

John Mills Recalls

Experiences with de Havilland Australia and the United Kingdom pre-war and during World War II.

Some autobiographical notes by John Mills, with special reference to the production of the Mosquito in Australia.

Inspired by the occasion, hosted by Hawker de Havilland Australia to commemorate the 50th anniversary of the first flight of the Mosquito in England, November 25th 1940 and the invitation to those present to record what they were able, towards a definitive history of Australian Mosquito production.

Australian Mosquito production amounted to 108 aircraft up to VJ day. These were all constructed as fighter/bomber Mk 40 which had armament of four .303 Browning machine guns, four 20 mm cannon, capacity for four 500 pound bombs and under wing storage capacity for airborne rockets.

Six of these FB Mk 40 were modified after delivery by de Havilland to photographic reconnaissance aircraft, fitted with five cameras, fitted in the fuselage, 100-gallon drop tanks fitted under the wing, with internal fuel capacity increased, giving a range of 3000 miles.

Fitted with rockets, the firepower was equivalent to that from the broad side from a naval cruiser. As a photo reconnaissance unit, the Mosquitos could cover Japanese activities efficiently.

As a side comment, whilst golfing at Forster, my partner who did not know of my connections with the Mosquito, told me he had been involved in Mosquito photo reconnaissance unit operations against the Japanese north of Australia. He told me he flew out 1000 miles to his target using one engine, he started the second engine for his photographic run so that they could outstrip the Japanese fighters and he flew home on one engine (the other one). The one engine flying was done because he believed it helped his range. His opinion of the Mosquito was of the highest. Opinions such as these speak for themselves and all who flew the Mosquito had the highest regard.

For November 25th 1990, Peter Smith director of Hawker de Havilland invited all those persons who could be located and had active participation in the manufacture of the Mosquito in Australia to be part of a ceremony at Bankstown. This ceremony was to commemorate the 50th anniversary of the first flight of the Mosquito in England by Geoffrey de Havilland eldest son of the legendary founder of the de Havilland company.

The ceremony was a memorable occasion. All present were invited to make whatever contributions they could towards forming a definitive history of Australian Mosquito production.

For this writer, it was a particularly stirring occasion, arousing memories which had lay dormant for some 50 years. Bringing back strong feelings of pride in our parent company's amazing achievement and pride in our Australian group who performed quite magnificently in producing the aircraft in Australia, after Japan has entered the war and the country's resources were very stretched.

These notes are made without access to files or records, because I took none with me. The recollections I have recorded here are the facts I can confidently recall. The omissions will concern some people and some detail that escapes me now. But the notes are a humble recollection concerning wonderful people with whom I had the privilege of working and with whom we achieved worthwhile results.

Peter Smith, at the historical ceremony, said "if an organisation cannot properly look at its past with pride and learning, then it will not properly be able to look at the future". (The quote may be a little inaccurate in its words, but to the meaning is certainly not!).

In making my contribution it would seem best to do it in three parts:

- (1) a note covering where I fitted into the organisation, which will include some observations concerning the parent company and our own Australian company, I have called this "Part A",
- (2) a note concerning "people" remembering that the greatest asset a company has is its people, I have called this "Part B", and
- (3) a note concerning my personal participation in the Mosquito project in Australia with as much information as I memory will enable me to recall and relate, I have called this "Part C".

Martin Sharp and Michael Bowyer produced an award-winning book "Mosquito" in 1967 which must be regarded as the official history of the Mosquito. In Australia, David Vincent in 1982 produced "Mosquito Monograph", a history of Mosquitos in Australia and RAAF operation for which he researched official records. I have made use of dates and

facts from both these publications in these notes and wish to make due acknowledgement.

Without records of any kind, historical recollections can be difficult. I had to refer to Lord Casey's book "Personal Experiences 1939-46" for instance to learn the date of the fall of Singapore and highly was impressed that Lord Casey's records consisted of his personal diaries which amounted to some 700,000 words. Reading the biography of General Monash, I noted that our most famous General took with him into and out of Gallipoli, into and through France, his files, without which history could not have accurately being written.

It is with these acknowledgements that I suggest that these notes are somewhat of an autobiography rather than a contribution to a definitive history. But recognising this, the contribution is all I can muster!

Part A

This part describes my position in relation to the Australian Company that had been set up by Hereward de Havilland (brother of the company's founder Sir Geoffrey de Havilland) in 1927 as the oldest overseas de Havilland company and headed by Major Alan Murray Jones from the early 1930s.

I was, as it happened, the first university trained engineer to be employed by Major Murray Jones, who was quite legendary. I joined de Havilland early 1937 having just graduated in the science and engineering (with honours) and receiving the Geoffrey Sulman memorial prize for Aeronautics for a thesis on the boundary layer. My degree was in civil engineering, the department of aeronautical engineering not being formed until 1940.

I had little practical experience and Major Murray Jones arranged for me to travel to de Havilland England where I worked "on the floor" with our parent company in the aircraft, engine and propeller divisions at Hatfield and Stag Lane. I also spent a period in the aerodynamics department under Richard Clarkson developing a photographic system for the measurement of aircraft takeoff and landing performance which was done as an "extracurricular" project with Bruce Douglas, ex De Havilland Canada and running the laboratory at Hatfield. This work was published as a paper in the journal of the Royal Aeronautical Society in 1939 and in the de Havilland Gazette.

It is perhaps significant that a simple piece of equipment such as this was considered worthy of publication in the RAE's journal, and perhaps significant to that the ARB took up the idea. We sometimes forget what immense technical strides our industry took in the years after 1939.

The unique opportunity to work "on the floor" at de Havilland enabled me to get a special view of the de Havilland organisation, including the company's directors who were around in a special way, walking through the factories, greeting the workers. I gained a special insight into how de Havilland had continued between World War I and World War II supplying civil aeroplanes for personal and company use.

I recall Mr. W. E. Nixon, secretary and director of the parent company remarking that day had in management experts who had showed them that they had lost money on each aircraft they had designed and built between the wars. The worldwide reputation of de Havilland products and services with the "Moths", the Gypsy, the Tiger, the Box, the Puss and the Leopard, together with the Dragon and its amazing performances in New Guinea made the management experts conclusions somewhat doubtful!

The company groups operated boxing clubs in each location and has a member of each boxing club as I moved around, I saw the directors as keen front row audience when inter factory competitions happened. I remember Mr. Lee Murray, the Australian born General Manager of de Havilland Hatfield, complaining that he and the company secretary had got their clothes blood damaged whilst at a contest at which I had participated.

And when, somewhat covered in grease and oil in an engine test cell it was quite remarkable to hear one of the directors on their rounds make some cryptic but apt comment about one's performance at a recent contest.

Design staff, some of whom later developed the Mosquito in that incredibly short period of 11 months, were around the place to, some with their peculiarities, some with their sense of humour. They mixed and they were real.

I recall Wilkins (who was the designer later to redesign the 500-pound aerial bomb so that the Mosquito could carry four of them instead of 4 x 250 in its bomb bay) talking seriously of a great idea to replace windscreen wiper as on cars with rotating glass panels which would shed the water by centrifugal action. He had a quizzical and entertaining manner.

The Albatross four engine aircraft was around, being developed. The Albatross was an aerodynamic gem, which was, streamlined to an extent that had its wing and fuselage surfaces being flat plates of the same area rather than being in the form of an aeroplane, then it would have increased in speed only some 40 mph if pulled forward by the same thrust! Cruising at 210 mph it yielded 36 gross ton miles per gallon of fuel.

The Albatross fuselage was made of a ply/balsa/ply sandwich construction that was later used in the Mosquito so successfully.

Sir Geoffrey de Havilland was a most impressive but perhaps shy person who had the legendary respect of everyone as a quietly walked around his company. A story about de Havilland from Lee Murray:

“There are was a rash of failures in the Gypsy Major engine oil pump which seemed not to want to be solved. de Havilland disappeared for a couple of days and was found in the workshop where he had an oil pump rigged up we are a push bike pedal drive. Using hand drive, it was possible to “feel” the thuds on the drive at certain speeds, which was probably the cause of the failures. Changing the number of teeth on one of the pump gears solved the problem.”

Sir Geoffrey worked to make flying available to all as cheaply as possible. He worried about the costs which went with a large factory and he started a “new factory” on its own within the parent factory where he aimed to build a “Moth Minor” at a low price - then some £575. He had a special design team and manufacturing team to achieve this and a special test flying team which, as it happened, was a fair headed ex-de Havilland technical school pilot, John Cunningham who later was to become the premier night fighter pilot on Mosquitos in World War II.

I recall that John Cunningham allowed me to fly the Moth Minor, which clearly demonstrated his courage! I brought the drawings for the Moth Minor back with me to Australia when I returned early 1939 and we tooled up for local manufacture which was disrupted by the outbreak of war in September.

I learned about the manufacture and servicing of the Hamilton Standard propeller. de Havilland had the license and they called propellers “airscrews”. During the war the term “propeller” was universally adopted, partly I believe, due to confusion which could, and I believe did, occur between “air crew” and “air screw”!

I obtained a ground engineer's licence on the propeller and was given the job of inaugurating visits by propeller service persons to each of the flight sheds of the manufacturers using our propellers throughout the country. These were the latest aircraft. The Hurricane at that time had a fixed pitch propeller and the Spitfire was not a customer at that time. In early 1939 from these visits to all flight sheds in the country, I had inadvertently obtained up to date product information from each of the flight sheds in the country and being after Munich, it gave a pretty grim picture.

Bill Isbister joined de Havilland Australia in 1938 and travelled to Hatfield to spend two years with de Havilland England, returning in 1940. Bill Isbister and I had been fellow students throughout our University career, and he had decided to follow a year's postgraduate work after completing his degree that accounted for his later movement to de Havilland.

I returned to de Havilland Australia as works manager early in 1939 after visiting de Havilland Canada and Hamilton Standard at Hartford USA. and United Airline at Cheyenne, Wyoming, USA. They had their modest overhaul base whilst they supplied D. C. 3 sleeper accommodation across the USA. Whilst the rest of the aircraft world was quite some way behind. We at de Havilland aimed to set up propeller service facilities, and we had a contract to make Tiger Moths at a rate of one or two a month.

On the outbreak of war de Havilland was quickly asked to make to Tiger Moths a day for the empire training scheme, General Motors making the Gypsy Major engines. Major Murray Jones used me as the technical person to get production going, using subcontractors to make metal parts rather than making parts in our own plant. There are was little industrial backing for an aircraft industry at that time and it must be difficult, these days, to recognise how relatively unsophisticated industry generally was at that time.

I remember spending much time with toy manufacturers, makers of electrical meters, any shop that had metal presses and some toolmaking capacity to obtain a supply of the parts for the Tiger Moth. We at de Havilland where the backing of Jack Birchill made our welding jigs and drilling jigs needed to produce the Tiger at the required rate, which was much greater than anything we had attempted previously.

Steve Newbiggin, graduate from Sydney University engineering school joined us and did wonderful work with our subcontractors. Production experts were seconded to us from General Motors Holden and elsewhere to help us get the production rolling at the proper rate.

Sir John Storey who was a commissioner with the aircraft production commission and who pre-war had been production director for G. M. H. spent time with us and was of immense help. He really taught us the difference between making an aeroplane and making several aeroplanes at a required rate. Sir Harold Clapp was the chairman of the Aircraft Production Commission.

We at de Havilland had built a factory for propeller servicing near the aerodrome, at O'Riordan Street, Alexandria that had administrative offices also and here we moved, leaving the corrugated iron hangars at Mascot for Tiger Moth assembly. As a side comment, the location of this factory was quite close to a boiling down works where blood and bone was made. When the vats were opened, the odour was dramatic and I first noticed that my ability to smell was mercifully dulled and I suspect my co-workers were similarly affected. It was not very long before we achieved our desired production rate and kept it (May 1940).

de Havilland had the task of making the variable pitch propellers and the constant speed governors that would be needed for Wirraway, Boomerang, Beauforts, Wackett trainers (later) and Beaufighters (later). Ian Spittle was released from de Havilland propeller division, Stag Lane to set up our Australian propeller production under Major Murray Jones.

The propeller service factory had to be enlarged to the full size available at that site and later a second, larger, factory was built close by.

I was transferred to the propeller division in May 1940 as Technical Manager to Ian Spittle, responsible for all technical aspects that included inspection, servicing, engineering and experimental. The experiment included vibration, heat treatment, metallurgical and physical testing.

In May 1940, the propeller division had only a few people but grew to over 1000 by the end of 1941. de Havilland Australia produced over 2000 propellers up to V. J. day, sufficient for all Australian production and repaired a far greater number.

Propeller blade forgings were developed at the Australian aluminium company factory at Lidcombe where the drop hammer was installed. The factory was about a mile from the C.A.C. engine factory at Lidcombe and I remember that when the drop hammer for the propeller blades operated, the ground shock wave would make itself visible as a mark on the machine surfaces being ground at the engine factory.

Forgings for propeller hubs and spiders were developed with Commonwealth Steel, Waratah, and we had a period developing, inspecting and approving the grain flows and material strengths for all vital parts. Commonwealth Steel produced all the special steels we required, quickly and to a high standard. Propeller blade forgings were also to the highest standard.

We had a period when we thought that supplies of aluminium could be cut off and we developed wooden propeller blades as an escape solution. These wooden blades were developed with close cooperation with the wood technology section of the C.S.I.R.O.

The root of the blade was made of strongly reinforced plastic impregnated, compressed wood which was scarf jointed to normal timber and these planks, when glued together, gave a laminated structure of considerable strength. The shank, of compressed impregnated wood was screwed into a steel sleeve that enabled the normal propeller attachment to the hub, as for the aluminium blade.

We developed full strength for this "screwed in" hub by carefully developing the outside steel screw so that the case would stretch, thus preventing the first thread taking all the load and leading to early failure before the other threads could take their share of the load.

The wooden bladed propeller was developed, tested, but was not needed. Aluminium was undoubtedly the proper material for wartime propellers that must accept bullet holes and bending.

de Havilland propeller division supplied all the needs for C. A. C. and the Aircraft Production Commission on time, and with the constant speed units made locally, made a substantial contribution.

I recall the reported dissatisfaction expressed on occasions by L. J. Wackett General Manager of C. A. C. concerning our efforts.

Also, I recall travelling to Melbourne by car overnight with Ian Spittle, taking with us various propellers for the Wackett

trainer to pacify and satisfy our customer. To me it always seemed a little difficult to ascertain just what the problems were, but our visits to C.A.C. were always very worthwhile and pleasant. The Chief Engineer of C.A.C., Bill Air became a friend and we would talk and compare notes with the C.A.C. design office friends who included Fred David, Ian Fleming, Ted Faggetter, Doug Humphries and others.

Alec Bee came from England to help start propeller service and this later grew, under Archie Steinbeck, into a very large operation covering service to the USA as well as the RAAF needs.

The propeller factory had an excellent machine shop, under Wally Holman, heat treatment facilities for full propeller blades, excellent anodising baths, a first-class tool room which turned out first-class work which is the only way that constant speed governors and propellers can be made.

We had close ties with the Hamilton Standard company as well as our parent de Havilland Propeller Company and we carried out with Hamilton Standard expert Sam Fitting, propeller blade vibration tests to ensure the engine/propeller combinations we were making would not have damaging features. This measurement of the stresses in an actual propeller blade whilst it is operating at full load fitted to an engine is a highly sophisticated operation, but a very necessary one for safe operation which is so essential even in wartime when equipment did not have very long lives often.

Geoff Venn Brown and Martin Chapman came to us from Sydney University engineering school and formed a strong team on our technical side. The propeller division team was an efficient and strongly supportive group that was a pleasure to be part of. Everyone worked untiringly.

Propeller development occurred during 1941 and later. But we did have some other thoughts, in early 1941, which concerned a simple fighter aircraft for the RAAF, which at that time was supplied with the Wirraway, although the Beaufort was coming.

When the Tiger Moth with its steel tube fuselage and wooden wings had successfully reached production, Major Murray Jones and his staff believed that we had the capacity, with outside support, to give the RAAF a simple fighter aircraft quite quickly. At the end of 1940 and start of 1941 there seemed to be no plans around to improve the situation.

The twin row Wasp was now under manufacture at the Aircraft Production Commission's engine factory at Lidcombe which had been set up to make engines for the Bristol "Beaufort". This was the first of the APC projects, and we sought to ascertain the top fighter performance we could get from this locally made engine using locally available materials.

We had the enthusiastic support of Professor A. V. Stephens, newly arrived Hargrave Professor of aeronautical engineering at Sydney University, whose considerable background of experience at the Royal Aircraft Establishment in England was available for aerodynamics, controls, stability and performance. We also had his promise of the support of his students for this work.

Additionally, Mr. L. P. Coombes, head of the Aeronautical Research Laboratories at Fishermen's Bend, Melbourne, offered every assistance including aerodynamics, structures, weights, etc.

At de Havilland, we had a young but dedicated group with a great feeling of confidence and enthusiasm for such a project. At the time, before Pearl Harbour, aircraft from overseas seemed to be unobtainable. Perhaps, in the absence of a close threat, the need for a fighter was perhaps academic, but Major Murray Jones, with his World War I fighter background was convinced something should be done.

We produced a proposal for a simple single engine fighter, wooden wings and steel tubular fuselage, powered by the twin Wasp engine and using every piece of aerodynamic technique available with the guidance of our advisers.

We called the project "ADH-1" and Major Murray Jones presented it to the Chief of Air Staff, RAAF for his consideration when he visited us. A copy of the proposal is in the H. D. H. archives at Bankstown.

The only response we at the Havilland received from the RAAF was a question "why don't you use a more powerful engine?"

We at de Havilland were unaware at that time of the top-secret Mosquito in England which was having its first flight on 25th of November 1940, had reached 20 deliveries at the end of 1941 and 443 in 1942 from Hatfield. The Mosquito was still "top secret" at the end of 1941 when revealed to us.

Historically, after Pearl Harbour, C.A.C. produced the "Boomerang" and de Havilland were given the go ahead for the Mosquito production in Australia, but the incident of the "ADH-1" is part of the record of that time. I was responsible for producing the proposal.

John Mills can be contacted at:

'Corandirk'
Lake View Crescent
FORSTER, NSW 2428

Part B

This part describes "people" - some of these were pre-Mosquito but they are all part of the DH team, which enabled the production to happen.

With the recall of history, as we are now doing, the most impressive point is people-the greatest asset of a company is its people. In recalling in the "people", the great danger is that important people will be left out. But it is the best to try.

A remarkable fact about people involved with aircraft production in wartime is that they have little or no career ambitions - their only ambition is to produce aeroplanes or propellers as quickly as possible. They will help anyone who asks and will share their knowledge and skills freely.

Indicative of the sort of ties which grew from wartime DH work is the fact that in my own case, some 50 years on, one feels very close to those who shared in the work-much closer, in fact, than with colleagues from post war activity.

My own experience includes the honour of being best man at the weddings of three of my friends and colleagues and gratefully have one of these to be my best man at my wedding to Judy postwar.

In a project like the Mosquito, people drive themselves. I recall that quite many our people became sick with stomach ulcers, so much so that we used to compare notes to help us take precautions to avoid being off the job.

To start talking of people, my outstanding memory is that of our legendary DH Chief, Major Alan Murray Jones, who was a World War I pilot of great renown, brought tremendous status with him together with his amazing links with everyone connected with civil and military aviation.

He also brought with him and amazing talent as a leader for developing enthusiasm, loyalty and hard work in all those around him. One's dedication, working with him, was absolute.

My own experience, being the first university trained engineer to be employed by him, and subsequently, as it happened, being the first Chief Engineer to be appointed in the Australian DH company, was one of the greatest admirations.

Major Murray Jones was the greatest leader for whom I have had the privilege of working and from sharing with others, some of whom held high posts postwar in other organisations, I think this view was generally shared.

Major Murray Jones had a wonderful family who supported not only him but also people working in the company. Relaxation is an essential part of work if it is to be hard and continuous and the sojourns at MJ's home and tennis court were memorable.

A story about people in 1937 to 1938 acetylene bottle exploded in our DH metal shop at Mascot causing terrible burns to the welder (Syd Smith) and the apprentice (Jimmy Allen). Major Murray Jones testified at the inquiry, which also involved insurance, that he would not be able to reemploy them in their old jobs.

When I returned from Hatfield early 1939 Jim Allen was taken on as a junior in the drawing office. The drawing office consisted of a well-organised collection of the drawings of all DH types and there was a desk for studying drawings or when required, making a drawing!

Eddie Connellan (of Connellan Airways, NT) and his friend Damien Miller brought their Percival Gull to Mascot and asked us to install a stretcher, which we did with some ingenuity. Jim Allen, in a "duplicate type" drawing book did all the drawings for D. C. A. approval and the stretcher was subsequently approved.

Many years later Eddie Connellan enthusiastically recalled the incident and said, "many, many patients were transported by that stretcher in the outback". Jim Allen went on to a senior position in the DH technical department, wartime and postwar and later became chief craftsman for Qantas.

Syd Smith came back to DH in 1940 to cover inspection of the great supply of metal parts for the Tiger Moth which came in from subcontractors. He continued metal parts inspection through the Mosquito project under Bill Isbister and he became "quite an institution".

Bill Isbister was my friend and colleague throughout our university training. He joined DH Australia in May 1938 and proceeded to DH England, returning to Australia mid 1940 after the war had been declared. He played an important role in DH Australia including the most difficult but important post of Chief Inspector for the Mosquito project in Australia.

In the wartime, there is a universal call "to get production ahead". Rejections induce criticism such as "surely this is good enough!" The judgement concerning acceptance and rejection is a very important and essential part of the Chief Inspector's difficult role.

Steve Newbigin started his engineering course at Sydney University the same day as Bill Isbister and me and had suffered a gliding incident prewar leaving him with a limp. As an army reserve engineer, he was called up but his activity would have been limited by his limp and he gladly came to help us at DH to make aeroplanes when approached by Manpower. He became a vital part of the subcontract work for Tiger Moths, so essential to getting production moving quickly. Steve played an important part in the design and production of tow gliders for the RAAF and subsequently in the Mosquito project. He was Project Engineer for the two stage pressurised version of the Mosquito. Steve continued his distinguished career with HDH until his retirement.

Martin Warner was a remarkable person. Prewar he was a great glider man flying, designing and building primary and secondary gliders. He was a natural designer. Post-war he was awarded the Oswald Watt gold medal high altitude record in a Gull IV sailplane when he climbed to 23,500 feet. Before the war, he was a LAME at the Royal Aero Club of New South Wales. He came to DH as an Inspector for Tiger Moth production and then with Steve Newbigin and he headed the design and building of towed gliders required by the RAAF. An exciting project in 1942 which was supplemented by Professor Stephens and his students from Sydney University who included Lou Gardner, Peter Langford, Devon Dobel, Sandy Blight, Jack and Bas Scoles.

After the gliders, Martin went on to important work with the Mosquito. He controlled the flight shed activities for our first Australian built Mosquito which were under the most difficult circumstances and later set up and controlled the field service department which worked directly with RAAF operating groups and formed a most important part of the program. Harry Broe MBE was a respected member of Martin's field service group.

Post-war Martin Warner headed the DH design group which initially conceived the ADH-2 (a single engine, twin seat monoplane trainer/private owner) and the ADH-3, three engine Dragon replacement which became the "Drover".

Mervyn Waghorn came to DH Australia by release from DH England in 1942. He was engineering superintendent for the Mosquito and was given design delegation from Mr. C. C. Walker, Chief Engineer of the parent DH company. I had known Mervyn prewar when I was working at DH Hatfield and we had both being members of the DH Hatfield Boxing Club, sharing the adventures that went with training and competition. Ours was a long friendship.

Mervyn's DH activities are so well known as not needing to be recorded here because post-war he became a company director and worked with DH until retirement. He was also a great glider man and post-war was awarded the Oswald Watt gold medal for his cross-country sailplane flying, a year or two after Martin Warner was awarded his medal for his gliding height record.

Mervyn shared a flat with Steve Newbigin and Pat Fillingham a DH test pilot who visited Sydney 1943 and he formed a solid technical team around him at work in the technical department. Mervyn would have remembered his team better than I would, but Lou Gardiner, Devon Dobel and Peter Miller come to mind. Peter Miller post-war became a consulting engineer of distinction and was the President of the World Body of Consulting Engineers as well as being awarded honours from the Australian Institutions of Engineers are becoming Dr. Miller. George Brooker was second in charge during the early stages of the Mosquito project and later became methods engineer.

Ian Spittle had been the assistant to John Parkes, propeller chief for DH England and he was released to come to Australia to set up propeller production in Australia in 1940. DH Australia produced over 2000 propellers up to VJ day sufficient for all Australian aeroplanes, which were produced, including the Mosquito. Additionally, DH repaired many propellers not only for the RAAF but also for the USAF and although I do not have figures, it is my belief that the number

of repaired propellers would greatly exceed the new production numbers.

I had met Ian Spittle prewar in England and it was a real pleasure to work with him in Australia and watch him set up the first-class factory, which was the propeller division. The standards were the highest available at that time, which even in wartime are so essential for propellers and constant speed governors. After VJ day Ian returned to England but again came to Australia to HDH where he became a director.

John Byrne, prewar Company Secretary, had joined DH Australia and MJ from the RAAF. He had handled all spares and financial matters and was MJ's backstop. He was known to all in the industry and was well liked by all.

John and I travelled together to the USA. in 1942, Ian for propeller machine tool procurement and John and I for Mosquito matters. As Supply Director, John and his fine group did sterling work and our supplier's shortages during Mosquito production were minimal. John had a fine group with him and John Throsby, Hec Adams and Peter Rockingham come to mind as key people.

David McLachlan joined us as Finance Director after war was declared and we were producing Tiger Moths. He and his wife Lorna were an important part of our work. Besides doing everything he could to help production by helping our subcontractors, David's reputation later was of a Director who could and would, take time to advise a "man on the floor" concerning his personal finances.

Ian Spencer joined DH from Advanx, at "Tiger Moth time", where he had been Secretary. Besides his financial strengths, he was an excellent administrator, in its best sense. It was he who enabled us, with the assistance of "punch cards" to quickly get our "bill of material" into shape for the Mosquito. Ian moved from area to area to give management cover as required and he came to support me, as Manager DH 98 division, by becoming my Administration Manager at Camperdown and he ably fulfilled many tasks set him by Major Murray Jones as the needs arose.

Ian Spencer brought his colleague Doug Buzacott into our financial group. Doug was a strong supportive person who left us to fly as a navigator with the air force where he carried "carrier pigeons" as a means of communication during radio blackouts! He returned to join the DH after VE day.

Mr. Lee Murray, an old friend of Major Murray Jones, born in Australia and having, before leaving Australia, been involved in the design of an aeroplane here, returned to DH Australia in March 1945 to support MJ as General Manager, aircraft division.

Mr. Lee Murray had been General Manager of DH Canada before going to England to become General Manager of DH Hatfield. It was here I had met Lee Murray prewar when I had spent two years at Hatfield and Stag Lane, and he had been my "overseer and friend" during my stay. He was to me a sort of "father figure". Lee Murray had to bear the brunt of the problems associated with the birth of the Mosquito, where official reluctance to order became mixed up with urgent requests for production and quickly, followed by changes in the orders to vary types without recognition of the effect this would have on production. This sequence is recorded clearly in Martin Sharp's "Mosquito". Lee Murray had gone to DH Canada in 1943 and came to help Australia in Australia some 18 months later.

Mr. Lee Murray was a great leader, as his friend Major Murray Jones and he ran a "good tight ship" at Bankstown and we all enjoyed working with him. As Chief Engineer for the DH organisation at the time, I reported to him.

Bill Downs joined DH after graduating from aeronautical engineering at the newly started course under Professor Stephens. He worked on the Dragon, moved over to the Mosquito with Mervyn Waghorn's technical department. He was chosen to go to England with the select band from Australia who were to be trained on the then secret aspects of jet propulsion. He spent some two years in England, including a valuable period at the DH Hatfield organisation and returned to DH Australia with much-needed skills and knowledge to enable us to be able, postwar, to study and promote a three engine Dragon replacement which later became "the Drover". Bill pursued a distinguished career at Hawker De Havilland until his retirement. I particularly recall our attempts to invent a single bladed propeller, fitted with a small fuel burner, intake and exhaust, at the propeller tip, which we consider, might be able, as a ramjet to become a light aeroplane power plant, after it had been initially rotated sufficiently to enable ramjet operation to occur!

With development, who knows?

Part C

On the 7th December 1941 Japan attacked Pearl Harbour and entered the Second World War. The threat to Australia

was obvious. On February 15th 1942 Singapore fell losing all the 8th Division AIS as prisoners of war.

Mr. John Curtin had become Prime Minister of Australia on the 7th of October 1941 and had arranged that Mr. Essington Lewis, leader of B. H. P. should take supreme control of all munitions production including aeroplanes in Australia.

The aircraft advisory committee which Mr. Essington Lewis headed with Mr. (later Sir Daniel) McVey as secretary held its very first meeting on 13th January 1942. It met weekly with a firm discipline which Major Murray Jones, D. H. Australia General Manager, respected and adopted within his own organisation.

In December 1941 I was Technical Manager for the propeller division of D. H. Australia. Ian Spittle was Manager and was about to visit the US and UK for machine tool procurement. Major Murray Jones called me to his office showed me the photograph of a beautiful aeroplane and said,

“This is a wooden aeroplane, an unarmed bomber, or fighter, it is the fastest aeroplane in the world, it is top secret, designed and made by our parent company, it is called the Mosquito, do you think we can make it here? If so, you and John Byrne should go to Canada immediately, D. H. Canada are building the Mosquito also and you should join Ian Spittle who is travelling to the USA”.

We received from the Prime Minister of Australia, Mr. John Curtin, letters of introduction dated January 2nd 1942. These letters of introduction had large red seals and requested all to help us in our unnamed task. These letters turned out to be quite miraculous wherever we travelled. It was reported that Mr. Curtin had said, after taking over his heavy wartime responsibility, “how big should we make the red seals on our letters of introduction?”

The three of us set out for America by the quickest possible means which in this case was the Swedish cargo ship “Kanangoora” which took some three weeks to get us to San Francisco with due security activity as the Japanese were around.

We made immediate contact with D. H. Canada who could not have but then have more helpful and we visited the Australian Ambassador in Washington who was Sir Richard (later Lord) Casey. We knew that if the building of the Mosquito was to proceed in Australia, supply of engines was essential. The Rolls-Royce Merlin was being made by the Packard Company in the USA. and it would be from here that our engines would have to come.

Sir Richard Casey was, as always, tremendously helpful. Prewar as Mr. Casey he had been Treasurer of the Australian government and had been a private owner and pilot of a Percival Gull aeroplane. His aeroplane broke its tail wheel casting taxiing past our D. H. service hangar at Mascot and the pilot asked for a quick repair. We did this overnight and I recall ringing Mr. Casey in Canberra to tell him, with some pride, of our achievement and telling him the cost. I recall him saying “Mr. Mills, just because I happen to be the Treasurer of the Commonwealth of Australia it does not mean that I have access to the country’s funds”. But that was prewar history.

Sir Richard was practical and helpful to us and it was no doubt due to his help that John Byrne could cable D. H. Hatfield on February the 26th. “engines supply now satisfactorily arranged and project practically certain”. Incidentally, history shows that it is March 31st 1942 when Sir Richard left Washington to become “Minister of State in the Middle East” with a seat on the British war Cabinet, (unknown to us) and this was being organised while we were there with him.

Also, historically it could be noted that in Australia at the first meeting of the aircraft advisory committee, held on January the 13th 1942, “it was noted that the company had dispatched two of its officers at its own expense to investigate the production” of the Mosquito. At the seventh meeting on February 23rd, it was recorded that a memorandum to the Department of Air stressed the view that no time should be lost in making arrangements for the construction of these aircraft. That was if the air board was satisfied that this is the type of fighter aircraft required for use in this country. This urgency was influenced no doubt by the bombing of Darwin four days previously.

D. H. Canada was “flat out” getting the Mosquito into production. Harry Povey and Doug Hunter from the D. H. Hatfield were there handling production and design matters and the Bill Tamlin from the Hatfield design office team was there on a quick visit to give first-hand design update on a rush trans-Atlantic visit.

Although D. H. Canada would do anything, they could not help Australian production, it became apparent that if the Mosquito was to be built in Australia, our help would have to come from D. H. Hatfield. Accordingly, I was to proceed to England leaving John Byrne to handle supplies matters in Canada and the USA.

My trip to England was by a bomber delivery flight. It was to be a “flying fortress” from Montreal Prestwick, Scotland,

via Gander in Newfoundland. Later after some week or two of delay ("weather was a real problem") I found myself in the nose bomb-aimers compartment just in front of the navigator who had just completed his empire air training school course and was on his initial flight across the Atlantic.

We struck Scotland close to the north tip as morning broke and then turning south we had an amazing flight down the coast of Scotland. For someone and half-hours at an altitude of some 1000 feet, which from the bomb-aimers nose seat on a cloud less sunny morning must have been without parallel. We joined the balloon barrages near Prestwick. After landing spent the very long time needed to travel to London and then to Hatfield under the difficult wartime conditions which were a part of the U. K. Everyone took it as a matter of course with air raid warnings, flying bombs and a blacked-out existence.

Hatfield, the D. H. headquarters, were quite amazing, producing the Mosquito under the most difficult of conditions and with the aeroplanes versatility and performance now known (the Mosquito was found to be 23 miles per hour faster than the Spitfire). Many variants had been made and were being requested. Hatfield had also been bombed.

With all this pressure on the D. H. Hatfield the people whom I had got to know when I worked there prewar could not have been more cooperative and friendly. You could have been excused for thinking that all they had to do was to help us make the Mosquito in Australia. This spontaneous feeling of help and assistance, besides being part of D. H. is remarkable war effort, probably reflected the great respect and affection held for Australia's D. H. General Manager Major Murray Jones.

Suppliers of Appendix A and other essential parts had to be released from the ministry of aircraft production and Martin Sharp was "one of us". In peacetime Martin Sharp was public relations manager but in wartime was everyone's helper. Subsequently Martin was co-author of the award-winning book, with Michael Bowyer, "Mosquito", published in 1967 which must be regarded as the Mosquito "official history".

We needed drawings of the fighter bomber version for Australia. The drawing office of immediately set about making a full set of microfilm photographs of the many tens of thousands of drawings which constituted the Mark VI version so that I could take them back with me when I returned. They also included masses of technical data and schedules that are so essential.

Mr. Lee Murray was the Australian-born General Manager of D. H. Hatfield, agreed to release Merv Waghorn to come to Australia as Technical Superintendent and arrangements were made for a continuing supply of drawings and updates to be supplied on reproducible linen, so necessary for production drawing needs.

Mr. C.C. Walker, chief engineer of the D. H. parent company gave his design delegation to Merv and, because Australian plywood would need to be used and there would be many designs the decisions needed.

Arrangements were also made to send to Australia a sample finished Mosquito. RAAF Squadron leader Bruce Rose came to Hatfield and completed a quick conversion course just before returning to Australia. Bruce Rose, incidentally, was a remarkable pilot of great skill who had one "tin leg". The sample Mosquito DD644 flew in Australia on December 17th 1942 after arriving in a disassembled condition Bruce Rose being the pilot. This was a special day for me because after the first flight which was most impressive Bruce took off again with myself as passenger thus enabling me to experience personally the spectacular power dive of reaching 450 miles per hour indicated air speed near the ground. This was followed by the pull-up and near vertical climb for some thousands of feet, for which the Mosquito was becoming famous. It must be remembered that 450 miles per hour indicated air speed was quite remarkable in pre-jet days.

In due course when all microfilm drawings and technical data were complete, I departed for Australia with a heavy briefcase plus protective strap containing all this precious material about the top-secret Mosquito. Naturally I had to take special precautions on the return trip especially with overnight stops. Mr. Curtin's letter worked wonders whenever the contents of the briefcase come under question.

The return to Australia was by Pan American clipper from Southampton to Baltimore USA, and by Liberator courier plane from San Francisco to Australia. The clipper was cut to essentials and the leather briefcase with its precious drawings constituted the maximum weight of luggage I was allowed.

The Liberator service across the Pacific had been set up to deliver mail, communications and urgent freight to various Pacific islands that had been occupied by US forces. The Liberator had a civil crew. The navigator, with radio silence and no navigation aids did a magnificent job of making each of the various Pacific islands come up in the middle of the horizon at each of our calls. I was the only passenger and we had a machine gun mounted above the fuselage for some type of defence and the engineer, a civilian, used to try it out on occasions just to satisfy himself.

We called at Honolulu, Johnson Island, Christmas Island, Phoenix Island, and Fiji before landing at Williamstown, then a long trip to Sydney followed.

It was early January when we left Sydney, early February in the USA and Canada, Hatfield and the UK in April and returned to Australia mid-May to early June 1942. There had been the opportunity to hear much wisdom, see much activity on manufacturing fronts, learn as much as I was able and generally to be inspired by all, one could see and hear.

On return to Australia I found the excitement intense for the Mosquito project. D. H. had been allocated the two top floors of the Bradford Cotton Mills building corner of Missenden Road and Parramatta Road to start the project and priority seemed to have been given for the taking over of factory space and the supply of machine tools which were in short supply. We allocated the top fifth floor of Bradford as administration centre with the fourth floor for metal tooling and machine shop.

Major Murray Jones had John Byrne as director of supplies and David McLauchlan as director of finance. I was appointed to be manager D. H. 98 division with the open brief to get production going as quickly as possible and then hand over to production professionals whom we would gather around us. Adding to those from G. M. H. who had already come to us and had done such a great job on Tiger Moth production. Ian Spittle was Manager Propeller Division, covering the growing demands of the Australian aircraft industry, to which Mosquito propellers would now be added.

I was immediately required, on return, to visit Mr. Essington Lewis, in supreme command of aircraft production in Australia, to brief him on the remarkable and brilliant aircraft we had to manufacture.

The aircraft advisory committee, under Mr. Essington Lewis voices leadership had met weekly since January 13th 1942. Major Murray Jones instituted quite quickly a series of D. H. 98 meetings so that we were under a similar discipline to that of the aircraft advisory committee.

Our first task was to quickly print and catalogue the tens of thousands of microfiche drawings from Hatfield and make a "the bill of material" or "what does it take to build a Mosquito!" And the specially chosen group did this quickly, surveying each drawing and recording the specification and quantity of material requirements.

Computers were not then in existence but punch cards were around and with the guidance of Ian Spencer (who had come from Avianx) we could have printed out quite quickly the massive result which enabled John Byrne to get his supply system working. Spruce and Balsa wood had to be imported (as did the aluminium for aircraft propellers but plywood made from coach wood, was made in Australia).

We assessed all the constituent parts of the Mosquito and made decisions concerning their production. Some were made in our own shops, but the majority had to be subcontracted.

Mervyn Waghorn arrived from England around August and quickly got all drawings and technical material under strict control. He arranged for handling the arrival of the flow of drawings from Hatfield, which were to come in the form of reproducible linen prints from which drawing supplies could be given to our production people. Mervyn quickly tested Australian plywood to ensure it satisfied the design requirements and we recruited and transferred technical staff to give, under Mervyn's control and development, a strong and respected technical centre.

We set up an organisation to plan production, to make tooling, to subcontract, to manufacture, and to assess our success and lack of success in the various aspects of the project. Beales piano factory became available and we assessed it as suitable for fuselage production, tail-plane and flaps. Fifty years later this recalls the quotation, by Bishop-designer of the Mosquito-when he told of would Goering's words- "I turn yellow and green with envy when I see the Mosquito. The British knock together a beautiful wooden aeroplane which every piano factory over there is making." (see "Aerospace", RAeS November 1990).

On the floor of the Bradford building we made our "loft" of full-size drawings of the wing, fuselage and other surfaces, with the many sections enabling accurate templates and streamlining. We made a "mock-up", full size, of the fuselage so that we can get a proper "look" at things before being able to see a full-size product. We had skills for wood tooling and a strong backup of skilled wood working tradesmen. Jack McConnell, foreman of our D. H. prewar service department, was a master wood worker and he had a fine body of skilled wood workers on which to draw. He had a great knowledge of the wood working capabilities of the factories around Sydney and this was invaluable in choosing subcontractors for our work.

We set up the fourth floor of the Bradford building as our tool room and machine shop. Harry Shaw, from our propeller division, was devising the ways and means of getting our tooling made at this stage of the war. We were allocated the few toolmakers that were available from Manpower and we set up a training program for men with little metal work experience. They could be trained to take a tool to a certain distance from completion, leaving the skilled toolmakers to complete the job to the required tolerances.

Gradually the fourth floor of Bradford got machine tools for our old machine shop and we were also allocated a Jig borer, a significant and heavy piece of equipment. It was installed on the fourth floor, but its movement causing the building to vibrate to an extent that ink spilled from my ink well on a desk on the fifth floor! The structural engineer assured us the building was all right!

I do not have records of areas, but from scaling photographs it seems each of the Bradford floors were around 30,000 square feet with concrete pillars spaced at 25 foot centres. Our working population would have been around 200 for each floor. Access was by one small lift taking around 8, and a broad concrete stair well, which nearly everyone had to use and with four or five floors this doubtless helped to keep folk in condition. There was also an industrial lift, suitable for a truck, which slowly could move bulky items in. One newcomer to the fifth floor noted with interest the appearance of the old cart and horse that came to remove the garbage!

Part D

Enthusiasm in the project caused all to work seven days a week until we found that it was taking seven days to do six days' work and we then nominally reverted to a six-day week. But the pressure was great and this pressure came from each person.

Bill Isbister took the heavy work job of Chief Inspector for the Mosquito and he was supported by Sid Smith, who became quite an "institution", and many other dedicated inspectors who performed an outstanding task which is one of the most difficult. The inspectors had to ensure that nothing "gets through".

Steve Newbigin was a stalwart in the subcontract field, as he had previously been in the Tiger Moth project and was later joined by Vic Webb from the Aircraft Production Commission. There was a large force of talent. Recruiting was considerable and constant, and the subcontract area became a large part of the project.

Cec Fordham, the backbone of prewar civil aircraft electrical work at Mascot, moved from his business to take over the complete electrical side of the Mosquito and it is probably this fact which is responsible for the complete absence of any electrical problems with the Mosquito.

Jim Kirby (later Sir James) whose machine shop was of the highest standard and had been used by civil aircraft operators pre-war constantly, took over the Australian production of hydraulic jacks that operated in an exemplary manner. Jim Kirby also took the management job for aero engines at the APC Lidcombe factory.

Automatic Totalisators turned their machine shop over to Mosquito work.

Wunderlich developed the skills for Australian manufacture of the highly stressed aluminium castings used in the Mosquito for control surface hinges and many other components. The product developed with x-ray control was of the highest standard.

Wood working firms such as Rickett and Thorp (makers of first-class furniture) made spars, ribs and other wooden components.

Chrysler in Adelaide using their motor car expertise made engine cowlings and fairings. Mervyn Waghorn, who had had experience with engine cowlings produced in England, expressed the view that the Australian cowlings fitted better than the English made.

Our shops made the first Mosquito wings. We took over a factory at Forest Lodge, where we made the spars, ribs and skins to try our tooling and methods, and then assembled the wings. We did not have the resources for wing production that required considerable area. General Motors at Pagewood had the area and was keen for the job, but they wanted, as was their custom, to be self-sufficient and be responsible for the task they were performing, rather than being, as it were, under the control of our inspection.

The Aeronautical Inspection Directorate who controlled all inspections for the RAAF undertook to supervise and control this work with care as it was agreed that General Motors would be an "approved firm". Later, we had quality

problems so we took a direct interest.

Various areas of buildings became available to us to use for production or for bulk storage of supplies. As for instance, a factory became available which previously was used for coffin making by Wood Coffil. We formerly inspected prior to taking over, the coffin makers still being at work. One cheerful worker said to us "we always mark down the height of people as they come in here-we know we'll get you sometime!"

Final assembly of the Mosquito would require a special building. This was to be made at Bankstown. Major Murray Jones summoned me to accompany him to Bankstown one day with the purpose of pegging out what would be our assembly hall and flight-shed. Bankstown aerodrome was surrounded by virgin land at that time and was in fact, quite a trip from Mascot and Camperdown.

The difference between the Bankstown aerodrome of the day and the Bankstown aerodrome scene at the occasion of the 50th anniversary of the Mosquito's first flight was quite noticeable!

I had been very impressed with the consolidated "Liberator" assembly line at San Diego, California, which allowed one Liberator to come off the line every hour. This line was about a mile long. It seemed to me that our Mosquito assembly line would need to be a long one, with the assembly hall designed to allow one line, shaped like a "U", two parallel lines of half the length with the area allowed down the middle for stores and engine sub assembly. The hall we designed had accommodation for some twenty Mosquitos.

The flight shed and tarmac were adjacent and the adjoining factory for fuselage manufacture happened later to meet our needs.

In writing these notes some 50 years after they occurred, I find it not possible to properly recall names of the great and quite remarkable team whom we gathered around us to build the Mosquito in Australia.

I find it not possible to refer to any of the wonderful and thorough files which was so diligently and faithfully compiled and kept to by my secretary Marion McKillop whilst she supported me in most difficult circumstances, but I would like to acknowledge the wonderful help to me personally.

In referring to the great team again, which helped build the Mosquito, I recollect the true statement, often forgotten, that the greatest assets an organisation has are its people. I have written a separate note covering "People" for this purpose.

Our initial wooden construction was carried out using casein cement. "Beetle" cement was produced locally by Elliott Brothers, it tested well and we changed completely to "Beetle" cement at the same time as English and Canadian production. It was found that under conditions of low humidity, Beetle cement had problems and accordingly we arranged to measure humidity regularly and, when necessary, we adjusted the workshop humidity using fixed water sprays fitted near the roof.

During the project, I did not recall any problems from gluing either casein or Beetle, when the joints had been formed in a proper manner. They were problems with wings when the gluing had not ensured proper fit at the time of assembly, as referred to later.

The sample Mosquito from England arrived disassembled and flew at Bankstown on the 17th December 1942, the pilot being Squadron Leader Bruce Rose. After fitment, later with Packard Merlin engines it again flew on the 23rd March 1943 and later became A52-1001.

The subcontracting of manufacture was a very demanding business because the weakest link limits the strength of the chain. We had many hundreds of subcontractors.

Tooling became a problem when some of our subcontractors found that the tooling for machining operations was inadequate causing scrapping of valuable castings and forgings. We obtained help in correcting this aspect.

David McLauchlan as Director of Finance was of great help in assisting with subcontractors financially. A contractor who has financial problems can be a problem.

John Byrne had a fine team in the supply side, John Throsby and Hec Adams and Peter Rockingham were key people.

The first Australian made Mosquito flew as a fighter bomber, Mark 40 as A52-1 on the 23rd July 1943, Wing

Commander Gibson Lee being the test pilot, thus making the period from commencement just over a year. The first delivery to the RAAF was March 4th 1944, followed by the second that month, and one in April, two in May, one in June.

After the first Australian Mosquito flew, Major Murray Jones considered the production stage had occurred and that the DH 98 divisions ceased to exist, all production groups reported directly to the General Manager.

Major Murray Jones appointed me in September 1943 to be the first Chief Engineer of the Australian company with responsibility for engineering, inspection, experimental and field service sections of our aircraft division. I was moved to the corporate headquarters that were in the Watson House, Bligh Street in Sydney.

The stress of trying to get production going quickly was felt by all those in the project. Problems and disappointments are a constant part of such an operation. Each person worked to the utmost of his or her capacity with only one objective and the bond that was formed in such an experience is lasting and remarkable. It cannot be properly described, but it is real.

The challenge of having some twenty Mosquito aircraft on the assembly line with difficulties preventing them from moving forward caused a great amount of work for parties from other sections.

Groups organised from Mervyn Waghorn's technical group spent nights and days troubleshooting and helping the men on the regular assembly line. Our main sources of trouble were mechanical and hydraulic; the electrical side of production, watched over by Cec Fordham seemed to just flow on smoothly.

We had sad times. On the 10th of June 1944 Mervyn Waghorn and I and many others witnessed the breakup of Mosquito A52-12 as it pulled out of a high-speed dive near the ground killing the test pilot – Hubert Boss Walker (who had come to us from CAC) and Peter Rockingham. Peter, our supply manager, was having his first Mosquito flight. Peter had been brought to Bankstown by myself and given my "seat" in the aeroplane which I had arranged with Boss Walker.

A very detailed inspection of each piece of the aeroplane indicated that there had not being any glue joint failures, each fracture having shown timber coming away with the glue, showing the maximum strength had been achieved.

We concluded that there had been high-speed flutter, starting at the wind tip causing the wing tip to pull off and start peeling off the wind surface which continued quickly at the high-speed and gravity loads. We introduced a modification of the wing tip attachment and did not experience a repetition of this failure. We discussed this with Mr. Bishop, designer of the Mosquito.

In mid-1944 we discovered that some wings that had been assembled at GMH Pagewood were defective. Wing MM 121 was damaged due to a crank problem at it was discovered that there had been faulty fitting of the top wing skin to the front spar.

A delivered aircraft crashed due to a wing failure and inspection showed a similar defect. All aircraft were grounded around July/August 1944 for detailed inspection that included samples trepanned from the top skin and Windows cut in the front spar to enable the wing/spar glue joint to be checked.

There was a crash of a T Mk 3 (English built Mosquito trainer) at the Petersham Public School, which fortunately avoided any children, in which we were involved. There was a prior pre-delivery crash of one of our Australian Mosquito's at Bankstown which was, after investigation, put down to excessive speed and pullout near the ground and on his first test flight as the company pilot, Flight Lieutenant Ifould crashed on approach at Bankstown and was killed. This, on investigation was put down as an unfortunate accident,

This was a sad time and John Kerr; Service Manager for D. H. took over all company test flying and continued for many months until relieved by "Titus" Oates. He, in due course was relieved by "Black Jack" Walker who continued as the DH test pilot into the post war era.

Pat Fillingham, test pilot from DH England, came to us in October 1943 to give us the essential detail of the finished product that is so necessary. He spent some months with us and was a most helpful and commanding personality. As a side comment, in a letter this year, when he was told that HDH was putting together a Mosquito for the museum, he said "I have great feelings of affection for the time I was able to be in Australia-if you want your Mosquito tested I would love to come out".

When the faulty wing assembly problem was discovered, Major Murray Jones instructed me to personally move into

the Pagewood plant of GMH until the matter could be resolved.

Bill Isbister allocated top line inspectors to be resident at GMH, the Aeronautical Inspection Directorate, RAAF, had a reassessment of staff and approved the firm's status. Wings assembled were now under the strictest control.

I remained at Pagewood until the situation was satisfactory and it was then resolved I should travel to DH England to personally confer about our Australian experiences.

The trip to England and return could now be quick and by air. The Qantas Colombo/Perth Liberator flights had now replaced the famous "double sunrise" flights by a Catalina flying boat. Colombo/Karachi was by RAF land plane and Karachi/London and return was by Sunderland flying boat.

DH Hatfield and the London area generally were under V2 threats on a regular basis and it was always more than impressive to see the civilian reactions to this enemy action. For instance, on a side note, a medical appointment in London whilst waiting my turn, surrounded by women and children and some men, an incredibly loud blast, followed by an earth tremor in the room, occurred. No one showed the slightest concern or surprise. The doctor said quietly, giving me one of my shots, "another V2 - quite close" and business went on as usual.

As I drove away, I saw that the V2 had landed a couple of hundred yards away. I saw the roads being quietly cordoned off and workers beginning to remove the rubble and carry out their allotted tasks.

DH Hatfield had had bomb damage but not extensive. The spirit to produce aeroplanes was tremendous and now the whine of jet engines could be heard as the DH jet engines were being tested in the nearby tests' cells. For very urgent development!

DH 103 "Hornet", twin engine developments of the Mosquito were around with their powerful, improved performance, but the main effort was for Mosquito production.

Some people at DH were thinking about what would happen when Hitler was defeated and David Newman told me of the possibilities seen for a four-engine passenger jet liner, firstly with centrifugal compressors and later axial compressors.

This dream subsequently, postwar, became the "Comet" which was surely have swept postwar civil jet airliner field had not been for the problems of fatigue in aluminium alloys, not foreseen by designers or by our air worthiness authorities.

I had long talks with Mr. Bishop, chief designer of the Mosquito, telling of our Australian Mosquito experiences, our accidents, our difficulties we had experienced and our beliefs about the causes.

Mr. Bishop was a very thoughtful person and a far-seeing leader. The consensus concerning our A52-12 breakup in which Boss Walker and Peter Rockingham lost their lives was that it could well have been flutter which initiated the breakup. The evidence being of ply breakup in small fragments growing to larger segments and with all glued joints showing as timber failure and hence full glue strength which was important in this regard. The wing tip attachment modification was considered the final fix.

I had meetings with Mr. Richard Clarkson, Chief of Aerodynamics who, in his quiet manner, showed me the curves which confirmed that the Mosquito was still the fastest aeroplane driven by propellers.

As a side comment, it is interesting to read in 1991 how Richard Clarkson, prewar, having read the latest work on engine radiator cooling produced a radiator layout for the Merlin engine which will give a positive thrust.

History shows that that the Royal Aircraft Establishment tested the arrangement (although they were told they could not do so because no order existed for the aeroplane) and were delighted with the positive thrust they obtained which probably added some 15 miles per hour to the aeroplane speed.

I went with the best wing making people to learn their latest and quickly returned with the valuable information.

In May 1944, the RAAF asked DH to convert six FB Mark 40 aircraft to PRU version with five cameras and extra fuel. A special design group was set up in the working party, supplemented by Manpower from the RAAF, did the job quickly, the six PRU aircraft being delivered in October 1944.

The trials report showed a range of around 3000 miles with 100-gallon wing drop tanks and internal fuel capacity

increased. These are unarmed PRU aircraft saw much service reconnoitering the Japanese north of Australia.

I have tried not to repeat material from Martin Sharp's book (though I have made constant reference to it) but the above material is from Martin's book.

I have not tried to cover in any detail the immense amount of work and study by the technical department that resulted from the unfortunate wing assembly situation, briefly referred to above. It was done with the greatest devotion, covering the non-destructive testing and repair requirements that resulted.

Towards the end of 1944 Major Murray Jones arranged that Mr. Lee Murray should come to Australia as general manager of the aircraft division. Mr. Lee Murray, born in Australia, had been General Manager of the DH organisation in England, prewar and during the difficult times when the production of the Mosquito in England was often in the balance.

When the quality of the Mosquito was recognised, then the demand for production quantities always exceeded the capacity of the original designer/constructor. Over 7000 Mosquitoes were ultimately built in England, Canada and Australia of which the Australian number were 103 up to VJ day (209 finally). Australian Mosquitos in the PR squadrons and to tactical reconnaissance squadrons were equipped to use the Mosquito in World War II in ended.

Mr. Lee Murray was a great leader, like Major Murray Jones his close friend. He remained as Aircraft Division General Manager after the end of World War II.