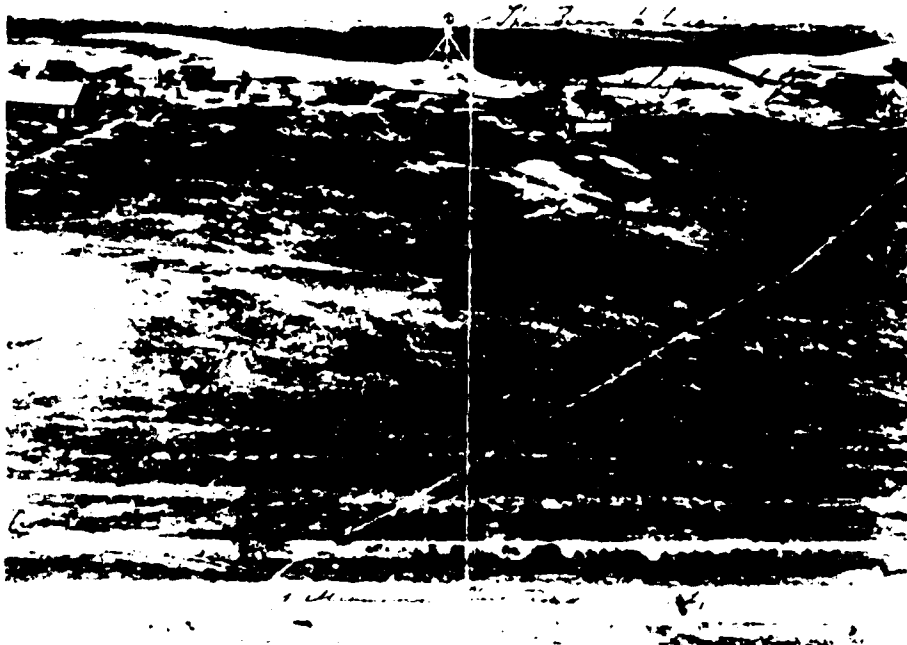


Figure 8 Aerial view of the Port Melbourne Aerodrome with the Shaw-Ross hangar at top left. The hand-written captions indicate the planned aerodrome improvements.

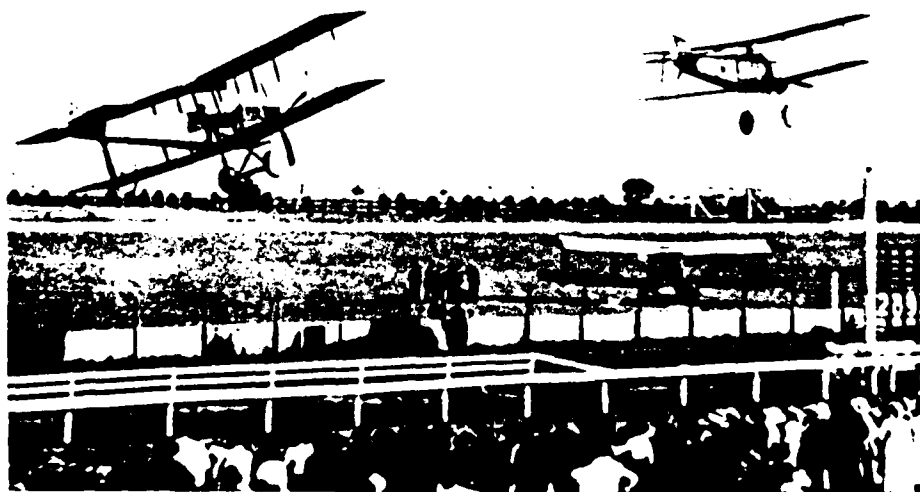


Figure 9 The Shaw-Ross DH6 struggles to keep up with a Lasco Sopwith Dove in the first Victorian Aerial Derby. The Sopwith Gall on the ground is probably G. EAIL, later G-AUBY.

4. COODE ISLAND

When, in 1835, John Batman sailed up the Yarra River to discover Melbourne, he was forced to make a wide swing to the north. This northward curve in the river was subsequently called Fishermens Bend. As Melbourne grew, Fishermens Bend and its associated Humbug Reach became an increasing hazard to shipping until, in 1887, Sir John Coode by-passed the problem with Coode Canal. This formed an island which, not surprisingly, became known as Coode Island. To that fiery character H.J. Larkin, Coode Island looked like the spot for an aerodrome.

4.1 Larkin Aircraft Supply Co

After being wounded at Gallipoli, Jimmy Larkin was discharged from the Australian Light Horse Brigade and joined the Royal Flying Corps. On 11 June 1919, he founded the Larkin-Sopwith Aviation Co. as Australian agents for the Sopwith Aviation Co. When Sopwith folded up, Larkin's company was re-registered as the Larkin Aircraft Supply Co. or Lasco on 1 July 1921. An aerodrome was established on waste ground behind the Caulfield Racecourse (Aerodrome Licence No. 4 issued 1 October 1921, lapsed 31 March 1922) but this was short-lived and Lasco moved to the new government aerodrome at Essendon. Just when everyone was comfortably settled, some Water Board or other started to dig a great hole right alongside the aerodrome. Called the Essendon Service Reservoir, it remains to this day as a shining, and apparently everlasting, monument to bureaucratic non-co-operation. Properly incensed by this vandalism, Larkin vowed to have nothing more to do with government aerodromes and moved to Coode Island.

Much filling was required in the swampy ground and the aerodrome area, as finally surveyed, was 700 x 470 yards (Fig 10). Hangars, administration offices and a fully equipped aircraft factory (Fig 11) were erected at a cost of £30,000, a lot of money in those days, and Aerodrome Licence No. 22 was formally issued to K.R.M. Farmer on 1 October 1927 to cover Coode Island Aerodrome. Lasco had previously established a close relationship with Keith Farmer when it imported Avro 504K G-AUFP on his behalf and this relationship continued throughout the life of the company. Now named Melbourne Airport, Coode Island Aerodrome was officially opened by Governor General Lord Stonehaven on 20 October 1927.

Lasco's air transport subsidiary was called Australian Aerial Services (AAS) (Figs 12-14). AAS was formed in 1922 to operate a scheduled Adelaide - Sydney service under contract to the Federal Government. Services began on 2 June 1924 and continued, with several route variations, until the government, disenchanted by an effective subsidy of £4 per letter carried, cancelled the contract in June 1930.

In 1928, the government decided to improve the mail service between Darwin and Brisbane by linking Camooweal, the north-western terminus of the existing Qantas service, with Daly Waters, the proposed southern terminus of the railway line from Darwin. To everyone's stupefaction, the contract was awarded to Lasco despite the proximity of Qantas and the remoteness of other Lasco operations. Commenting on this

strange decision in its August 1928 edition, *Aircraft* said 'An advisory committee was appointed to deal with the matter in the Minister's absence and the manner in which the committee did its job inspires the profound hope that it will never again be allowed to meddle in matters on which, taken as a body, it has shown itself so hopelessly unqualified to advise'.

To compound the problems created, the railway never did reach Daly Waters; it ran out of steam in the bush near Birdum Creek, some 50 miles to the north. For four years, the gap was filled by a car (but only in the dry season), which was not exactly what the advisory committee had anticipated.

Initially, two aircraft of Sopwith design were used on AAS services, Sopwith Antelope G-AUSS (Fig 15) and Sopwith Wallaby G-AUDU. Lasco then contracted for the delivery of Handasyde aircraft but contracts were transferred to the Air Navigation and Engineering Co. (ANEC) when Handasyde failed to deliver. ANEC re-designed the Handasyde monoplane as a biplane to Lasco requirements, called it the ANEC III and delivered three to Lasco in 1926. The only ANEC III's built, the three aircraft c/n 1-3 were registered as G-AUEZ, G-AUFC and G-AUGF respectively (later to become VH-UEZ, UFC, UGF Fig 16). As an interim measure, three DH-50A aircraft c/n 129-131 were imported in 1924 as G-AUEI, EJ and EK. This fleet operated AAS services including those terminating in Melbourne (Figs 17-19).

Lasco embarked on aircraft construction at Coode Island (Fig 20), with an Avro 504K built in the jigs and fixtures used for reconditioning RAAF aircraft. Apparently the designers, A.V. Roe and Co., were not consulted. Registered on 17 February 1928 as G-AUGP, the Avro was used for pilot training and Arthur Butler (of Butler Air Transport fame) learnt to fly on this aircraft. Its brief career ended in a crash at Melbourne on 21 March 1930.

In 1928, W.S. Shackleton was appointed as Chief Engineer. Bill Shackleton had previously acquired experience in aircraft design with various firms including Bleriot and Beardmore. During his three years with Lasco, Shackleton designed the Lascoter VH-UKT, (Figs 21,22) (240 HP Siddeley Puma engine) which made its test flight at Coode Island on 25 May 1929. This was the first Australian designed aircraft to receive a full certificate of airworthiness. Then followed the similar Lascondor VH-UMY (Figs 23,24) (three 150 HP Armstrong - Siddeley Mongoose engines) first flown at Coode Island on 23 March 1930. Finally, the highly successful Lark glider was flown at Coode Island on 12 December 1930 and, in 1931, broke the Australian duration record on three occasions; the last with a flight of 2 hr 40 min.

Shackleton was also responsible for the re-design of engine installations including the replacement of the 110 HP Le Rhone rotary in Sopwith Gnu VH-UBY, which Farmer bought from Lasco in October 1928, with a 220 HP Wright Whirlwind J.5 radial. He undertook a major re-design of the ANEC's in an effort to improve their performance, they cruised at a stately 77 mph, substituting 420 HP Armstrong - Siddeley Jaguar IVA radials for the 375 HP Rolls-Royce Eagles and increasing the seating capacity from 6 to 10. When rebuilt to this new design, the two surviving ANEC's were dubbed Lasco Lascowls (Figs 25,26). The third, G-AUFC (Fig 27), was considered not worth rebuilding after it collected a fence during take-off from Hay on 27 December 1927.

Shackleton returned to England in 1931 but his story had an interesting postscript when the Beardmore Wee Bee, another Shackleton design, arrived in 1933. Powered by a 32 HP Bristol Cherub engine, only one example (G-EBJJ) of this ultra-light was ever built. It was imported by P.T. Parker, assembled and test flown at Coode Island before departing to rural areas where it continued in use as VH-URJ until 1948.

After the Lascoter, the next aircraft to be built was DH-50A VH-UMN (Fig 28) registered on 20 September 1929. When completed, this aircraft was fitted with short metal floats for joy-riding around bayside holiday resorts but it soon reverted to landplane configuration. Together with G-AUEJ and EK, it was later converted by Lasco to a DH-50J by fitting a Bristol Jupiter radial in place of the Siddeley Puma. Lasco had successfully tendered for a contract (signed 15 April 1929) to build 32 DH-60G Moths for the RAAF. These aircraft numbered A7-23 to A7-54 were delivered between June 1930 and March 1931 (Fig 29). At least three subsequently appeared on the civil register and one of these, VH-AFR ex A7-44, was eventually exported to the USA as N168G. Thus, including the Lark glider, 37 aircraft were built at Coode Island.

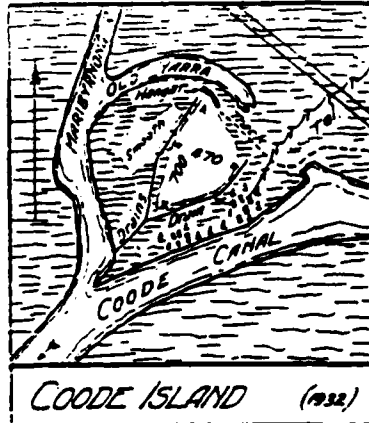
Lasco's agency, (Figs 30,31), for Blackburn aircraft proved unrewarding and only two Blackburn Bluebirds, VH-UNS and VH-UOC, were imported. The latter didn't last long. It was written off on 20 November 1930 after a radius rod failed on take-off from Coode Island; the undercarriage collapsed and the aircraft overturned. The former was used by Ludwig Nudl to test his "Raysola" ignition device, advertised as enabling high performance engines to run satisfactorily on low grade fuel. This is the modern equivalent of the old alchemists' dream of turning lead into gold and is about as successful. It re-surfaces at the Bend from time to time; more recently with an attempt to use brown coal as the low grade fuel.

Coode Island was also used briefly by Skywriting, Australian Division, an offshoot of the UK parent Savage Skywriting Co. Two SE-5a's, G-EBQA and G-EBVB, arrived in March 1928 and were used later that year by G.A. Lingham to write such deathless prose as HELLO and LUX in the skies above Melbourne and Sydney. The local advertising world was unimpressed and both aircraft were shipped back to the UK in December without ever receiving Australian registrations.

AAS suffered a fatal accident when Lascowl VH-UGF crashed at Temora, NSW on 14 July 1931. VH-UEJ became the second aircraft to be lost within 12 months when it burnt out following a misjudged forced landing in fog at Methul, NSW on 9 June 1932. After that, Lasco's decline was rapid. AAS ceased operating in 1933, the Lasco School of Flying (Fig 32) closed in May, aircraft were sold or scrapped and, by 1934, staff had reduced from a peak of 113 (Fig 33) to 7. The remaining assets were acquired, via New England Airways, by Airlines of Australia which, on 11 March 1937, announced plans to establish a flying training school at Coode Island. Through lack of government support, nothing eventuated.

Melbourne

CIVIL AVIATION BRANCH DEPARTMENT OF DEFENCE AUSTRALIA
NOTICE TO AIRMEN NO. 11/1928.
(REVISED AND REPRINTED 1935) COODE ISLAND, VIC.



CLASS OF GROUND: Private aerodrome licensed for all types of landplanes.
PROPRIETORS: Larkin Aircraft Supply Co. Ltd., Melbourne.
POSITION: On Coode Island, at junction of Maribyrnong and Yarra Rivers, between city of Melbourne and Hobson's Bay.
Lat. 37° 49' S. Long. 144° 56' E.
MAGNETIC VARIATION: About 8° E.
DISTINCTIVE FEATURES: River confluence.
MARKINGS: Hangar roof marked "Melbourne Airport." Wind indicator on hangar.
DESCRIPTION: Irregular shape, good level surface.
DIMENSIONS: N. - S. 700 yards.
E. - W. 470 yards.
HEIGHT ABOVE SEA LEVEL: About 10 feet.
APPROACHES: Clear on all sides.
SURROUNDING COUNTRY: Generally unsuitable for forced landings.
PETROL AND OIL: On aerodrome.
WATER SUPPLY: On aerodrome.
WORKSHOPS: Aircraft factory on aerodrome.
HANGAR ACCOMMODATION: Yes.
TELEPHONE: On aerodrome (Central 6451).
TELEGRAPH: By telephone from aerodrome.
NEAREST TOWN: City of Melbourne, about 2½ miles.
NEAREST RAILWAY STATION: Spencer Street, Melbourne, about 2½ miles.
REMARKS: This is a private aerodrome, and arrangements for landing should be made with the proprietors.
Relative strip maps Nos. 5, 11, 30, 42, 43.

CONTROLLER OF CIVIL AVIATION.

T-197. S.195. P.574.

Figure 10 Coode Island Aerodrome.

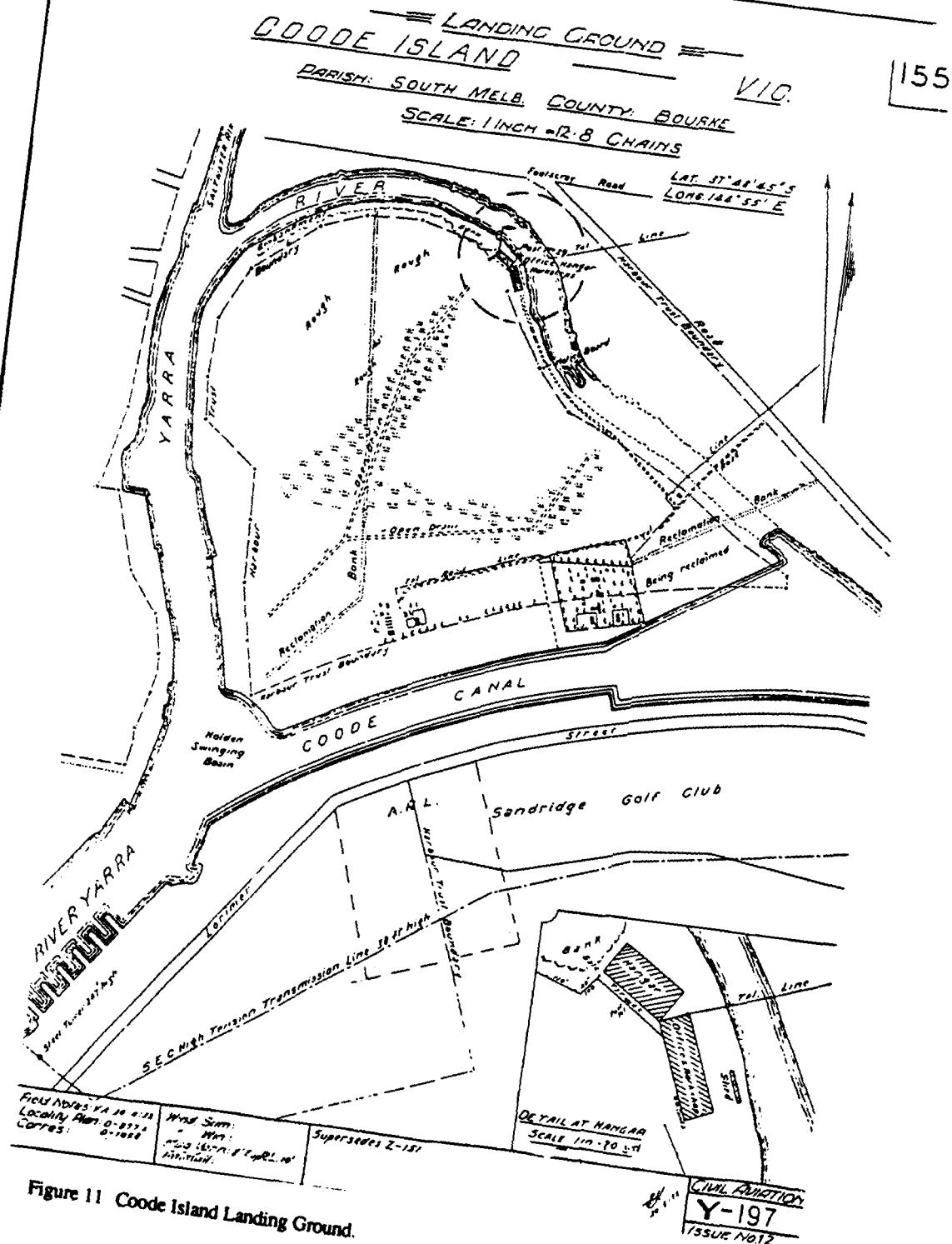


Figure 11 Coode Island Landing Ground.



Figure 12 The Handasydes are coming.
Cover of an AAS timetable c. 1925.



Figure 13 The ANEC'S are come.
Cover of an AAS timetable c. 1927.
Designs change but the scenery doesn't.

NEW SOUTH WALES

SYDNEY

COOTAMUNDRA

CANBERRA

Waggonville

Deniliquin

Echuca

Rochester

MELBOURNE

Geelong

Adelaide

Broken Hill

Wentworth

Swan Reach

Victoria

Murrumbidgee River

Snowy Mountains Highway

Legend:

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- Regular Airports
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- Rail Connections
- HAY
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Text Box:

Best types of hay of interest:

- Cattle Straw
- Cattle Hay
- Coltsfoot
- Mountain
- Shagbark
- Black River
- Clay Farm
- Woolly Stem
- Orchard
- Timber
- Sheep Hay
- Sheep Stations

SEE AUSTRALIA BY AIR.

Australian Aerial Services Limited

Figure 14 Aerial Route Map



Figure 15 Sopwith Antelope G-AUSS "Whip Bird" at Coode Island. This was the only antelope ever built.



Figure 16 Part of the Lasco fleet at Coode Island looking directly towards the future site of ARL which lies behind the trees dimly visible in the distance.



Figure 17 DH-50 aircraft were overhauled and fitted with Bristol Jupiter engines in readiness for the Camooweal - Daly Waters service of AAS. VH-UEJ "Wattle Bird" and UEK "Bell Bird" at Coode Island late in 1929.

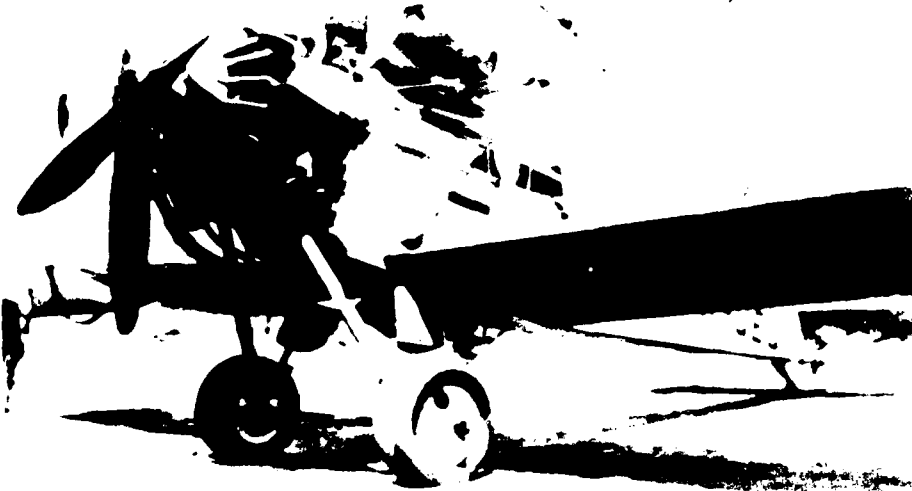


Figure 18 VH-UEJ and EK adopted a DH-61 type engine installation for the 515 HP geared Bristol Jupiter XI.

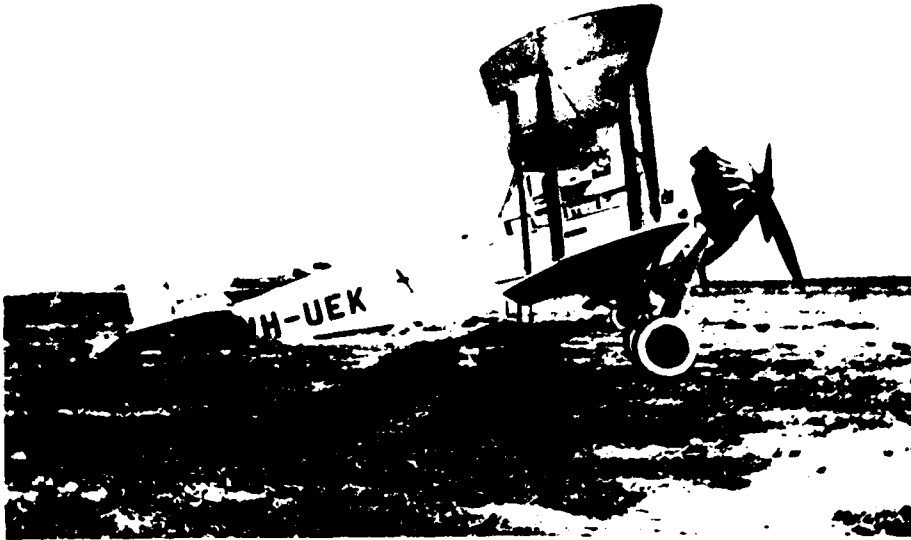


Figure 19 DH-50J VH-UEK at Coode Island. After service with AAS, it ended its days in New Guinea with Pacific Aerial Transport.

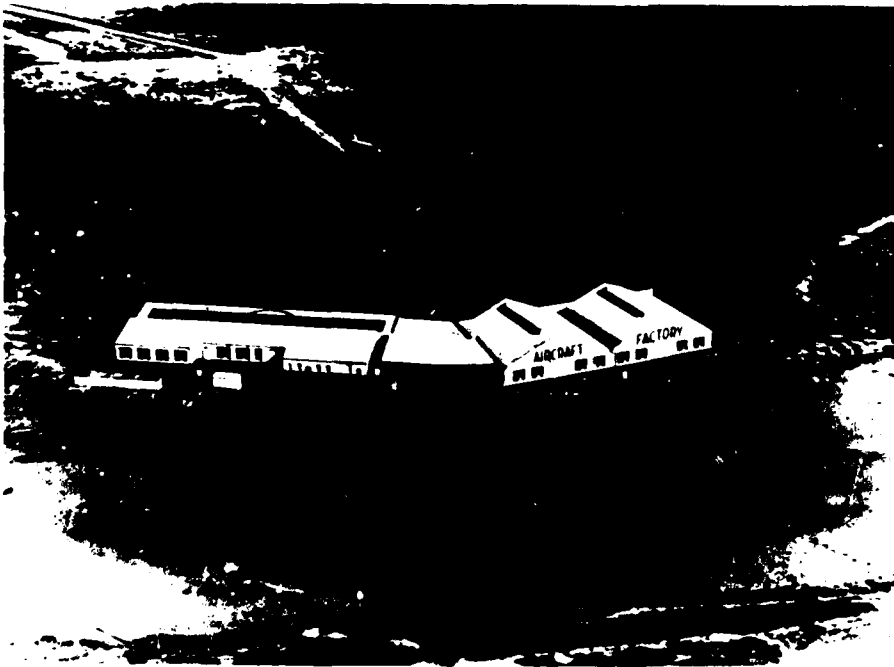


Figure 20 The Lasco factory at Coode Island with the old course of the Yarra in the foreground.

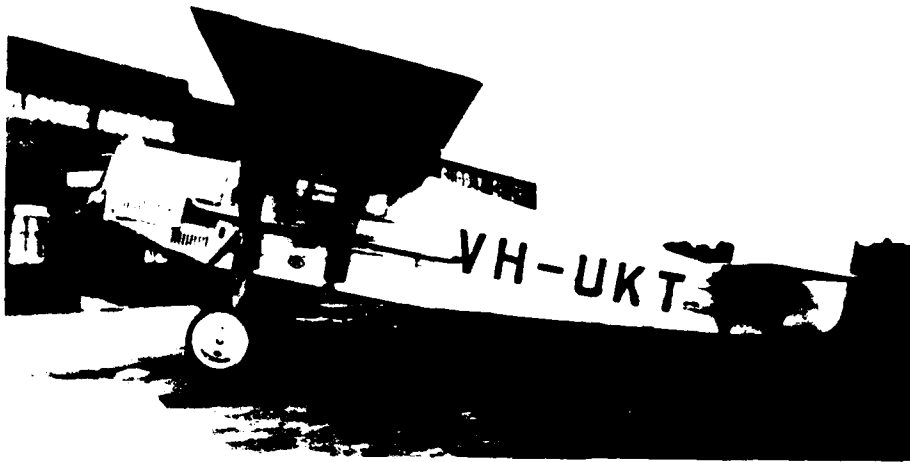


Figure 21 Designed and built at Coode Island - the Lascoter outside its birthplace.



Figure 22 Another view of the Lascoter at Coode Island with the Yarraville sugar refinery in the background.

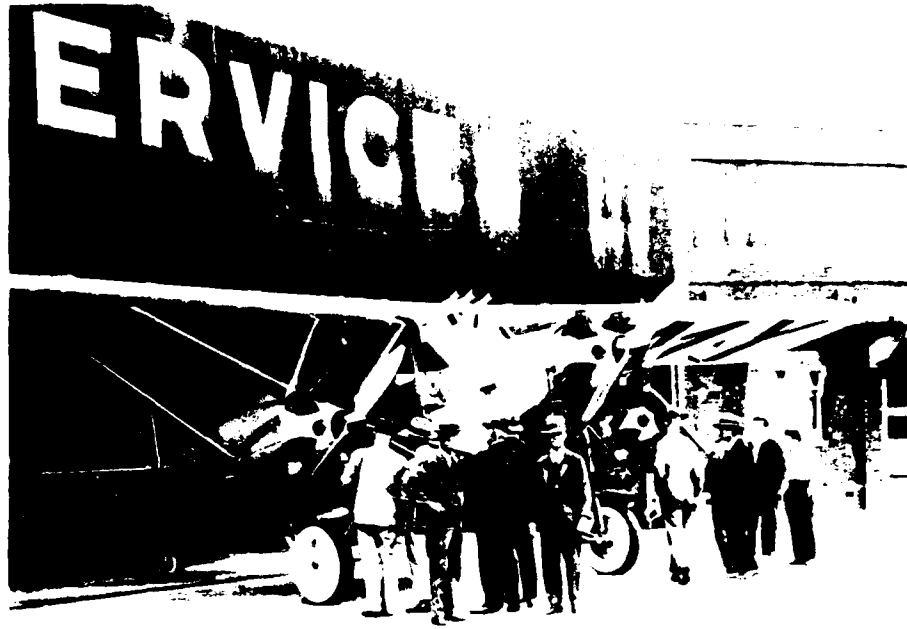


Figure 23 Roll-out of the Lascondor now registered VH-UMY.

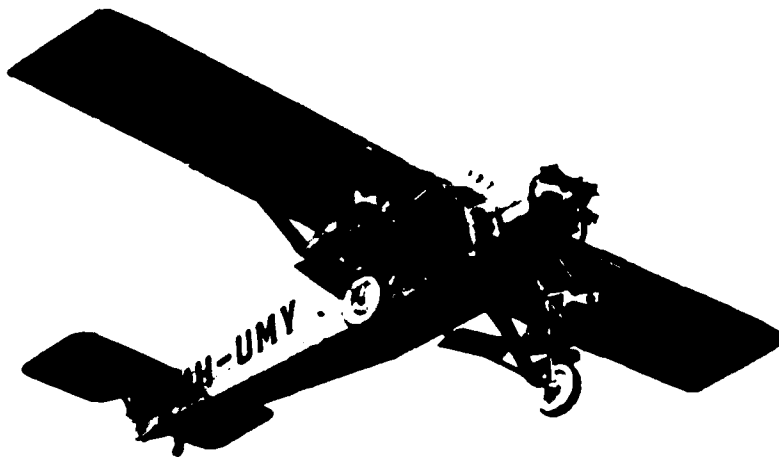


Figure 24 The Lascondor takes to the air.

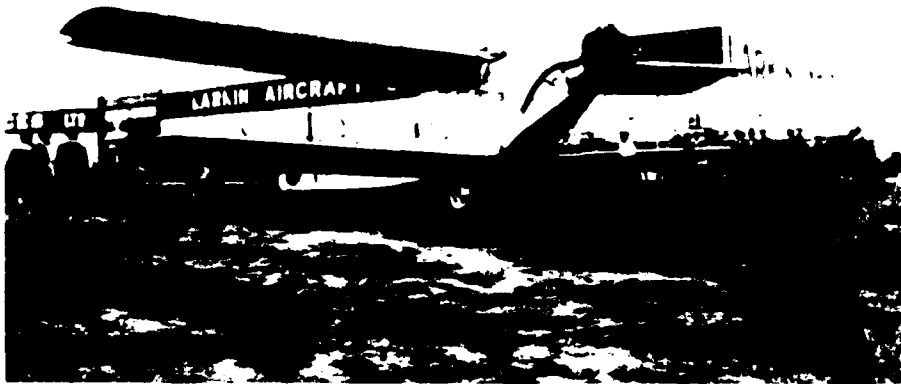


Figure 25 Members of the public inspect a Lascowl during the 1930 Airfield Day. Note the auxiliary fuel tank fitted above the wing centre section in preparation for the Mackay expedition to Central Australia.



Figure 26 During the Mackay expedition, Lascowls VH-UEZ "Diamond Bird" and VH-UGF "Love Bird" became the first aircraft to land at Ayers Rock, 16 June 1930.



Figure 27 Lasco Lascowl VH-UEZ after conversion from the original ANEC III. Its new name "Diamond Bird" was inherited from the defunct G-AUFC.



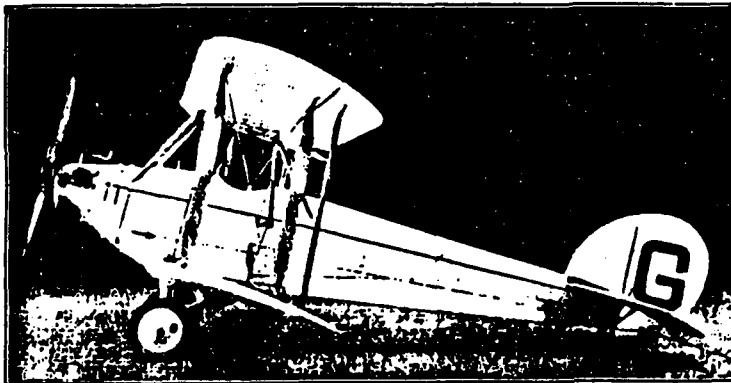
Figure 28 Built at Coode Island - the newly completed DH-50A VH-UMN "Sun Bird". Two Lascowls and an Avro Avian are also visible in the hangar.



Figure 29 The second Gipsy Moth to be built by Lasco; A7-24 lasted only until 1 June 1934 when it crashed into the sea off Altona. The rear fuselage fabric seems a bit rough.



Figure 30 Another Airfield Day attraction; a Blackburn Bluebird runs up its Armstrong - Siddeley Genet II.



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LIGHT AEROPLANE**

THIS 2-SEATER AIRCRAFT IS SPECIALLY USEFUL FOR INSTRUCTIONAL AND PLEASURE FLYING PURPOSES. THE SIDE-BY-SIDE SEATING ARRANGEMENT GREATLY FACILITATES INSTRUCTION AND IS MUCH MORE SOCIABLE.

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Melbourne Aerodrome, Dudley St., Melbourne. C1.

G.P.O. Box No. 4539.

Telegrams: Larkairsup.

Telephones: Central 6451 (3 lines).

Figure 31 A Lasco advertisement for the Blackburn Bluebird - only two were imported.



Figure 32 DH-60M Gipsy Moths of the Lasco School of Flying at Coode Island.



Figure 33 Lasco staff pose before their latest product, 9 May 1930.

4.2 Other Operators

In the days when it was considered that only lunatics attempted to fly without engines, Larkin actively supported the gliding movement. The Melbourne Gliding Club was formed in 1929 by Ray Garrett, one of Lasco's pilots. It operated from Coode Island from 1931 to 1935 using aerodrome and hangar facilities provided free of charge.

Homebuilt aircraft enthusiasts were also encouraged and the Fox brothers flew their biplane from Coode Island for several years. Aptly named "Flying Fox", this aircraft could fairly be included among those built at the Bend. The fuselage was based on Farman Sport drawings, courtesy of Harry Shaw, the wings were rebuilt from those salvaged from a crashed Sopwith Dove (ex Lasco) which also contributed an 80 HP Le Rhone rotary engine. Graham Carey provided sundry fittings while other materials were obtained from Shaw-Ross, Lasco and Moore's Timber Yard in South Melbourne.

Reg Fox made the first straight hop at Port Melbourne on 12 December 1929. The aircraft then went to Essendon, then to Coode Island where, with a 60 HP A.D.C. Cirrus I engine fitted, weight and performance estimates were made by Lasco engineers. This was in response to repeated CAB requests, late in 1930, for specifications and drawings. The drawings eventually turned up at CAB where they had been gathering dust since mid 1929 - in bureaucracy, some things don't change. The aircraft made its first real flight when it flew two circuits at Coode Island on 7 May 1931. After logging some 56 hours flying time, it was swapped for a Graham-Paige car and disappeared, apparently for ever.

After the demise of Lasco, Coode Island 'with its easy access for unauthorised flying' continued to be used by a small number of private owners. P.J. Perry flew his Klemm Swallow from there but seemed to prefer flying R.E. Ousten's homebuilt Samco monoplane. This was a single seat, low wing monoplane with inverted V strut bracing powered by a 40 HP Salmson AD-9 radial. After some 37 hours of flight time, it shed its port wing on 29 August 1937 and crashed close to the site of the future ARL. Pat Perry was killed on impact.

J.J. Smith kept his Westland Widgeon VH-UKE and DH Hawk Moth VH-UNW at Coode Island where they shared a hangar with an unregistered Austin Whippet (c/n AU-5). The venerable DH-50A VH-UEM (Fig 34) flew from Coode Island until it crashed at Footscray on 28 January 1940 while Stan Carrig briefly operated a Hillson Praga during 1941. Since Farmer still held the aerodrome lease, he moved his joy-flight and charter activities from Essendon to Coode Island. These activities were maintained by the Gnu (Fig 35) supplemented by sundry other aircraft including DH-50A VH-UAB and Monospar ST-11 VH-UAZ (Figs 36,37).

Coode Island Aerodrome died in WW.2. VH-UAB was impressed by the RAAF as A10-1 in 1942, Airlines (WA) Ltd bought VH-UAZ the same year and, as for the Whippet 'a young chap bought it and towed it away up the road behind his bike'. The whole thing vanished up into Footscray somewhere'. The last seven residents trickled away in 1943. These included the Gnu and the Lascoter, a brace of Desoutters VH-UEE and UPR, Nancy Lyle's Hornet Moth VH-UYO, and an ancient Sopwith Pup VH-UCK built in the UK some 27 years earlier and imported in 1919 by C.D. Pratt for Geelong Air Services. Following their departure, the buildings were taken over by the RAAF and used as a vehicle maintenance depot until the end of WW.2. Aerodrome Licence No. 22 lapsed on 29 September 1943 and the last vestige of Coode Island Aerodrome finally disappeared in October 1966 with the demolition of the hangar.

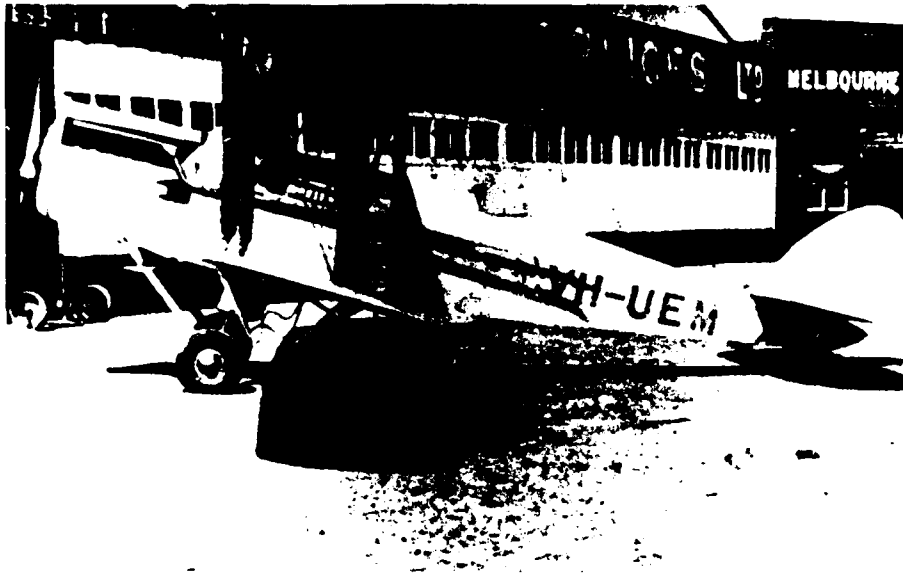


Figure 34 DH-50A VH-UEM started life with Western Australian Airways, then went to Australian National Airways before ending its days at Coode Island.

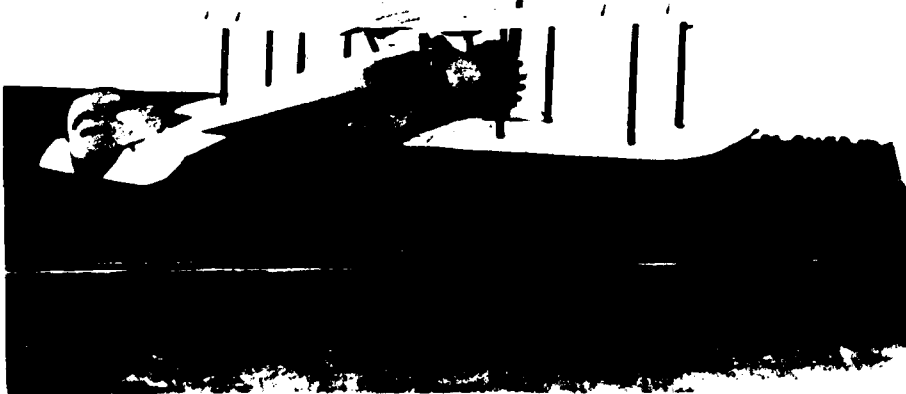


Figure 35 Keith Farmer's Sopwith Gnu with Wright Whirlwind fitted. After 26 years of service it was destroyed by a gale at Essendon on 19 April 1946.

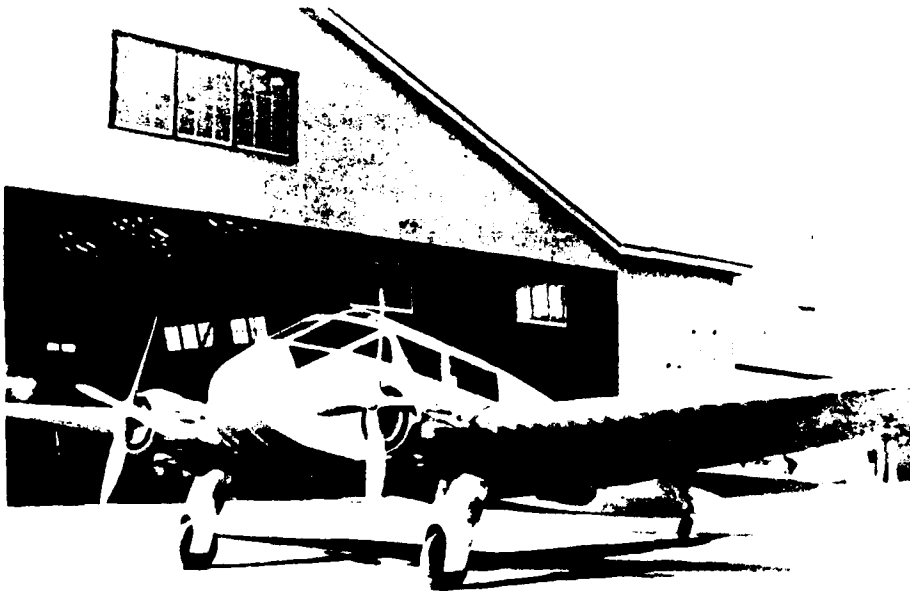


Figure 36 Only two Monospar ST-11's were built; both came to Australia and VH-UAZ operated briefly from Coode Island.



Figure 37 Part of the Farmer Fleet at Coode Island in 1941; Sopwith Gnu and Monospar ST-11.

5. FISHERMENS BEND

On 9 July 1930, a deputation to the Victorian Minister of Land and Water Supply urged that 45 acres of land at the Bend be set aside for an aerodrome. From then on, the saga of Fishermens Bend Aerodrome reads like a script from *Yes Minister*. In 1934, the Minister for Defence said that adequate reasons would have to be advanced before the Department would consider whether or not to investigate the proposal - goodness knows what sort of reasons an investigation would require. The Victorian Premier, Sir Stanley Argyle, was opposed to land being 'sacrificed for use as an airport'; the site might be required for 'warehouses, stores, factories and homes for workers'. Since the government of the day could hardly be said to represent the workers, the last named factor put aviation pretty low on the totem pole.

In 1935, the new Victorian Premier A.A. (Uncle Albert) Dunstan said that he was not in favour of an airport at the Bend and that Coode Island could not be considered because of planned dock developments. Ten days later he announced the decision not to reserve land for an aerodrome at the Bend since other areas, including Coode Island, were available. A further 18 days later he said the government would not re-open the question, the decision was final and conclusive. In May 1936, Dunstan agreed to reconsider the matter but was adamant that the government would not depart from its policy (whatever that was).

On 11 November 1936, Dunstan announced that, in accordance with government policy, 140 acres of land had been set aside as an aerodrome for the newly established Commonwealth Aircraft Corporation.

5.1. Commonwealth Aircraft Corporation

The Commonwealth Aircraft Corporation (CAC) was founded on 17 October 1936 and, following the lead of one of its major shareholders GMH, quickly established a factory in Lorimer Street, Fishermens Bend on 30 acres of land purchased from the Victorian Government (Fig 38). On the recommendation of L.J. Wackett, two North American prototypes were imported in 1937, the NA-16-1A (c/n 32-387) and the NA-16-2K (c/n 33-388). Within Australia, these two aircraft are usually referred to as the NA-16 and NA-33 respectively and, in due course, they received the RAAF serials A20-1 and A20-2.

Initially, the Federal Government ordered 40 NA-16's from CAC but on the advice of Wackett, now General Manager of CAC, this was changed to NA-33's on 23 November 1937. Built as the CA-1 Wirraway, the first aircraft A20-3 (Fig 39) made its test flight at the Bend on 29 March 1939 and was handed over to the RAAF on 1 August 1939. Thereafter, CAC went on to build a total of 755 Wirraways, (Figs 40-42) the last 135 of which were fitted with dive brakes to serve as dive bombers pending the delivery of Vultee Vengeances from the USA. The last Wirraway A20-757 was delivered to the RAAF on 9 July 1946.

The CA-2 Wackett was CAC's first local design. This was conceived as a low-cost primary training monoplane fitted with a 130 HP Gipsy Major engine and the first prototype A3-1 (Fig 43) made its test flight on 19 October 1939. The aircraft proved to be underpowered so both prototypes were re-engined with the 200 HP Gipsy Six and re-serialised A3-1001 and A3-1002. Because of the war situation, this engine became

unavailable and the 200 production CA-6 Wacketts (Figs 44-45) were fitted with 165 HP Warner Super Scarab radial engines imported from the USA. GMH joined the list of aircraft manufacturers at the Bend by building the wooden wings and tailplanes for all production Wacketts.

After RAAF service during WW.2, when they were used to supplement Wirraway training, some 46 Wacketts found their way on to the civil register (Fig 46). The active life of the type ended on 31 December 1963 when the Department of Civil Aviation refused certificates of airworthiness to all aircraft of wooden box spar construction.

The CA-4 bomber was CAC's next essay in design. Each of its two nacelles housed a Pratt and Whitney Twin Wasp engine, oil tank and oil cooler, a dual wheel undercarriage leg, a bomb bay holding two 250 lb bombs and a remotely controlled armament barrette with two 0.303 in Brownings - a lot of eggs in one basket. The prototype A23-1001 made its first flight on 19 September 1941 but subsequent flight tests, conducted by ARL, revealed some serious shortcomings in handling qualities. Elevator control was inadequate and, thanks to the turbulence generated by the rather awkward nacelles, violent tailplane and elevator buffeting occurred at low speeds. On 15 January 1943, test pilot J.H. Harper took off from the Bend with two CAC observers as crew. A serious fuel leak developed in the port engine and activation of the propeller feathering switch promptly produced an explosion and fire. Harper managed to bail out but the two crewmen died when A23-1001 crashed near Kilmore.

The design was extensively modified before entering production as the CA-11 Woomera. Twenty were ordered for the RAAF but only the first, A23-1, was ever completed (Fig 47). Following its first flight on 7 July 1944, it was apparent that most of the shortcomings of the CA-4 had been overcome but tail buffeting was still a problem although this had not been apparent in ARL wind tunnel tests. The problem was finally overcome by fitting a tailplane with 12° dihedral and, thus modified, the aircraft was delivered to the RAAF on 21 November 1944. However, since there was no longer any operational requirement for the aircraft, the project was cancelled.

Conceived as a stop-gap fighter powered by a CAC-built Twin Wasp engine and utilising as many Wirraway components as possible, design of the CA-12 Boomerang started on 21 December 1941, two weeks after Pearl Harbour. At this time total RAAF fighter strength in Australia was nil and the all stops out approach adopted by CAC is still remembered with awe by those involved with the project. Boomerang A46-1 (Fig 48) made its test flight on 29 May 1942, a remarkable effort, with the last of 250 built being delivered on 31 January 1945. Subsequently, it became fashionable to denigrate the performance of the Boomerang but the aircraft served with distinction in New Guinea (Fig 49) and was always popular with the pilots who flew and fought in it (Fig 50). One further distinction earned by the Boomerang was that of making the last landing at Coode Island. This ensued when CAC test pilot G.R. Board managed to run out of fuel in the Fishermens Bend circuit area.

The Boomerang was replaced on the production lines by the North American P-51D Mustang. One USAAF Mustang, 44-13293, was imported in 1944, re-serialised A68-1001 and used as a pattern aircraft. Eighty CA-17 Mustangs, A68-1 to 80, were assembled from imported components and were followed by a further 120 CA-18 Mustangs, A68-81 to 200, built at the Bend (Figs 51-54). These Mustangs were delivered to the RAAF between 31 May 1945 and 31 July 1951 to supplement 298 US built examples supplied to the RAAF under lend-lease between April and September 1945.

CAC designed one further fighter during WW.2. This was the CA-15, broadly similar to the Mustang but heavier and fitted with the more powerful Rolls-Royce Griffon engine. The prototype A62-1001 (Fig 55) made its test flight at the Bend on 4 March 1946 and proved highly successful with excellent performance and handling qualities; on one occasion it exceeded 500 mph while in a dive over Melbourne. The CA-15, together with several contemporaries, represented the pinnacle of piston-engined fighter development but their era was over and no further examples of the CA-15 were built.

The Winjeel was the penultimate piston-engined aircraft produced by CAC. Conceived as a Wirraway replacement, two CA-22 prototypes were built with the first, A85-618, making its test flight on 3 February 1951. The second, A85-364, followed at the end of the year. Following flight trials and structural strength tests at ARL, a number of modifications were made to the basic design and incorporated in production models. Numbered A85-401 to 462, sixty two production CA-25 Winjeels, all fitted with the Pratt and Whitney Wasp Junior engine, were completed and duly delivered to the RAAF between August 1955 and December 1957 (Figs 56,57).

In June 1954, two Wirraways, A20-692 and 696, were fitted with aerial spraying equipment and registered as VH-SSF and VH-SSG respectively. After limited use, both were withdrawn from service in 1956 and scrapped. This experience prompted CAC to produce a much modified variant of the Wirraway for aerial agricultural purposes. Known as the CA-28 Ceres, (Fig 58) the first (VH-CEA) was test flown at the Bend during February 1958; the last of 21 built (VH-CEW) during July 1963. With a payload of one ton, the Ceres was a useful crop duster but was probably a little ahead of its time.

When the North American F-86 Sabre was selected to be Australia's first swept wing jet fighter, the RAAF specified that it be fitted with the more powerful Rolls-Royce Avon engine and two 30 mm ADEN cannons to provide more firepower than the standard armament of six 0.5 in machine guns. These changes committed CAC to a major re-design of the fuselage so that the prototype CA-26 Avon-Sabre (A94-101) did not make its test flight until 3 August 1953, too late for the Korean War. Production Avon-Sabres (Fig 59) were designated CA-27 and were built in two series, A94-901 to 990 followed by A94-351 to 371; a total of 112 including the prototype. When A94-371 was delivered to the RAAF on 19 December 1961 an era ended; it was the last aircraft to be wholly built by CAC.

Subsequently, the CAC aircraft factory built aircraft in co-operation with other manufacturers. The wings and fins for Mirage fighters were built at the Bend and delivered to the GAF assembly line at Avalon. As the prime contractor for the Macchi trainer, CAC was responsible for fuselage construction and for final assembly. Finished fuselages were transported by road from Fishermens Bend to Avalon for mating with wings and tailplanes built by Hawker de Havilland at Bankstown, NSW. The first 21 Macchis, A7-001 to 021 (Fig 60), were assembled from imported components but the remaining 76, A7-022 to 097, (Fig 61) were built in Australia. These were delivered between August 1968 and September 1972.

The final task undertaken by the aircraft factory was the assembly of Bell 206B Kiowa helicopters. After the first twelve, locally made components were progressively introduced but the degree of local manufacture was always limited. When the program terminated in 1973, 56 had been delivered to the Australian Army as A17-1 to 56 (Fig 62). CAC then merged with Hawker de Havilland and, on 1 July 1986, was formally renamed Hawker de Havilland Victoria Ltd.



Figure 38 CAC factory under construction in August 1937.
The main buildings were completed in five months.



Figure 39 CAC officials pose with their first aircraft - Wirraway A20-3 - during the roll-out ceremony. L.J. Wackett is second from left.

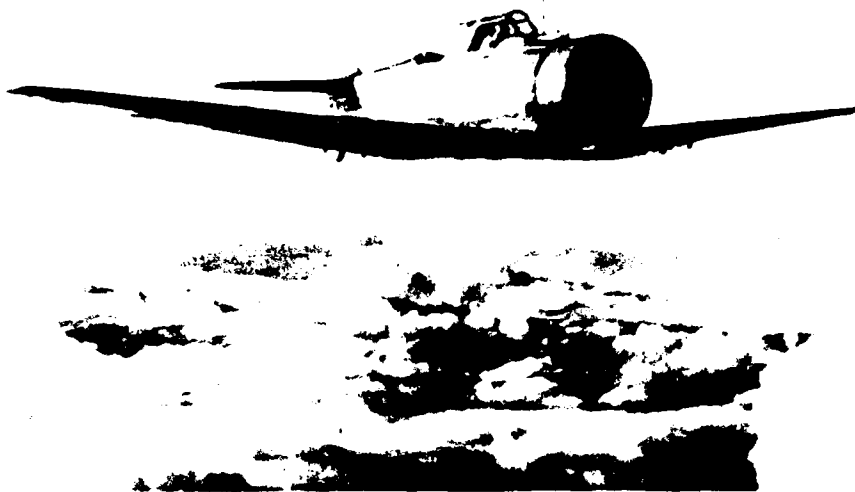


Figure 40 A late production Wirraway in its natural element.

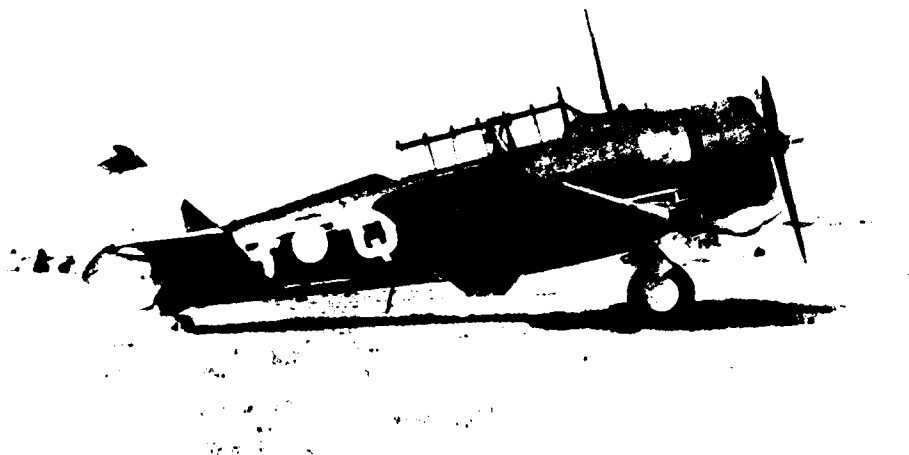


Figure 41 Refurbished Wirraways were fitted with a larger oil cooler although A20-561 retains its original radio mast.



Figure 42 Stick back and flaps down, Wirraway A20-659 about to touch down on a murky day at Fishermens Bend.

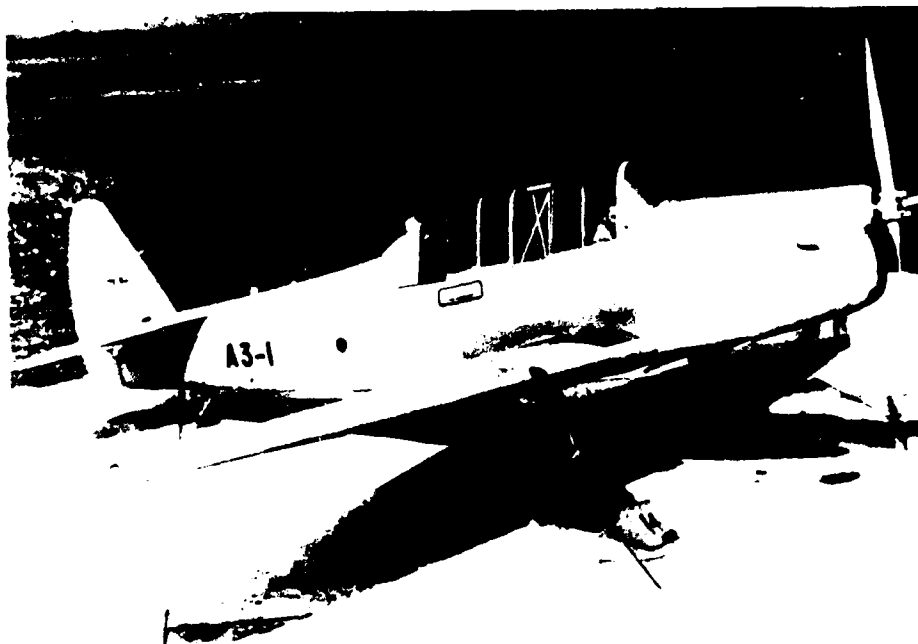


Figure 43 The first Wackett trainer prototype as originally built with the 130 HP Gipsy Major Series II engine and VP propeller.



Figure 44 Delivered to the RAAF on 7 August 1941, Wackett A3-22 outside its birthplace 36 years later.

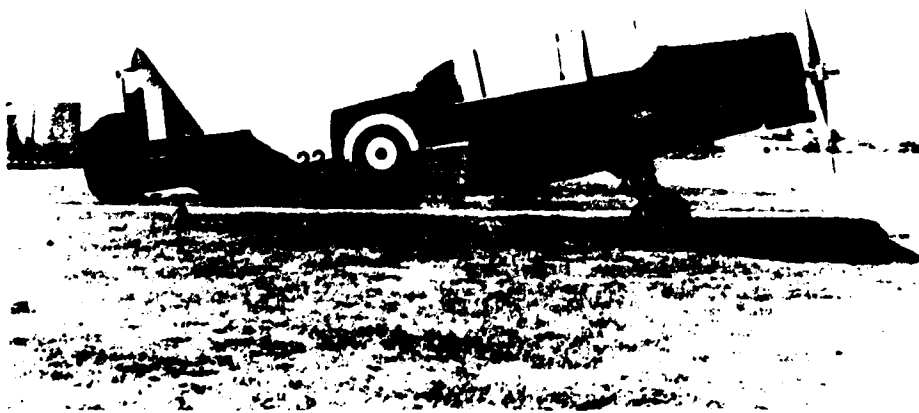


Figure 45 This view of A3-22 shows the lines of the Wackett to advantage.

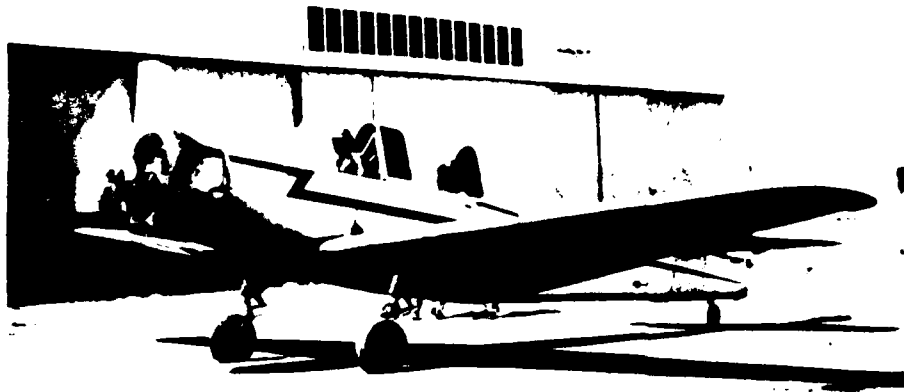


Figure 46 Running up the Warner Super Scarab of VH-AGE ex A3-138 at Moorabbin.

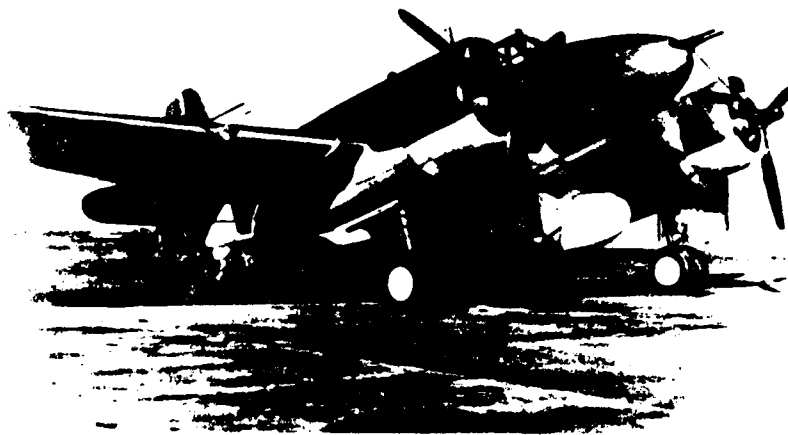


Figure 47 CA-11 Woomera A23-1 as first flown without tailplane dihedral.

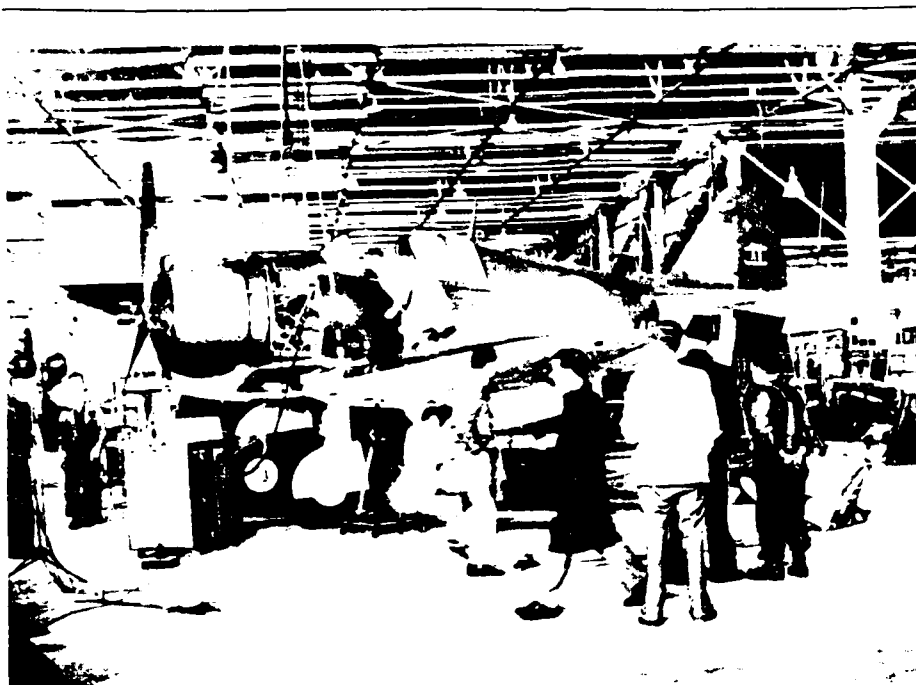


Figure 48 The first Boomerang A46-1 nearing completion.

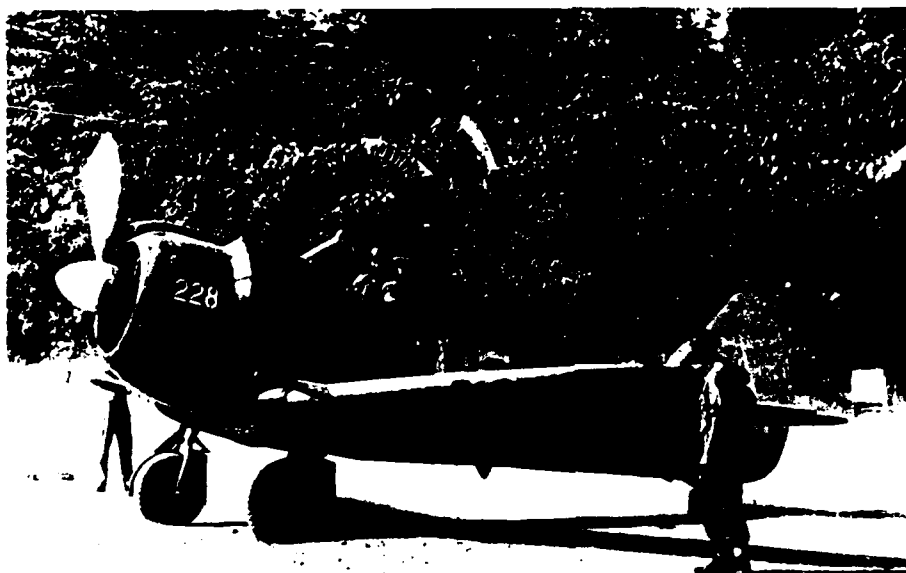


Figure 49 The Boomerang is the only Australian designed aircraft to be used operationally; a fine study of A46-228 in service with No. 5 Squadron at Bougainville in 1945.

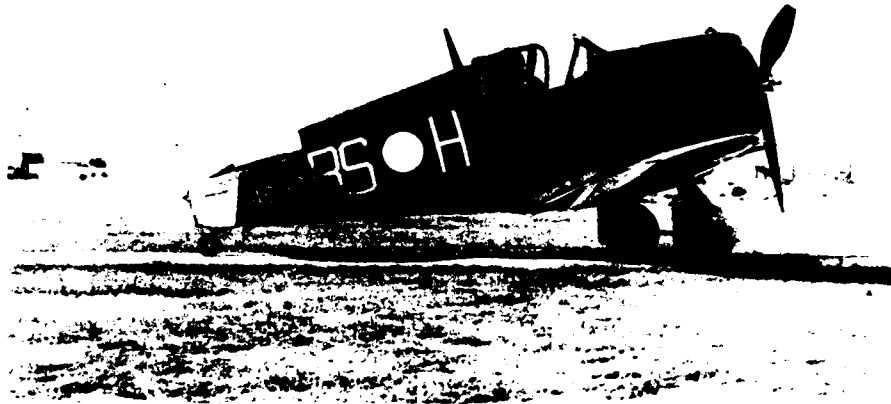


Figure 50 The last surviving Boomerang, A46-30 flew 492 hours in RAAF service and was chosen for the role of Lockheed Altair VH-USB in the film "Smithy"; now with the Canberra War Memorial.



Figure 51 The last Australian built Mustang is lifted over A68-57 (undergoing modification) to the end of the line.



Figure 52 A Mustang on final approach to the Bend as seen from the front gate of ARL. The pilot's view was strictly limited.

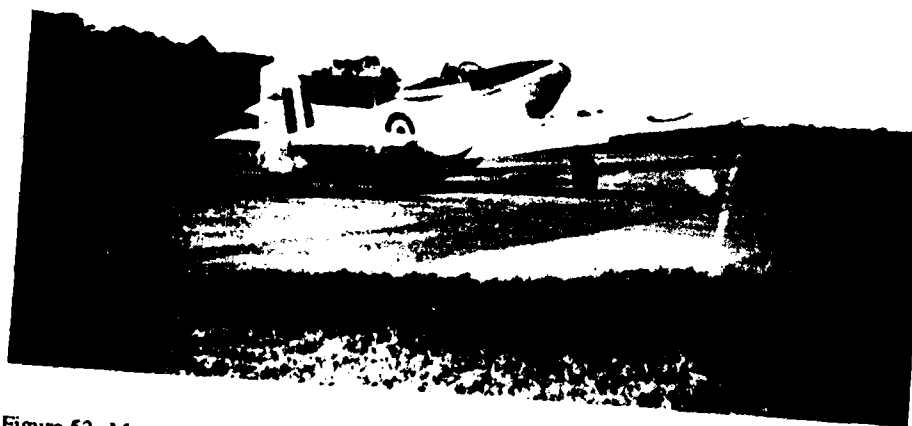


Figure 53 Mustang A68-183 was fitted with an experimental servo-hydraulic elevator control system which was subjected to an extensive flight test program at the Bend.

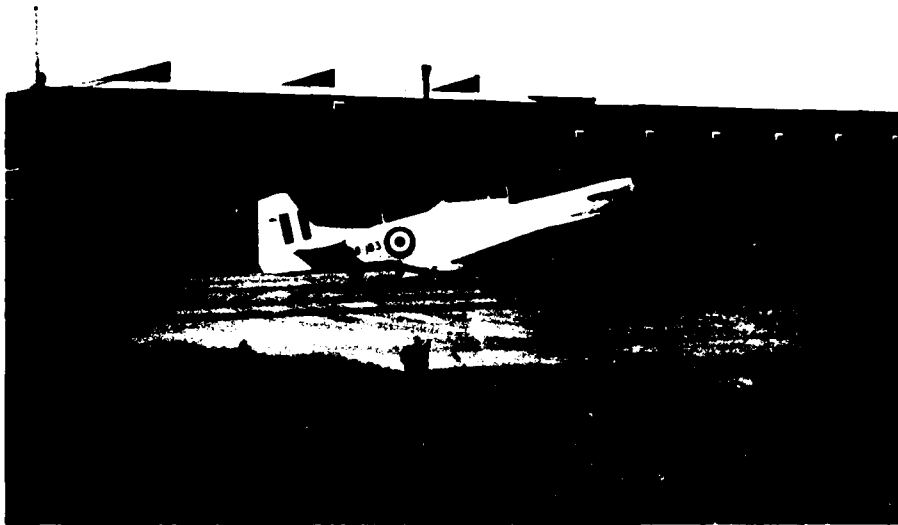


Figure 54 ARL Structures Division performed extensive ground resonance tests and flutter calculations on A68-183; seen here posed in front of the Structures Building.



Figure 55 The CA-15 represented the pinnacle of piston-engined fighter design.



Figure 56 Winjeel production line.

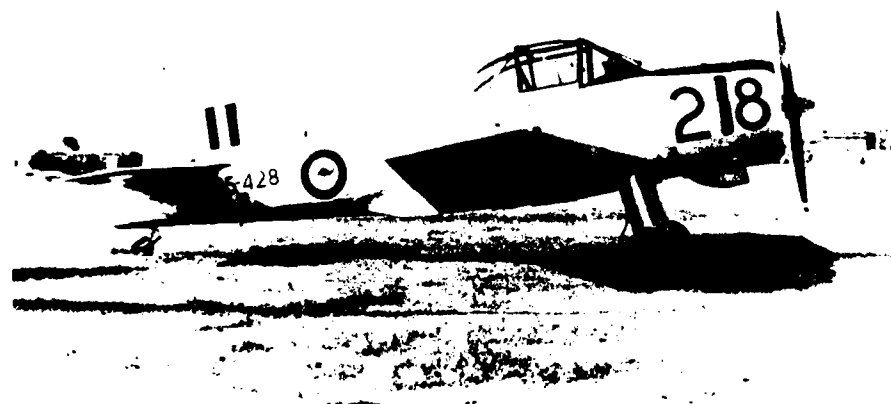


Figure 57 A production CA-25 Winjeel, A85-428 was delivered to the RAAF on 26 June 1956

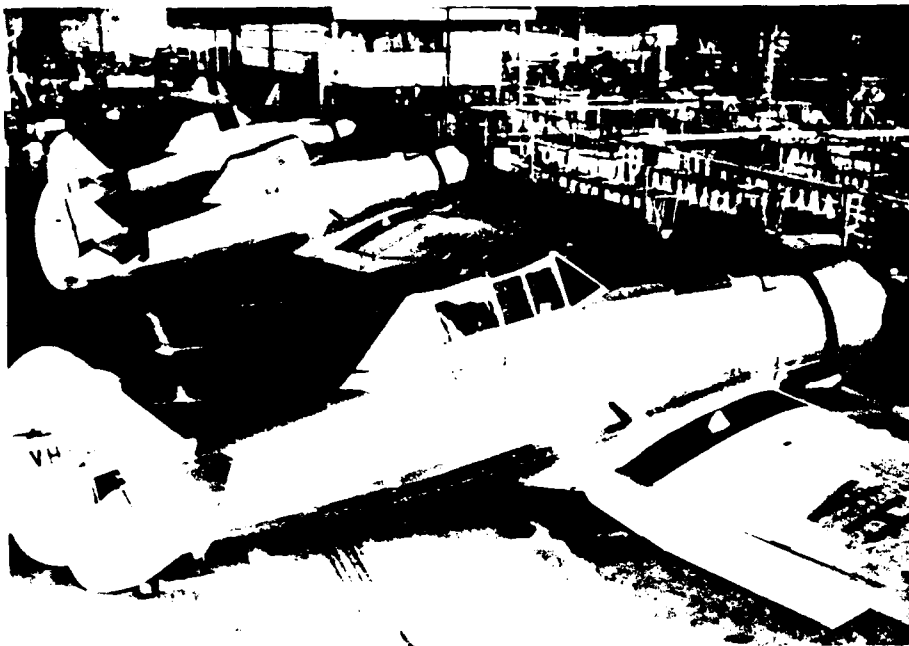


Figure 58 Ceres on the line nearing the end of the production run.



Figure 59 Avon-Sabre A94-965 made its first flight on 11 May 1957, seen here in RAAF service with 77 Squadron



Figure 60 Macchi A7-011 was assembled in Australia from components imported from Italy.

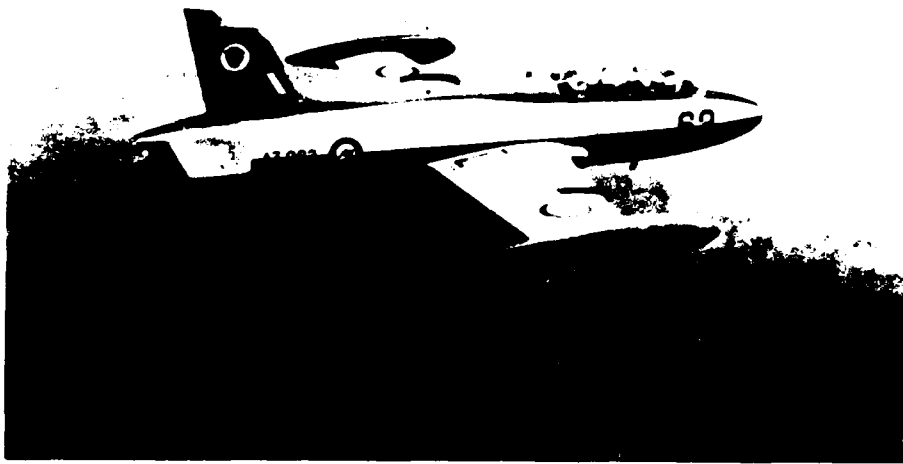


Figure 61 Macchi A7-063 was built in Australia.

5.2 Government Aircraft Factory

The Government Aircraft Factory (GAF) grew out of Australia's inability to import bomber aircraft from the UK during the years immediately preceding WW.2. In March 1939, the Federal Government accepted a recommendation to build the Beaufort bomber in Australia and set up the Aircraft Construction Branch, Department of Supply and Development, to do the job. A suitable production organisation was established which made extensive use of existing railway workshops at Chullora NSW, Islington SA, and Newport Vic, for the manufacture of major subassemblies. These were then moved either to Mascot or to Fishermens Bend for final assembly. At the Bend, a new factory was constructed alongside CAC (Fig 63) so that both could make use of the existing aerodrome. The factory was completed in March 1940, just in time to be placed under the control of the Aircraft Production Commission which, in a burst of management efficiency zeal, had replaced the Aircraft Construction Branch.

Originally, it was planned to use Bristol Taurus engines in the Australian Beauforts but, in October 1939, it became clear that this engine would not be available and Pratt and Whitney Twin Wasps were substituted. The engine change required extensive re-design of the nacelles, engine mountings and controls, which modifications were incorporated in L4448, the eighth production Beaufort imported in August 1940 as a pattern airframe. L4448 made its first flight with Twin Wasps at Mascot on 5 May 1941 and was quickly followed by the first Australian Beaufort (T9541) which made its test flight at Laverton on 22 August 1941. By this time the Aircraft Production Commission had been replaced by the Beaufort Division, Department of Aircraft Production as notified in the *Commonwealth Gazette* of 26 June 1941.

Somehow the Beaufort program managed to overcome the disruptions caused by this zeal for efficiency and steadily gained momentum (Fig 64). The first Mascot-assembled Beaufort (T9546) was test flown on 20 October 1941 and, by the end of the year, ten had been delivered. Only the first batch of fifty received RAF serials and one of these (T9547) became the first Australian built aircraft to make an operational sortie when it flew a photographic reconnaissance mission to Singapore on 8 December 1941, the day after Pearl Harbour. Despite being badly shot up by Japanese fighters, the mission was completed successfully but the aircraft was beyond repair and was subsequently destroyed to prevent capture.

One further Australian modification was an enlarged fin for better directional stability under asymmetric power. This was introduced on the 91st production Beaufort and retrofitted to all existing aircraft including L4448. Production reached a peak in September 1943 and terminated in August 1944 when the 700th and last Beaufort was delivered from Mascot. This was A9-700, the initial batch having been re-called retrospectively (Fig 65). Subsequently, 46 Beauforts were modified as transport aircraft and re-serialised A9-701 to 746.

The Beaufighter followed the Beaufort on the assembly lines with the first being test flown on 26 May 1944. Since the Beaufighter used many Beaufort components, the change-over was straightforward but the Beaufighter used imported Bristol Hercules engines and did not achieve the high Australian content of the Beaufort. To insure against interruptions in the supply of these engines, one imported Beaufighter (A19-2) was fitted with 1660 HP Wright Double Cyclone GR2600-A5B engines, but the supply never failed and all Australian-built aircraft were delivered with the 1735 HP Hercules XVIII.

When production ceased in 1945, 364 had been delivered to the RAAF as A8-1 to 364, one additional aircraft crashing during a pre-delivery test flight. Few survive today, (Fig 66).

Early in 1943, a production mission recommended building the Avro Lancaster in Australia and, on 4 June 1943 a Lancaster Mk. III (ED930) arrived in Australia to serve as a pattern airframe (Fig 67). These proposals were dropped in favour of a later version, the Lancaster Mk. IV which contained so many design changes that it emerged as a new aircraft, the Avro Lincoln (Figs 68-70). Late in 1945, some alert person in Canberra noticed that the Beaufort Division no longer built Beauforts but was building Lincolns instead. As a result of this astute observation, the Beaufort Division was renamed the Government Aircraft Factory.

GAF went on to build 73 Lincoln Mk. 30 aircraft, the first five of which were assembled from imported components. Production proceeded at a leisurely pace to the extent that, while A73-1 made its test flight at the Bend on 12 March 1946, A73-73 was not delivered to the RAAF until 29 September 1953. Subsequently, twenty returned to the Bend to be modified to Mk. 31 standard (Fig 71). This involved extending the fuselage by 6.5 ft by inserting a locally designed nose extension section to house radar equipment and two additional crew members for the general reconnaissance role.

GAF's first original design was in response to British Ministry of Supply Specification E7/48 for a high speed pilotless target aircraft. Design commenced in March 1948 and resulted in the type B aircraft or Jindivik. A manned variant was also designed to serve as a test vehicle for checking the aircraft's flying and control characteristics. This was designated type C or Pika (Fig 72). Two Pikas were built at the Bend, both fitted with the Armstrong-Siddeley Adder ASA.1, a short-life jet engine specifically designed for the target project. Pika C-1 made its first flight at Woomera on 31 October 1950 and crashed there on 5 April 1951; the RAAF serial A93-1 was applied posthumously and was never carried by the aircraft. Flight testing continued at Woomera using A93-2 (delivered 26 April 1951) and ended on 25 June 1954, by which time the two Pikas had made a total of 214 flights. Pika is still the only conventional jet aircraft to be designed and built in Australia and it is appropriate that A93-2 has been preserved for posterity at the RAAF Museum, Point Cook.

Twelve Jindivik Mk. 1 aircraft were built, all with the Adder engine. Initial take-off attempts at Woomera were disappointing with the aircraft failing to leave its launching trolley but, on 28 August 1952, A92-5 made a successful take-off and uneventful flight before resolutely refusing to land. However, the various problems were duly sorted out and Jindivik commenced the career for which it had been designed, that of giving anti-aircraft guided missiles something to aim at.

No other Australian designed aircraft has been developed so extensively as Jindivik. Following the Mk.1, 114 Mk. 2 aircraft were built with enlarged air intake and jet pipe to cater for the greater mass flow of the more powerful Armstrong-Siddeley Viper ASV.3 engine. Major structural changes included a revised rear fuselage and a new wing with thickness-chord ratio reduced from 10% to 6%. These changes allowed an increase in the maximum Mach number from 0.73 to 0.85. Three Mk.2 aircraft were modified to Mk. 2A standard by replacing the flush air intake with a pitot intake. Then followed 76 production Mk. 2B aircraft, similar to the Mk. 2A but with ASV.8 engines and provision for either 40 in or 80 in wing tip extensions.

Development continued through the Mk. 3 and 3A, with the more powerful ASV.11 engine, to the Mk. 3B with the Viper 201. With these modifications, Jindivik achieved an outstanding high altitude capability; actual service ceiling was 67,000 ft with an initial climb rate of 16,000 ft/min.

The final production versions were the Mk. 4 and 4A with updated avionics and simplified structure respectively. When, after 35 years, production terminated in 1986, just over 500 Jindiviks of all marks had been built.

During its career, Jindivik steadily gained an enviable reputation for reliability (A92-418 made a record 285 flights during ten years operational service at Woomera) but versatility was perhaps its most notable attribute. Typically, the aircraft took off festooned with all manner of special trials equipment, IR flares, HD lamps, radar transponders, Luneberg lenses, etc. Special towed targets, designated Tonic, were developed for Jindivik together with a large towing winch fitted under the rear fuselage. For missile trials sorties, an Ampor pod (Airborne missile proximity optical recorder) was always fitted to each wing tip. Pod development was itself a major task with the Mk. 1 pod giving way to the more streamlined Mk. 2 which, in turn, was quickly replaced by the small diameter Mk.3. Provision for wing extensions necessitated Mk. 4 or Mk. 5 pods, or the massive 12 ft long Mk. 8 which contained two cameras, Luneberg lenses plus additional fuel. The final development was the Mk. 9 in which stainless steel replaced the aluminium alloy of the earlier pods.

When the Federal Government acquired a licence to build 48 English Electric Canberra bombers, a new airfield for final assembly and testing was required. On 3 October 1951, it was announced that this would be located at Lara, Victoria; later to be named Avalon Aerodrome. Major Canberra sub-assemblies were built at Fishermens Bend and moved to the new airfield for final assembly. The first Australian made Canberra B.20 A84-201 (Fig 73) made its test flight at Avalon on 29 May 1953 and was delivered to the RAAF on 1 July, barely in time to participate in the 1953 London to Christchurch air race in which it came second. This used imported Rolls-Royce Avon RA.3 engines but from A84-228 onwards, (Fig 74) more powerful Avon RA.7 engines built by CAC were fitted. Canberra production continued for five years until the last A84-248 was delivered on 30 September 1958.

The Dassault Mirage III-O supersonic fighter was GAF's next major production task. This was the first French designed aircraft to be selected for service in the RAAF and language problems created some difficulty; many thousands of dimensions had to be converted from metric to British Imperial. Two Mirages, A3-1 and A3-2, were wholly built in France so that A3-3 was the first Australian assembled aircraft. This was test flown at Avalon on 16 November 1963 and was followed by a further twelve assembled from imported components, (Fig 75).

For the Australian built aircraft (Fig 76), CAC made the wings, fin and engine, while GAF was responsible for the fuselage and for final assembly. The first (A3-16) made its test flight on 27 May 1965 and the last (A3-100) on 4 November 1968. In addition to the 100 fighters, 16 two seat Mirage III-D trainers (A3-101 to 116) were delivered to the RAAF between October 1966 and January 1974. However, these used imported fuselages and only the wings, fins and engines were built at the Bend.

With Mirage production ending, GAF turned its attention to the design of a small utility aircraft powered by two 400 HP Allison 250-B17 turboprop engines and with advanced

short take-off and landing (STOL) characteristics. The first prototype N2-01 made its test flight at Avalon on 23 July 1971 while, in 1972, the second prototype N2-02 achieved the distinction of becoming the first Australian designed aircraft to be flown at the Farnborough Air Show. On its return to Australia, it achieved the more dubious distinction of making a successful forced landing on the Maroondah Highway at Mansfield on 3 October 1973 when engine icing caused a loss of power.

Production models were designated N22 Nomad and the first (N22-1) was registered as VH-AUI on 29 April 1975 before departing for the Paris Air Show. In December 1975, trial airline operations were conducted locally between Sydney and Newcastle, but the Nomad soon lived up to its name by wandering as far afield as Mexico and Switzerland (Fig 77). The tenth production model was modified by inserting a 45 in fuselage extension section to become the prototype N24. This made its test flight at Avalon on 17 December 1975 but crashed there eight months later when it encountered tailplane flutter problems. Unfortunately, both the GAF test pilot, S.G. Pearce, and the acting chief designer of GAF, D.R. Hooper, were killed in this accident. The various problems were eventually overcome and on 20 May 1977, Nomad received its US type certificate from the Federal Aviation Administration.

Nomad production terminated at the Bend in 1984 with the 170th aircraft. Its passing marked the virtual end of aircraft production at Fishermens Bend with facilities being moved to Avalon for the F/A-18 program.

5.3 Aero Engines

Fishermens Bend also became a major centre for the manufacture of aero engines in Australia. As the co-ordinating contractor, GMH was responsible for the production of 130 HP De Havilland Gipsy Major Series I engines for the Tiger Moth program. All 1300 engines built were assembled and tested at the Bend with the first starting its type test seven months after the receipt of production drawings.

For the Wirraway program, the CAC engine factory built 680 Pratt and Whitney Wasp R1340-SIHG radial engines of 600 HP each and, together with GMH, supplied parts for 870 Pratt and Whitney Twin Wasp R1830-S3C4G engines assembled at Lidcombe NSW for the Beaufort program. CAC's involvement with piston engines culminated in the design of the Cicada, a 7 cylinder radial engine of 450HP intended for the Winjeel. However, the number required was too small to justify production tooling and the project was abandoned after the construction of two prototypes.

When pistons gave way to turbines, the Rolls-Royce Nene 2-VH became the first jet engine to be built at the Bend. A total of 114 Nenes were produced by CAC to power the Australian variant of the Vampire fighter. Then followed 225 Rolls-Royce Avon RA.7 engines of various marks built for the Avon-Sabre and Canberra, 140 Atar 9C engines for the Mirage and a similar number of Rolls-Royce Vipers for the Macchi. The latest engine to be produced at the CAC engine factory, now owned by Hawker De Havilland, is the General Electric F404 for the F/A-18 aircraft.

One further aero engine worthy of mention is the twin cylinder, horizontally opposed piston engine designed and built by ARL for remote piloted vehicles. Developing some 25-30 HP, this brings us back full circle to the Bassett engine installed in a Shaw-Ross Farman Sport at the Bend some 60 years earlier.



Figure 62 Kiowa helicopter at home in Oakey Queensland.

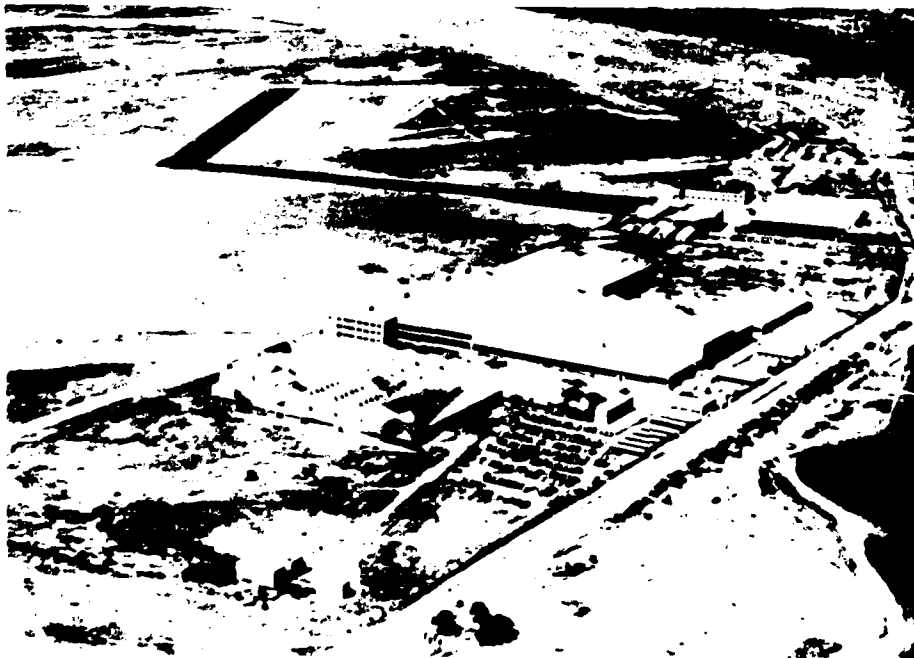


Figure 63 The aircraft factories of Fishermens Bend, 1942, with CAC in the foreground and GAF at centre right. Five Wacketts and the CA-4 prototype are visible.

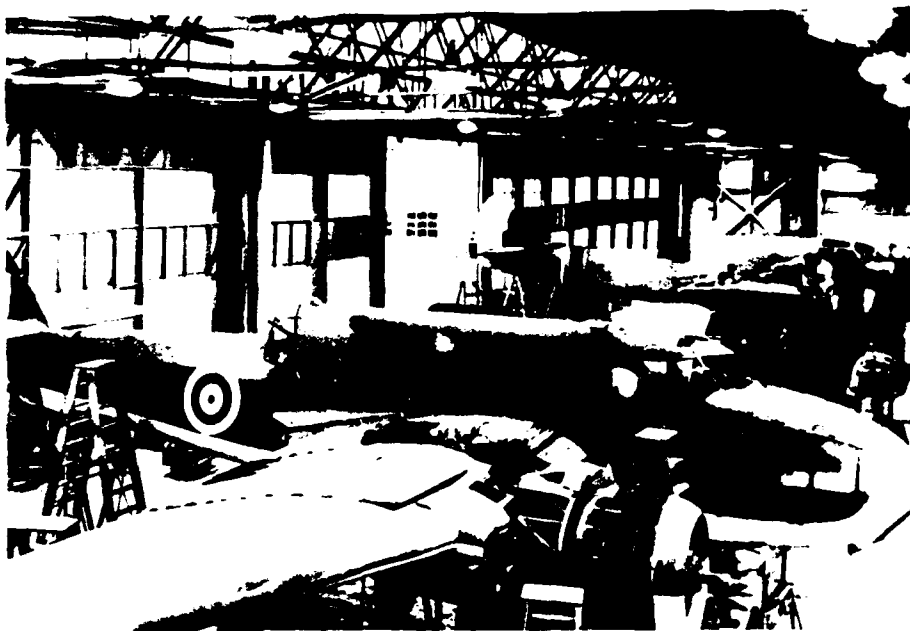


Figure 64 Beauforts of the first production batch nearing completion at Fishermens Bend. Note the small tail fin as originally fitted.

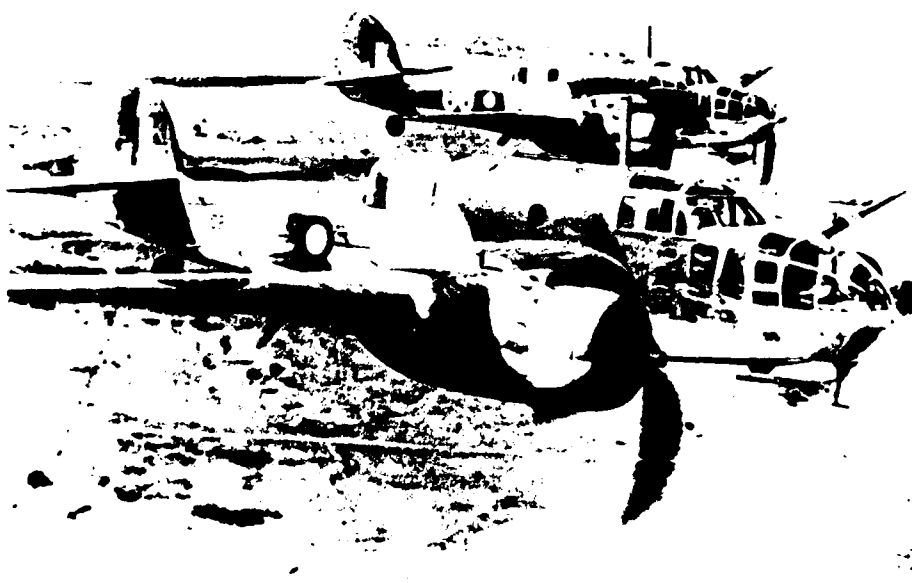


Figure 65 Beauforts A9-66 and A9-102 of No. 1 Bombing and Gunnery School, East Sale, 1943. The rather ineffective chin gun blister was frequently removed.



Figure 66 The final fate of most aircraft built at the Bend. Beaufighters at Tocumwal await the scrap merchant.



Figure 67 Avro Lancaster A66-1 (ex ED930) flying over Fishermens Bend. Plans for local production were dropped in favour of the Lincoln.



Figure 68 Almost brushing the Lorimer Street fence, Lincoln A73-26 turns into wind in preparation for a test flight at Fishermens Bend.

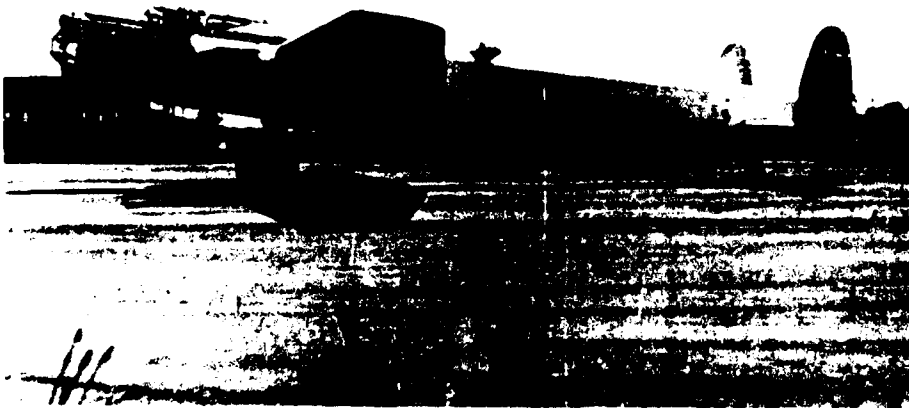


Figure 69 A73-26 lined up and ready to roll.

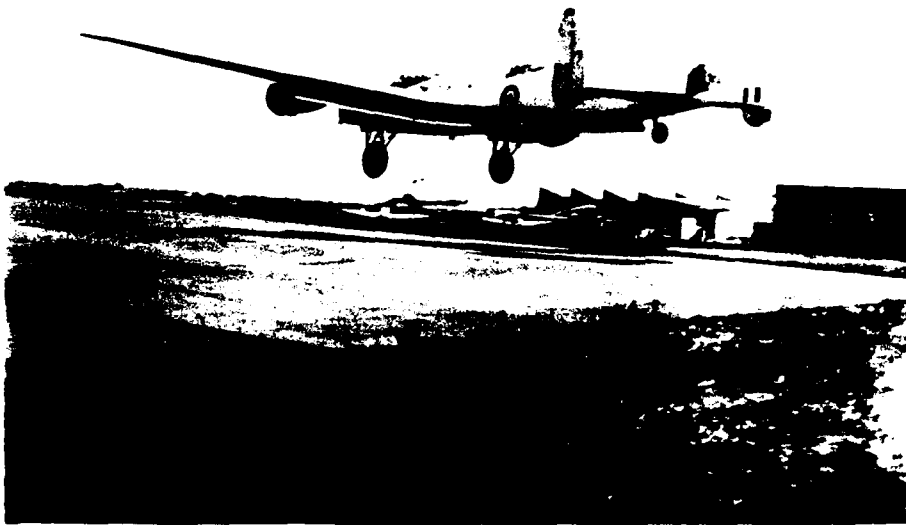


Figure 70 Now with armament fitted, Lincoln A73-47 returns to the Bend. The clearance between its port wing tip and the ARL Structures Building allowed little margin for error.



Figure 71 The Bend reverberates as four Merlins come up to full power and A73-62 starts its take-off roll. This Lincoln was subsequently modified to Mk. 31 standard.

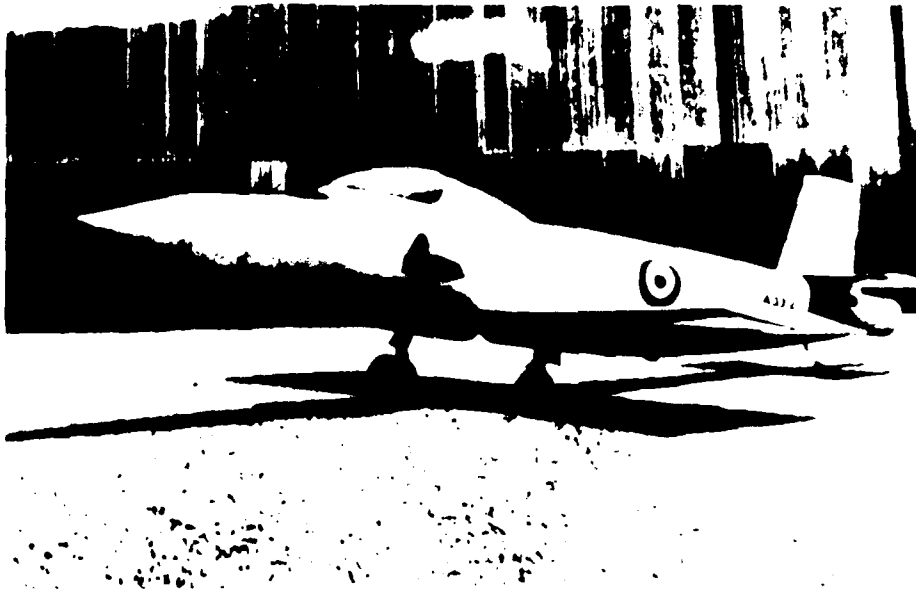


Figure 72 Pika A93-2 - still the only Australian designed conventional jet aircraft.

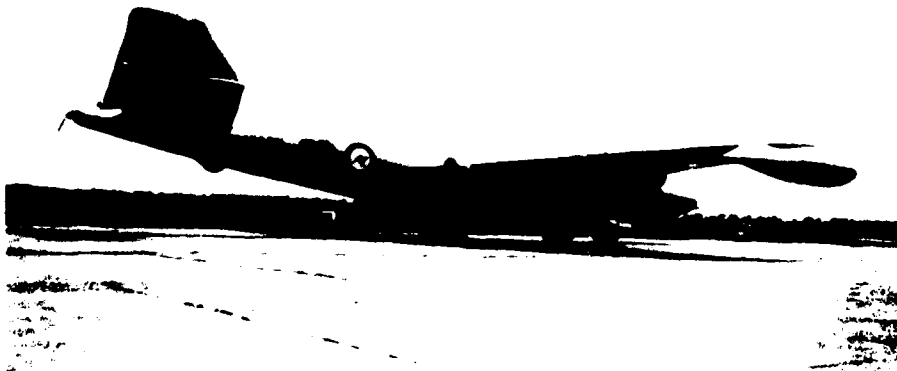


Figure 73 A84-201 the first Australian made Canberra at Laverton. Now on static display at RAAF Amberley.

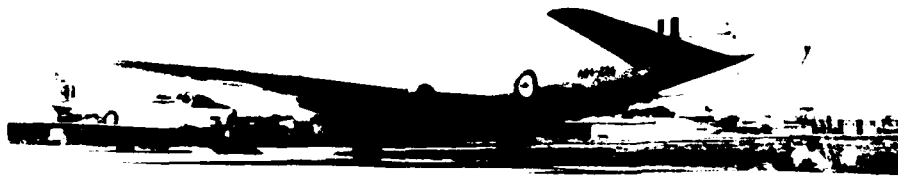


Figure 74 Both built at Fishermens Bend in 1956, Canberra A84-234 and Sabre A94-949 at Laverton



Figure 75 Assembled in Australia, Mirage A3-15 carries a Matra R530 missile on the centreline, two "Israeli" combat fuel tanks and two Sidewinder missiles on the underwing pylons.



Figure 76 Built in Australia, Mirage A3-78 displays its gun and missile armament while in service with No. 77 Squadron.

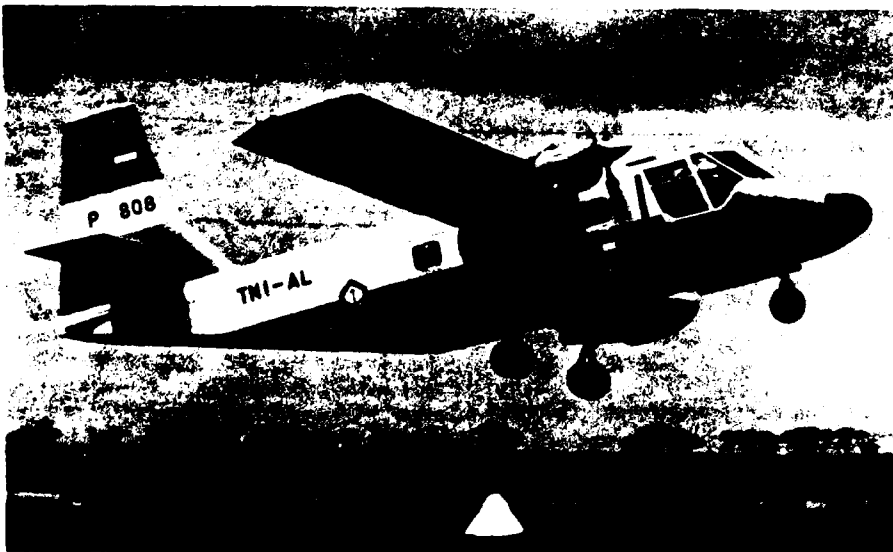


Figure 77 One of the export Nomads N-22. (Indonesian Navy)

5.4 ARL and Other Matters

The history of the two establishments, CAC and GAF, shows a high local design content; six of the ten aircraft types built by CAC were designed at the Bend. In 1939, the need to provide scientific and technical support for this growing design and manufacturing capability made the Bend look like an appropriate location for ARL. A site was selected next to GMH in Lorimer Street (Figs 78,79) and construction of buildings commenced in August 1939, one month before the start of WW.2. The first ARL staff moved in during April 1940.

With the rising tempo of activity at the Bend, this was none too soon. Certainly, ARL was quickly involved with the industry, performing structural strength tests on Beaufort tailplanes and engine mountings, dynamometer tests on Australian built aero engines, and wind tunnel tests for the Woomera and Boomerang. Thus in the final analysis, ARL is at the Bend because of the persuasive powers of GMH (BHP, another CAC shareholder, preferred Newcastle) supported by the flexible policies of the then Victorian Premier.

During WW.2, Fishermens Bend Aerodrome was a very busy place. In addition to aircraft built there, many imported aircraft were assembled and test flown by CAC for the RAAF and USAAF (Figs 80,81). The list is extensive and includes Lightnings, Thunderbolts, Kittyhawks, Marauders, Mitchells and many others. Four-engined types were represented by Fortresses (Fig 82) and Liberators which must have pushed runway availability to the limits. It is rumoured that the Libs normally touched down with brakes on to avoid ending up in the Yarra and to hell with the tyres. In those days, the Bend was a spotter's paradise (Figs 83-88) although P-43 Lancers must have created some problems not to mention the odd Airacobra, Curtiss-Wright CW-22, Douglas B-18 and Cessna Bobcat.

With the end of WW.2, aerodrome usage began to decline although all of the locally built piston-engined aircraft continued to make their test flights from the Bend. However, with the advent of jets, Fishermens Bend Aerodrome could no longer cope with the runway requirements. Beginning with the Avon-Sabre and Canberra, final assembly and flight testing were transferred to Avalon, visiting aircraft were rarer, and permanent residents dwindled to the two Lockheed 12's of Associated Airlines and a lone C-47 attached to the US Embassy. When these departed, the aerodrome closed. Life flickered briefly when a Tiger Moth, inward bound for Moorabbin and low on fuel, made a precautionary landing at the Bend but officialdom had the final say; the pilot was censured for landing at an unauthorised landing ground.

6. VALE

The aerodromes of Port Melbourne are no more. Graham Street Aerodrome has disappeared under industrial buildings, the suburb of Garden City covers Port Melbourne Aerodrome, Coode Island Aerodrome has been engulfed by Swanson Dock while the site of Fishermens Bend Aerodrome is fragmented by roads and a railway line. The roar of aero engines is no longer heard at the Bend. Some still run, but only when carefully muted by a test house which prevents them from adding their thunder to the cacophony of marine, rail and road traffic. It's called progress; some people even think it is.

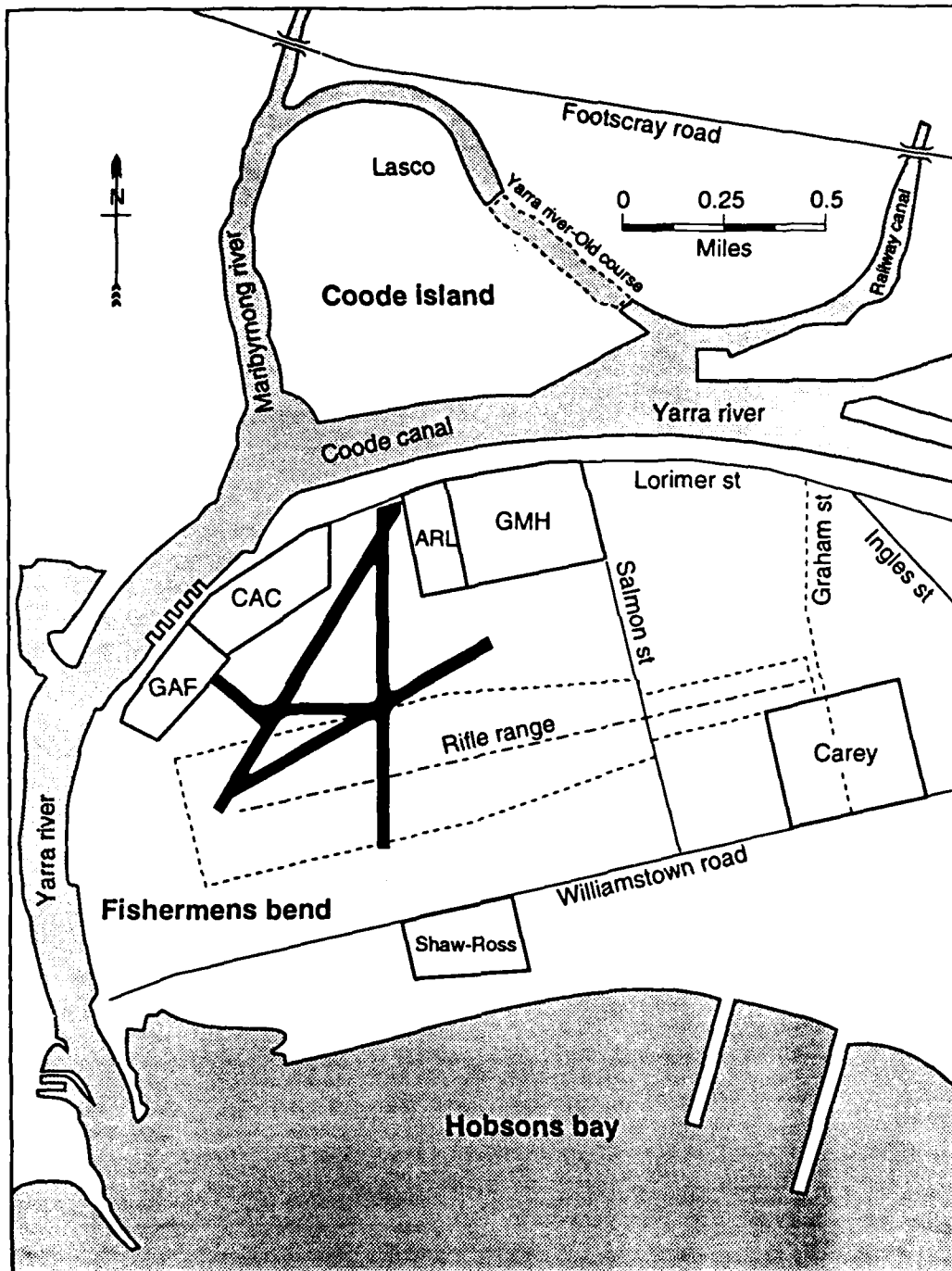


Figure 78 The Bend - Now and then.

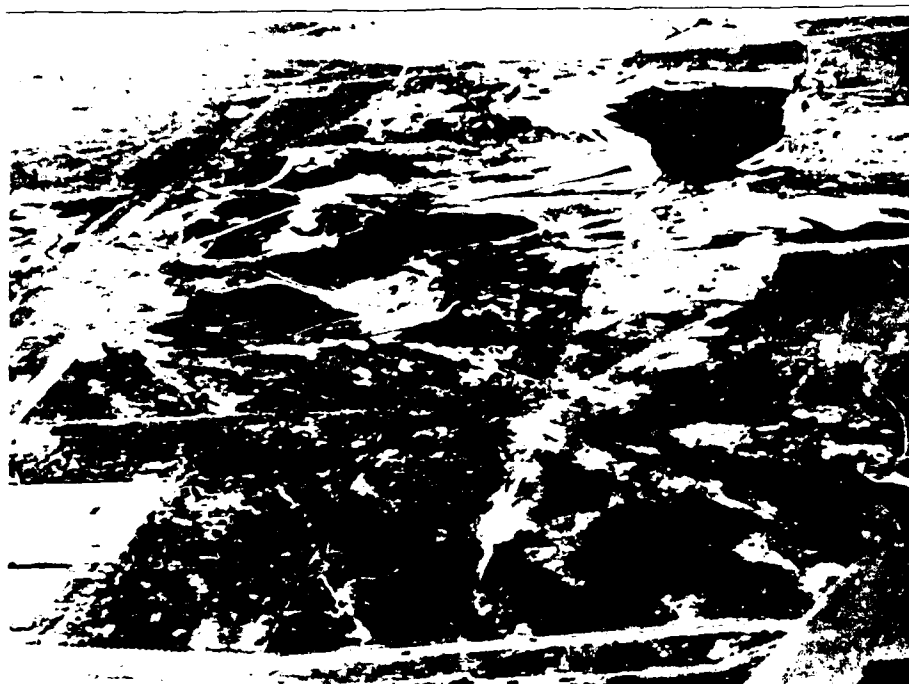


Figure 79 The ARL site (lower centre) as seen, early in 1939, from Percival Vega Gull VH-ACA belonging to R.G. Casey. GMH is at bottom left, Carey's aerodrome at top left, the Shaw-Ross site is at top centre with the Fishermens Bend Aerodrome at lower right.



Figure 80 CAC panorama April 1942 with Aircraft Factory No. 2 (left) and No. 1 (right). Locally built Wirraways and Wacketts mingle with two Marauders and a Lightning under assembly for the USAAF. Note the camouflaged buildings.



Figure 81 CAC panorama April 1942 with Aircraft Factory No. 1 (left), the Admin Block (centre) and the Engine Factory (right). Work proceeds on more Lightnings while three Douglas C-39's and two Douglas C-47's await their turn.

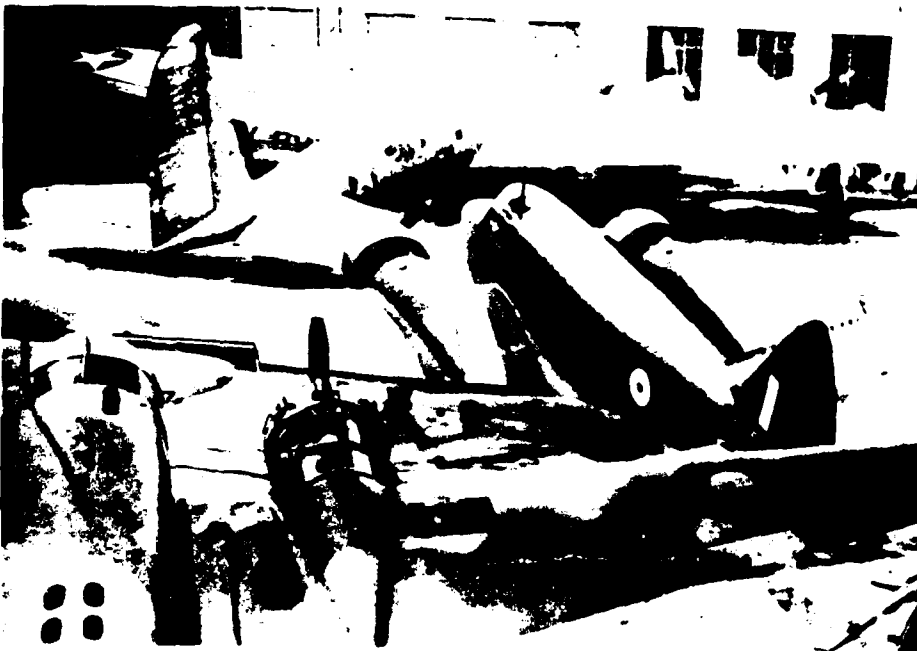


Figure 82 Inside CAC July 1942. Two Oxfords under assembly for the RAAF share the space with a USAAF B-17D Fortress (40-3097) and a Curtiss-Wright CW-22 Falcon.

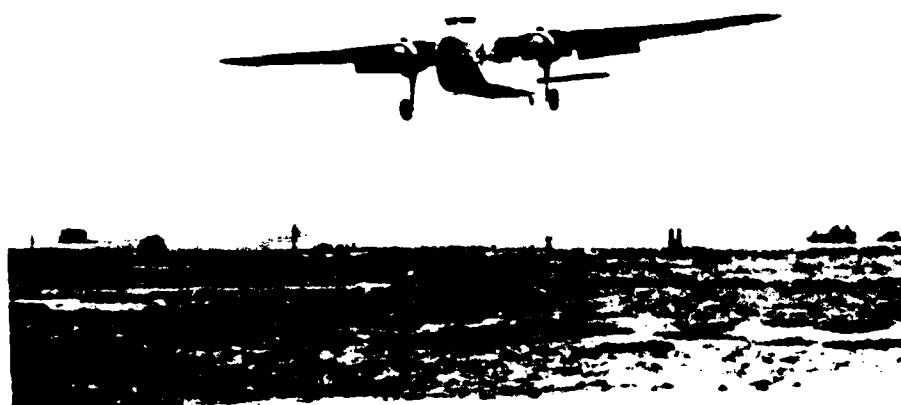


Figure 83 After WW.2, visiting aircraft were rarer. An RAAF Bristol Freighter makes its approach over Coode Island to land at the Bend.



Figure 84 The Bristol Freighter lines up for take-off. A Wirraway, a Mustang and the US Embassy C-47 complete the picture.

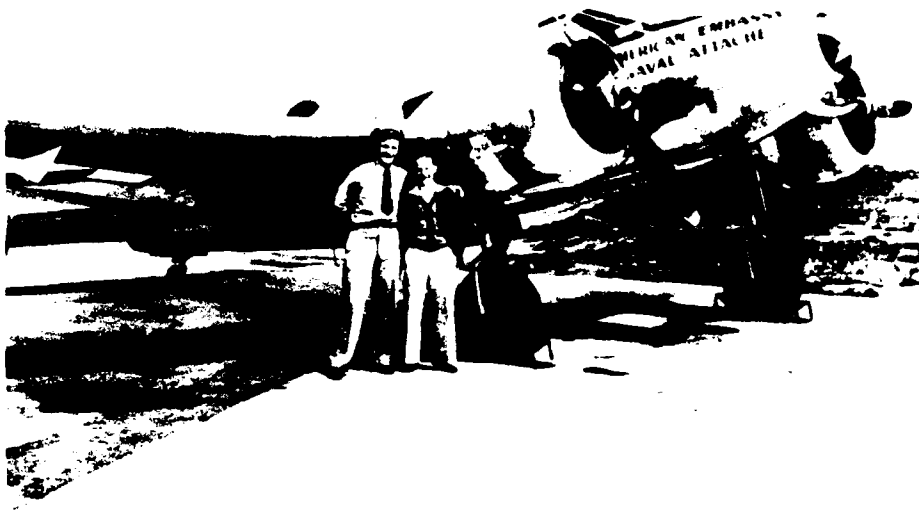


Figure 85 This US Navy JRB (Beech 18) was based at the Bend for some years after WW.2 and used by the US Naval Attache.

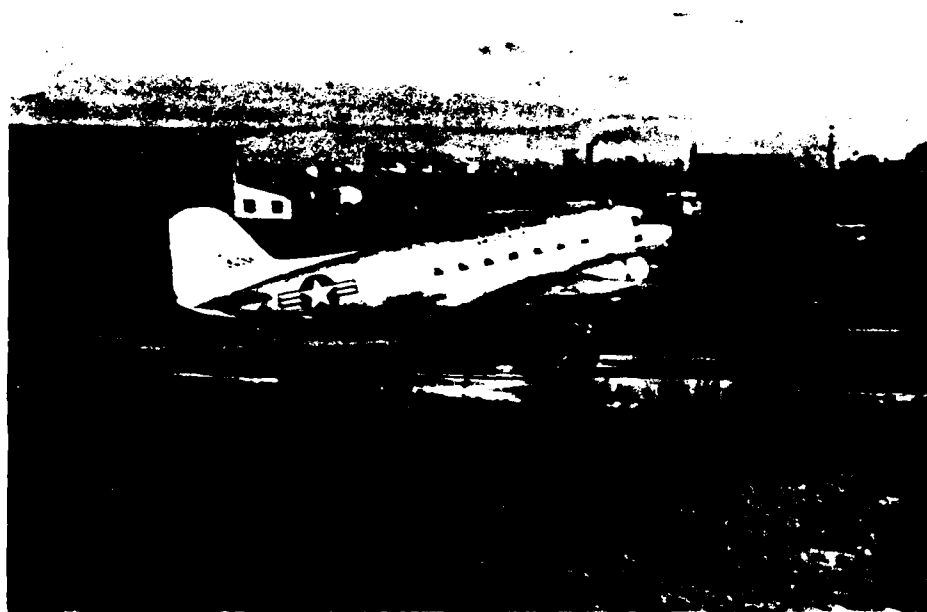


Figure 86 The US Air Attache used a Douglas C-47 seen here taxiing for take-off on the site of ARL's new Structural Test Facility.

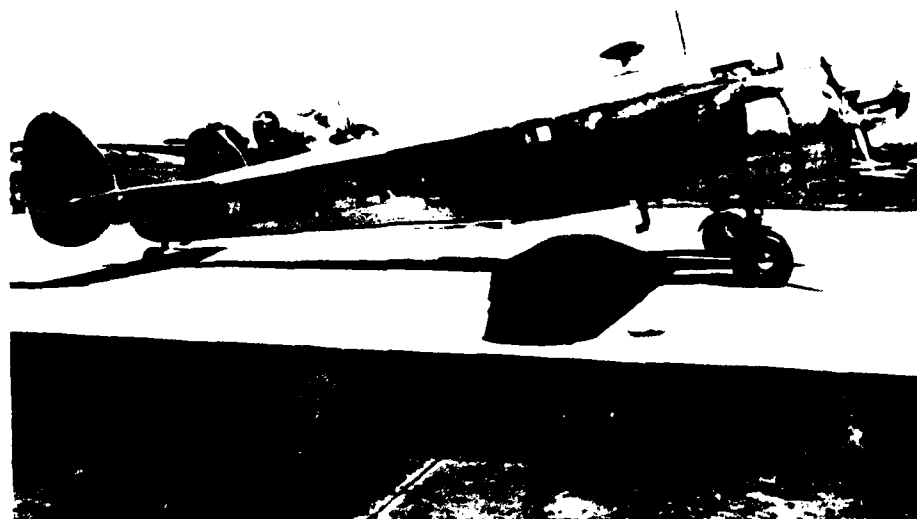


Figure 87 A Lockheed 12 at the Bend with the US Embassy Beech 18. Built for the NEI Army as a Lockheed 212 bomber, serial L2-34, it escaped from Java in 1942 and went to the USAAF as 42-1302 before joining Associated Airlines as VH-ASG "Silver Gull" in December 1946.



Figure 88 "Silver Gull" returns home after a busy week around Australia.

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16. ABSTRACT <i>Since 1919 Fishermens Bend Victoria has been a major centre of Australian aviation. Many of Australia's great aviation achievements were born there. From its formation in 1939 the Aeronautical Research Laboratory, situated astride this activity at the "Bend", has provided scientific and technical support to numerous aeronautical endeavours occurring in its surrounds. This report summarises the many activities at the Bend from the first flight of an S11 Shorthorn from the Carey Airfield in 1919 to the production to the last indigenously built aircraft, the Nomad in 1984. The aerodromes have long gone, the roar of aero engines are contained within test cells, but the strong tradition of Australian aviation still lives on at the Bend today.</i>			