THE HAWKER ASSOCIATION

NEWSLETTER NUMBER 13 - SUMMER 2006

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EDITORIAL

We have had our third AGM and the reports, summarised below, show that the Association is in good shape and would seem to be satisfying Members' requirements. The fifty Members present were asked if they had any suggestions for activities or talks, and if those of you unable to attend have any, please let me know.

You will see that there have been several interesting contributions to this Newsletter; please keep them coming in.

And don't forget the ties, the RAF Harrier Story; and the visit to Yeovilton...

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PROGRAMME FOR 2006 * = to be confirmed

Wednesday 14th June	**Summer Barbecue** - 1.00pm
Wednesday 12th July	"Boeing Training in the UK" - **Keith Hertzenberg**.
Wednesday 9th August	Social with video.
Wednesday 13th September	Social with video.
Thursday 21st September	**Coach trip to the Fleet Air Arm Museum, Yeovilton.**
Wednesday 11th October	*"The Future of RN Aviation" - An RN Officer.
Wednesday 8th November	*"Competition Sailplanes" - **Afandi Darlington.**
Wednesday 13th December	Christmas Lunch - 12.30 pm.

Unless stated otherwise, meetings are at the Hawker Centre, Kingston - the old Sports & Social Club - and start at 2.00 pm. Lunch and drinks are available beforehand, tea afterwards, and there is a large, free car park.

Keith Hertzenberg is an old McDonnell- Douglas colleague now with Boeing and in charge of product training in the UK. **Afandi Darlington** is an experienced aerodynamicist and expert competition glider pilot who has worked for BAe and Richard Noble. Currently he is a partner in Optimal Aerodynamics, a consultancy working on the Noble aircraft, now American owned and nearing completion in the USA.

Tickets for the June 14th **Summer Barbecue,** always a very enjoyable social event, are available from Percy Collino at £10.00 on 0208 3378143.

Don't forget the **Yeovilton** visit. As for last year's very successful Duxford visit the coach will leave from the Hawker Centre where cars may be parked free of charge. Departure time on Thursday 21st September is 8.45 am and we expect to back at about 7.00 pm. There will be an alternative pick-up point in Farnborough. The price, including the museum entrance, fee is just **£15** for members and £17.50 for guests. Book through Percy Collino, at meetings or by telephone on 0208 3378143, who will also have the Farnborough pick-up details if you need them.

ASSOCIATION TIES

These handsome ties are still available at £7.50 from **Harry Fraser-Mitchell** at meetings or by post (50p). Telephone him on 01252 626996.

THE RAF HARRIER STORY

The Association is supporting a reprint of this excellent book (see NL.12) and will purchase more copies. If you would like one, very reasonably priced at £10 plus post and packing, please call Ralph Hooper on 020 8948 2581.

CORRECTION

Bill Bedford joined Hawkers in 1951, not 1958 as stated in 'A Double Testimonial' in the last Newsletter.

CAMM BUST FOR RAF CLUB

Last year Duncan Simpson suggested to the RAF Club that Sir Sydney Camm should join those already commemorated on their premises; these were Reginald Mitchell, Roy Chadwick and Sir Barnes Wallis. Following a meeting with Air Cdr Geoff Claridge, Vice Chairman of the RAF Club, it was agreed that such a proposal should be made and that Ambrose Barber would sculpt a bust for consideration. On retirement Ambrose had seriously taken up sculpting figures and busts and as I (Ed) was familiar with his work I was sure he could satisfy the requirement and that anything he did would easily stand comparison with the other busts by a well known professional.

So, armed with copies of photographs of Sir Sydney from the Brooklands Museum, Ambrose set to work to produce a half scale clay maquette which was shown to the Air Commodore who submitted it to the RAF Club committee for approval; this was duly

gained. As Ambrose was willing to accept only a nominal fee for his work the cost to the RAF Club would be low and the Association was able to underwrite a fixed price for producing a full scale bronze on which work is now proceeding.

KINGSTON AVIATION HERITAGE PROJECT

Many heartfelt thanks to Members Colin Chandler, John Gilbert, Vernon Lidstone and 'Mac' Magee who contacted Les Palmer with offers to help in fund raising. Gratifying as this response is, Les will need all the help he can get so please don't hold back in volunteering. Phone Les on 01784 460418.

HARRIER NEWS

The MoD has awarded BAES a Joint Integrated Support (JITS) contract worth £46 million to provide a technical query support service to the Joint Force Harrier fleet at Cottesmore and Wittering until 2014. Harriers are expected still to be in service in 2017.

The first Harrier T.12 trainer with the uprated Pegasus as fitted to the GR.7A and 9A is undergoing flight trials.

The last Sea Harrier F/A.2 flight took place on 28th March. The Indian Navy is hoping to buy 8 of the retired F/A.2s. They would have AMRAAM and other US equipment removed.

It is rumoured that Sea Harrier XZ439, the second FRSMk1 and first FRSMk2 (F/A2) but still the aircraft with the lowest hours, has been bought by a retired US Marine who intends to fly it on the air show circuit in the USA. Anybody have details?

HAWK NEWS

The BAES company-owned development Hawk, ZJ100, has been modified to accept the Hindustan Aeronautics avionic equipment that will be fitted in the Indian Hawks, for flight testing before the first flight of HT001 in November.

MORE ON THE ORIGIN OF THE CRESCENT WING

Further to Harry Fraser-Mitchell's comments in News Letter No. 12, Ralph Denning expands his argument...

Harry F-M has charged me with making a (non-aerodynamic!) 'canard' in saying that Handley-Page got the idea for the crescent wing from Arado. He further implied that Arado used the crescent wing to solve a short-term problem of getting the centre of lift nearer to the C.G. I still stick to my views; in particular that Arado's main aim was aerodynamic. Arado's Chief Aerodynamicist, Rudiger Kosin, gave a full explanation in a book by Wolfgang Wagner entitled 'Die Ersten Strahlflugzeuge der Welt' (The World's First Jet Aircraft), as follows:

"When, in 1942, Arado considered the application of the swept wing effect, three wind-tunnel models with different constant sweep angles were tested in the low speed tunnel of the DVL...At higher angles of sweep the models showed massive flow detachment at the wing tips and, in fact, increasingly so at increased sweep which, with even greater growth, would have led to nose-up pitch, stall and nose dive. Experiments fitting leading edge slats, similar to those used on the Me 109, led to nothing so they hit on the idea of sweeping the wing more steeply on the inboard section than on the outboard section. Arado patented this idea in 1942...Despite all this theoretical work the flight behaviour of the wings with decreased outboard sweep was still not assured. Therefore it was decided to undertake a practical experiment with a large scale model." Kosin also states that "the wing plan form evolved in this way was employed after the war by Handley-Page on the Victor bomber, and permits attachment points on the fuselage to be retained with the same centre of gravity and landing gear...very important taking into consideration the pressure of deadlines in 1944."

This may well be the model photographed in the LFA A.1 tunnel shown in my lecture. I would also comment that RS Stafford (Chief Designer, Handley-Page) was a member of the Farren Mission to Germany that visited LFA Volkenrode in June 1945.

Harry agrees that HP knew of the Arado work but says that none of it was used by them. This seems to enter the field of semantics. My lecture was concerned with conceptual design issues rather than detailed design. It should also be remembered that all swept wing activity stems from Busemann and the simple sketch in his paper to the 1935 Volta Congress.

Harry also makes the point that HP optimised the exchange of sweep angle and thickness:chord ratio which was not done by Arado. I would say that with the engine thrust levels available in Germany from 1942 to 1945 the pursuit of the highest transonic Mach number was not the immediate priority.

Finally, I must emphasise that I wholeheartedly agree that Handley-Page optimised the crescent wing concept, as did Avro the delta, but using the German work, discovered in 1945, as a starting point.

AND EVEN MORE

Harry Fraser-Mitchell has more to say and comments on the above piece...

I believe that (Kosin's comments re wing attachment points and the undercarriage) supports the point I made which is that the sweeping forward of the outer panels of the Arado wing was allied to CG considerations.

The AR234 wing tested in the wind tunnel had sweeps of approx. 32, 24 and 17 deg from the apex outwards and corresponding thickness:chord ratios of 10.5, 10.5, 10 and 9 %. The Victor wing in its earliest form had sweeps of 50, 40 and 30 deg and t:c ratios of 16, 12, 10 and 9 % linked to this to keep the Mcrit constant across the span. I do not think that the Arado wing had this linkage and I believe this constitutes a major difference between the two layouts. Another difference is that the Victor wing had an intake at the root whereas the Arado had podded engines. The shape of the intersection at the Victor fuselage was also helpful in maintaining isobar sweep right up to the wing root.

Let us now consider what influence knowledge of the Arado work may have had on the thinking of HP's Chief Aerodynamicist at the time, Godfrey Lee. In a letter to Dietrich Kuchemann he wrote: "The real start of the Victor design was a visit in the autumn of 1945 to...Gottingen and Volkenrode by an MAP fact-finding team in which the Handley Page representative was the writer. It was here that the concept of swept wings as a means of enabling an aircraft with a reasonably thick wing to fly at high subsonic speeds without drag rise first became clearly understood." He goes on to say "...led to the need to have both high sweep and

moderately high aspect ratio...For us combining high sweep and high aspect ratio gave rise to the tip stall problem. The so-called 'crescent wing' was evolved to deal with this difficulty."

Editor's note. For brevity I paraphrase Harry's letter here...Lee established that the main reason for the problem was outward drift of the boundary layer towards the tip, basically due to the action of a flow obliquely entering a region where suction reduces to the rear which causes the flow to try to turn in a direction parallel to the swept isobars. He proposed three solutions but settled on: "reduce the outflow at the tips by reducing the obliquity of the isobars for the outer part of the wing, and this clearly suggests a progressive reduction in sweepback from the centreline to tip."

Harry also says that that he has May-June 1946 correspondence between Lee and Lachman, Head of HP Research engaged in translating and analysing German reports. A letter to Lee included a sketch of the Arado wing and a sketch of his own idea of a 'crescent' planform.

Thus, says Harry, we can establish that the Arado work was known about; but was the idea adopted from Arado's work?

He believes not, from the sort of analysis in HP reports and HP's own work in the low speed wind tunnel. In a letter to Lachman in June Lee says of his wing; "It is rather like the Arado planform." Thus Harry believes that Lee arrived at his conclusions for reducing wing outboard sweep quite independently of Arado, and when their work was pointed out by Lachmann he used it to support his contentions. To say that HP's ideas of how to ameliorate the low speed behaviour of swept wings owed anything to, and certainly not the "adoption" of, Kosin's ideas is, Harry believes, far from the truth and gives less than justice to the originator of the Victor wing helped, as he always maintained, by others in the firm and in the UK research establishments.

WARTIME PROJECT OFFICE

Ron Williams recalls life in the Hawker Project Office in the 1940s...

` In 1943, when I entered Hawkers, the Kingston works had already been bombed and the Project Office along with most of the Design Office and services was based in the supposedly safe Claremont, Lord Clive of India's country mansion at Claygate, just outside Esher. It was being used as a girls' school when Hawkers took it over. The House was now covered in camouflage netting and the valuables and fittings had been removed, although the tapestries on the walls remained.

The Project Office was located at the front on the ground floor, next to Stress. Robert Lickley was its head with Freddie Page (aerodynamics), Ken Bentley (structures), Alan Lipfriend (stability & control), Wally Walford (performance) and Vivian Stanbury (design layout). It did not get much bigger in later years; part of its success, perhaps.

I attended the new Design School run by a Mr Wiles and set up in Claremont Lodge at the foot of the long curving drive rising to the house. We spent two days a week there, with three-and-a-half days in our departments - mine was the Drawing Stores in the Kingston Drawing Office - and three nights at Kingston Tech. As a prize for coming top in the end-of- year exam I joined George Brailsford in Flight Research, part of the Project Office under Freddie Page, at Claremont but in a separate small room.

The Project Office had the task of seeing aircraft through their flight trials as well as creating the new designs to replace them. At this time there were special versions of the Tempest and several Fury and Sea Fury prototypes to manage. This burden remained through the years with the attitude, "You created these horrors; you put them right." Typical were two of the problems I met then: isolating the vibration on the Sea Fury and reducing the position error on the Tempest V. The excessive position error on the altimeter readings from the wing tip pitot-static probe made low level flying against the V1 'Doodlebugs' hazardous. Fortunately the solution was found quickly. Re-routing the static pressure line to a hole on the fuselage side below the cockpit reduced the variation in readings.

I had a closer view of the action in 1944, and again in 1945, when I was seconded to Flight Test at Langley, our 'shadow factory' and grass aerodrome, to stand in for Charlie Dunn who was taking the Tempests to Khartoum for hot weather trials. This gave me access to all the Flight Reports from No.1 by Philip Lucas on the Hart, including Frank Murphy's report on an incident when the instrumented Tempest V, JN729, reached 614 mph in a dive. I met a range of pilots, Company and RAF, based at Langley including 'George' Bulman, Philip Lucas, Bill Humble, Neville Duke, RN Muspratt and Capt HS Broad, and on a flying visit (and airfield beat-up) Roland Beamont in his personal Tempest V with its RPB fuselage lettering.

Back at Claremont in 1945 Freddie Page left for English Electric to work on the Canberra and I entered the office proper as the Technical Assistant with my own desk and drawing board. The P.1040 jet fighter was being schemed in detail and with various layouts, some being drawn with wing sweepback. Lickley asked me to see what I could make of a design with the Nuffield 100 hp piston engines being proposed by Morris Motors. The P.1058 five seat, twin engined air taxi was the result.

Although Sydney Camm was just across the corridor I cannot remember Lickley ever allowing him into the Project Office. Lickley was a bit of a tyrant, hard on the senior staff but generous to us, younger mortals. He used to bait Rochefort in Stress and we could hear his shrill voice in the many arguments.

Life at Claremont wasn't all that bad. Once you had evaded the V1s on the way to Kingston a coach took you to the House. We had two tennis courts and a swimming pool for lunchtime recreation, but the sight of the V2 rockets leaving shock wave condensation rings as they went supersonic falling on London was not very pleasant. More peaceful was the sight of Bob Copland flying his beautiful rubber powered Wakefield Trophy winning model aircraft over the large green slope in front of the House. We could also escape into the strictly out-of-bounds Claremont Park with its lake and folly, wild through lack of attention.

In the Project Office itself more attention was being given to the possibilities offered by new powerplants to meet the current and envisaged military and civil requirements. There was even a tail-less airliner project with boundary layer control air intakes along the swept wing. Parametric studies into optimum solutions were also performed. I suppose this incredible period ended in 1945, with the famous group photograph on the steps of Claremont.

By 1988, when the Kingston Future Projects Office was closed, I was the only employee left from that auspicious family and shut the door on one of the most successful teams in the world. It wasn't a bad training ground, either. Robert Lickley went to the College of Aeronautics, Cranfield, as Professor of Aircraft Design and then to Faireys as Chief Engineer. Freddie Page ended up as Chairman of the British Aerospace Aircraft Group and Ken Bentley became a director of the British Aircraft Corporation. Alan Lipfriend, who had been studying law at that time, became a barrister and eventually a High Court Judge, and Wally Walford left to

take up making specialised Chinese red clay pottery. Vivian Stanbury, who while at Kingston had rebuilt a De Dion veteran car for the Veteran Car Club Brighton Run, was for a time Chief Designer of Rolls-Royce Cars.

And of course Sydney Camm and Freddie Page received Knighthoods.

TRIPARTITE EVALUATION SQUADRON

Russ Fairchild who, with Alan Gettings and Charlie Phillips, was one of Flight Development's representative with the squadron, was reminded of a few anecdotes by the prospect of Dave Scrimgeour's talk...

I remember the USAF pilot, Lt Colonel JK Campbell, always referred to as "JK", who was particularly paranoid about flying the Kestrel. One particular mission required a rolling vertical landing into a clearing in some woods in the Stamford Battle Training Area. In the pre-flight briefing JK enquired in all seriousness what (electronic) navaids would be available to locate the landing site and guide the approach. It was probably the CO, Wing Commander Dave Scrimgeour, who patiently told him how to use his map, compass and stop watch to pass over a specific landmark on a particular heading at an appropriate speed and after so many seconds lower the nozzles. He would then, Dave assured him, come to the hover over the designated site. JK was also very concerned that the site would be swept (i.e. with a runway sweeper!) before landing.

On another sortie, the target for the day was at a map reference somewhere near Norwich where "...the rolling stock were to be destroyed." In other words the map reference was for a railway marshalling yard. In the de-briefing after the sortie a very disgruntled JK said he hadn't been able to find the target because "...there were no goddam cattle anywhere to be seen at that grid reference!"

The German World War II Luftwaffe ace, Colonel Gerhard Barkhorn, made a bone crunching, wince making, heavy vertical landing on the airfield at West Raynham. He had closed the throttle about three feet off the deck and just dropped the aircraft on to the concrete. In the bar that evening, when teased about his very heavy landing, he looked unamused and said very precisely "Zat vos not heffy, just verm!"

By the way, I am still involved in V/STOL, watching my bees returning from a mission laden with maximum external stores; a spiralling downwards transition with the undercarriage dangling, then a vertical landing at the hive entrance.

Editor's note. These two Colonels were amongst the most colourful of a colourful squadron. JK could not be mistaken for anything but an American with a cigar, usually out, always clenched between his teeth. Col. B was a totally self confident individual with a strong belief that he was immortal; well, with 201 victories it's understandable.

HAWK - FIRST DELIVERY

Duncan Simpson continues the 'first delivery' series...

The Hawk first flew on August 21st 1974, ten days before the Farnborough a Air Show; the first deliveries, to the RAF, took place only just over two years later on November 4th 1976. Flight development and clearance at Dunsfold went ahead on time, thanks to the team at Dunsfold led by Fred Sutton, Len Hearsey and Alan Wigginton. Flying was in the hands of Andy Jones and Jim Hawkins, the Hawk project pilots, who were A1 Flying Instructors and Weapons Instructors and had been test pilots at the A&AEE, Boscombe Down. One hundred and seventy-six aircraft had been ordered and they were going to be delivered on time!

The day came for the first two deliveries and I received a call from the Commander-in-Chief of Flying Training Command, Air Marshal Sir Rex Roe. 'Joe' Roe, an old friend from Air Force days, said, "May I come with you on the first delivery?" I was delighted; it was his aeroplane after all. The flight up to RAF Valley over solid cloud cover went well with the C-in-C flying the Hawk. He began his descent but the weather at Valley, heavy rain with moderate visibility but with the cloudbase well up at 3,000 ft, was not ideal for a first arrival. The runways and perimeter track were flooded by the downpour and I volunteered to take over for the landing; Sir Rex readily agreed.

It had been suggested that the 'World Press' would be meeting us but as we flew overhead not a soul was to be seen. We landed with due care. The Hawk brakes were not its best feature and I had failed miserably in trying to persuade the RAF to opt for the tail parachute. We taxied in towards the appropriate wooden hut and two airmen appeared holding waterproof capes over their heads. The Station Commander, Group Captain David Thornton, emerged from the hut, bade us welcome and ushered us inside to be warmly received by his Squadron Commanders and Instructors. The 'World Press' turned out to be a little lady from the local Welsh News and the Wales representative of the Daily Telegraph! The only question was, "Would the Hawk make as much noise in the valleys as the Hunter?" The Instructors asked more serious questions and were soon clambering all over their new Hawk in the dry and quiet of the hangar. Two hours later Sqd Ldr David Young, the Operational Requirements Liaison Officer (ORLO) at Dunsfold and Air-Vice-Marshal 'Togs' Mellersh, (SASO HQTC) arrived at Valley in the second Hawk, by which time the party was well under way.

In 1976 we had witnessed the start of a new era in advanced flying training and now, thirty years later, we look forward to the first deliveries of the Hawk 128 to the RAF. I note that it <u>will</u> be fitted with a tail parachute.

TEST FLYING THE HUNTER

David Lockspeiser wrote the following foreword to the programme for the Hunter 50th anniversary air show...

My introduction to the Hunter was at Dunsfold after I left a Meteor squadron in the RAF to join Hawker Aircraft Ltd. Neville Duke, whose name is synonymous with the Hunter, was Chief Test Pilot on the new aircraft. Like most jobs, test flying is largely routine and uneventful but, like anything else in life, it does have its moments. Production testing is designed to establish safety of operation and uniformity of performance. It was necessary to carry out development flying on all aspects of the aircraft and its systems and to determine the boundaries and limits of weapons carriage and release. The job also included some very different but still related duties including demonstrations at air shows and to customer air forces, conversion training, delivery and liaison. So over the years I have known and made friends with people from the sixteen countries that have flown the Hunter.

The Hunter production test schedule, flown clean, could be completed in two 45 to 50 minute flights if the weather was kind and nothing required rectification or adjustment. Usually it would take three or four flights to complete. The schedule called for two

engine measurement climbs, one at a fixed partial throttle setting and one at full throttle. Checks for surge during slam acceleration, functioning of the top temperature controller and inverted flight were included. The stall was investigated and all two-seaters were spun, twice in each direction, to ensure the aircraft would recover with at least a quarter of out-spin aileron. As the Russians had done with the MiG 15, we painted a white blob on the instrument panel to indicate the stick-central position required for recovery.

Inevitably the pilot develops a greater affection for the individual aircraft he is most familiar with and I can think of three. XE588, a Mk 6, was used for most of the single-seater demonstrations in Switzerland and the associated armament development work at the A&AEE. So impressed were the Swiss with the Hunter's ability to turn in narrow mountain valleys, even when at maximum weight, that when we turned up at the airfield at Meiringen one morning we found that they had painted the Swiss mountaineers' badge on the side. During the demonstrations the Swiss also wanted to see the safe release of napalm bombs. This was to be carried out over Lake Payerne, but napalm could not be used because it would endanger the fish, so the authorities came up with a liquid that had the same specific gravity as napalm. To my chagrin I have to relate that two drop tanks, each containing 100 gallons of Liqueur Poire William, were dropped in the lake!

G-APUX, our two-seater demonstrator, was used at home and abroad for demonstrations at airshows, taking potential customers, politicians and service officers of all ranks (including Luftwaffe Generals Milch and Galland) for flights, and converting customer pilots. I particularly recall an incident in G-APUX during the week of the Hanover airshow following a photographic sortie. I returned rather low on fuel and so made a straight-in approach and to my displeasure, when I lowered the undercarriage, the port leg remained up. From our Service Department reports I was aware that this had happened to an RAF Mk 9. The pilot had opted to jettison the 230 gallon tanks and make a wheels-up landing. However, the shock to the airframe caused by firing the ejector release units (ERUs) brought the leg down. G-APUX, unfortunately, was not fitted with ERUs so I could only induce shock to the airframe by banging the starboard wheel hard onto the runway. Fortunately this had the desired effect. On landing there were only 12 gallons of fuel remaining in the tanks; the following day I received a relayed reprimand from our director at Kingston; such is life!

People sometimes ask which of the many variants I enjoyed flying the most, and the answer is the Mk 6 because it combined the power of the larger 200 Series Avon with the centre of gravity moved further aft. The Mk 11 with the smaller engine was also delightful as it was much lighter, not having any guns, and had the same centre of gravity as the Mk 6. With the heaviest fixed gun armament of any aircraft, except the wartime Me 262, its genuine multi-role capability, excellent handling characteristics and unmatched elegance made the Hunter an immense pleasure to fly; and a source of great pride. I am indeed very grateful to have worked with those involved in the many aspects of the Hunter's design, development and production.

STRENGTH WITH EFFICIENCY

Amongst the late John Godden's papers Jan White found a copy of the first Sopwith Aviation Co. catalogue, published, it would appear, in 1912. Reproduced below is the text in all its charming period completeness...

Sopwith Aviation Co.

Under the direction of Mr T.O.M. Sopwith
General Manager - Mr R.O. Carey
Works Manager - Mr F Sigrist

FOREWORD

With the issue of this the first Catalogue of the Sopwith Aviation Company, it would not be amiss to give a brief description of the Company's works at Kingston-on Thames, and to summarize the ideas and intentions of the founder, Mr T.O.M. Sopwith.

Mr Sopwith's fame as an aviator is so wide-spread, that it is hardly necessary to remind the public that he is one of the few English aviators who have continued to fly successfully without mishap on many types of machine, since first taking his pilot certificate in November, 1910. A brief summary of his aviation career will be of interest, as showing the enormous amount of practical experience he is able to place at the disposal of the Company's customers. The pilot certificate aforementioned was taken by him on a Monday, and the following Saturday he put up a then English duration and distance record of 107 miles, in 3 hours 12 minutes. His performance of note was his historic flight from the Royal Aero Club ground at Eastchurch, Isle of Sheppey, to Beaumont in Belgium, this being also his first cross country flight, and constituted a world's record for long distance cross country flight at that date. This performance secured the £4,000 Baron de Forest Prize.

In 1911 he sailed for America, taking with him both a Monoplane and a Biplane, and with these machines made a tour of the States, exhibitions being given in all the principal Cities of the Eastern States, including New York, Chicago, Boston, Philadelphia, and Columbus. He also competed at aviation meetings held in these Cities, and secured the largest share of the prize money. Whilst there, he gained vast experience in the handling and construction of various types of Aeroplanes - both American and European.

On his return to England in the Autumn of 1911 he took up construction seriously at Brooklands Aerodrome. The first machine turned out from his sheds was a Tractor Biplane engined with a 70 h.p. Gnome engine. This proved such an instantaneous success that he decided to specialise in this type of plane and it was the forerunner of the present type of Sopwith Tractor Biplane. The next machine turned out of the same type gave great satisfaction to the purchasers, and carried a pilot and three passengers on its first flight.

Another great success was a biplane of a different design, carrying an All British A.B.C. engine of only 40 h.p., and with this machine a first place was in 1912 secured in every competition for which it was entered, numbering twelve in all. It was on this machine that one of the Company's pilots (Mr.H.G.Hawker) won the Michelin Long Distance Competition for All British machines in 1912, and at the same time established the present British Duration Record by remaining in the air 8 hours 23 minutes.

Enough has been said to show the high degree of success Mr. Sopwith has met with in the past, and all the experience then gained is now at the disposal of the Company's customers. Mr. Sopwith will personally superintend the construction of the machines and will test them when finished.

The Works Manager (Mr.F.Sigrist) is an engineer of the highest capabilities. He has been with Mr. Sopwith for the past four years, and has had extensive practical experience, which he has gained while engaged at nearly all the aviation meetings and competitions which have been held in England, and also at some of the largest meetings held in the United States.

All work and material put into the machines will be of the highest quality only, and the Company's motto - "Strength with Efficiency" - is to be the keynote of their construction. In this connection it is as well to say at once that the Company will not adopt that policy of cutting prices which is so inimical to good work. It is absolutely impossible to maintain the highest standard of construction if the prices do not admit of the very best materials being used and of the most skilled workmen being employed.

The new works are situate within a stone's throw of Kingston Station. They have a floor area of 30,000 square feet and contain the latest and most up-to-date wood and metal working machines driven by Electric Power.

The capacity for output is such that the Company are prepared to undertake large orders at a moment's notice, and to complete them in stated time, and here again attention must be drawn to a point of the highest importance, i.e., Punctuality of Delivery. This has always been and will continue to be made a speciality.

The Company will specialise in two types of machines - the Bat-Boat Hydro- Aeroplane, and the Tractor-Biplane, but they are at the same time prepared to construct any type of Hydro-Aeroplane, Biplane or Monoplane, as may be required by their customers, and quotations will readily be given for any of these types.

Although, as previously stated, it is not the intention of the Company to cut prices, they will always be prepared to make special quotations when the order is for more than one machine. A brief description of some of the Company's construction features will be found at the end of this Catalogue.

In conclusion, it is hoped that intending customers will visit the Works, and see for themselves the close attention which is being given to ensure the carrying out of the Company' motto - "Strength with Efficiency."

(Then follow the Specifications, abbreviated below, and prices for the aeroplanes...)

90 h.p. Bat Boat Hydro-Aeroplane (two-seater pusher biplane). Weight (light) 1,200 lbs., useful load 500 lbs., speed 42 - 65 m.p.h., motor 90 h.p Austrian Daimler. Price complete £1,500.

80 h.p. Tractor Biplane (three-seater). Weight (light) 1,000 lbs., useful load 750 lbs., speed 40 - 70 m.p.h., motor 80 h.p. Gnome. Price complete £1,185.

50 h.p. School Tractor Biplane (two-seater). Price complete £985.

80 h.p. Scout (single-seater tractor biplane). Weight (light) 750 lbs., useful load 390 lbs., speed 50 - 74 m.p.h., motor 80 h.p. Gnome. Price complete £1,085.

70 h.p. Armoured Warplane (two-seater pusher biplane). Weight (light) 1,200 lbs., useful load 800 lbs., speed 36 - 55 m.p.h., motor 70 h.p. Renault. Price complete £1,250. Gun extra.

(Finally...) **Special Points in the Sopwith Construction.**

THE SOPWITH AEROPLANES owe much of their great strength to the steel clips by which the various parts are united. In the case of other machines where a wooden member has given way the break has nearly always occurred at a point where the wood has been pierced. By the Sopwith method of construction, where the piercing of a spar is unavoidable, a steel socket is used which entirely encases the pierced member and prevents the slightest chance of splitting.

In the construction of the main planes, the sockets which hold the stanchions in position are built right round the main spars. As the clips also form the anchorage for the load wires, the load is not only distributed over quite a considerable portion of the spar, but the weight is taken from beneath the spar, or from above in the case of the upper plane.

All the flight wires are of stranded steel cable, and even this is doubled in the case of the load wires. Further the warping cable is in one length, running from one wing-tip over specially designed gunmetal pulleys through the fuselage and across to the other wing-tip. The cable which actuates the warp is quite separate from this and is joined on to the main cable.

The main plane spars and most of the compression struts in the machines are built up with ash cores and hollow spruce sides, glued together under great pressure and firmly bound, the whole is then given four coats of the best hard varnish.

The ribs of the planes are made from a very elastic wood, giving greater ease of warp. It is possible to twist one of the ribs through an angle of over 90 degrees and on being released it regains its normal shape.

The Sopwith undercarriage is a complete unit, the machine resting on the wheels and the heels of the skids. Upturned tips to the skids have been replaced by wheels, as a broken skid often flies into the propeller and breaks it, while the stump may catch a small hillock and wreck the whole machine. A tail-skid is fitted to take the weight when the machine is at rest.

The design of the undercarriage gives great strength and flexibility, combined with a minimum of head-resistance. A neat point is the streamlining of the axle. When in the air, the axle drops into a groove in a distance piece of stream-line section.

The windows are of non-inflammable material, which is pliable and practically unbreakable. Another refinement is the upturned lip in front of the pilot's and passenger's seats; this slight lip is sufficient to throw the slipstream up and over the heads of the occupants.

The tail unit is built largely of steel tubing as are also the tips of the planes, and the trailing edge of the main planes.

One hears much of the compression of the fuselage at the point where the planes are attached. The main spars of the Sopwith machines are continued to the centre of the body, where they butt together and are joined by steel plates. Thus there is no strain whatever on the fuselage; a saving in weight is also effected by this method of construction, as the body does not need to be reinforced to such a great extent as in machines in which the spars fit into sockets in the fuselage, but do not meet in the centre.

It will be noted that the above remarks deal more specially with the 80 h.p. Tractor- Biplane. The other machines are designed on exactly similar principles of construction, and it is always the endeavour of the firm to justify in this respect its motto of "STRENGTH WITH EFFICIENCY," and be it noted that STRENGTH comes first.

HAWKER PEOPLE NEWS

Members will be saddened to hear that Peter Jones, of Instrumentation and Product Support, Ted Fitton of Production, Dunsfold and Association Members James While and Brian Walden have died; but glad to hear that Cliff Bore has fully recovered from a heart attack.

NEW MEMBERS

We welcome the following as new members of the Association:

Brenda Bainbridge, Russ Fairchild, Jennifer Nicholas, Don Williams and John S Williams - Members.

John Dale - Honorary Member.

HAWKER ASSOCIATION MEMBERS - APRIL 2006

A: Mike Adams (A), Ken Alexander, Peter Alexander, John Allen, Terry Ansty, Alma Apted, Steve Apted, John Arthur, Alan Auld, Bryan Austin. **B:** Colin Balchin, Ambrose Barber, Ray Barber, Derek Barden, Peter Barker, Geoff Barratt, Graham Bass, Ken Batstone, Dennis Baxter, Colin Bedford, Anne Beer, Brenda Bainbridge, Guy Black (A)**,** Keith Bollands, Paul Boon, Cliff Bore, Steve Bott, Pat Bott, Bob Bounden, Alan Boyd, Pat Boyden, Phil Boyden, Roy Braybrook, Clive Brewer, Laurie Bridges, Ian Brine, Doug Britton, Peter Brown, Christopher Budgen, Roy Budgen, George Bunt**,** Reg Burrell**,** Robin Burton, Ron Bryan, .**C:** Bert Callan, Richard Cannon, Maurice Carlile, Chris Carter, Bob Catterson**,** Ken Causer, Jeremy Cawthorne, John Chacksfield, Colin Chandler, Keith Chapman, Gerry Clapp, JF Clarke, John Cockerill, Hank Cole (a), Bob Coles, Percy Collino, Brian Coombes, David Cooper, Paul Cope, Patricia Cosgrove, Ron Cosgrove, George Cotterell, Nick Cox, Eric Crabbe, Shirley Craig, John Crampton, Russ Culley**,** RG Curtis. **D:** Roger Dabbs, John Dale (H), Clive Dalley, Andy Dalto**n,** John Danse, Afandi Darlington, Jo Davies, John Davie, Ken Davies, Trevor Davies, Diana Dean, Ralph Denning (A), Norman Deviell, Mike Diprose, Mike Dodd, Lambert Dopping-Heppenstal, Jack Dowson, Brian Drew, Dick Duffell, Jean Duffell, Peter Drye, Neville Duke, Chris Dunhill, Mike Dyke. **E:** John Eacott, John Eckstein, Andy Edwards, Dave Edwards, Tony Elliott, Norman Evans, Roy Evans. **F:** Russ Fairchild, Ian Falconer, Mike Fantham, Chris Farara, John Farley, John Farrow, Max Fendt, Stan Field (a), Geoff Fieldus, Mike Finlay, Wilf Firth, Ann Fletcher, Richard Fletcher, Colin Flint, Dave Fowler, Mike Frain, Harry Fraser-Mitchell, Geoff French, Mike French, Heinz Frick. **G:** Roy Gaff, Mike Gane, John Gardner, Patricia Gardonio, Peter Gates**,** Sandie Gear, Tim Gedge (A),Mark Gerrard, Alan Gettings, Tony Gibbs, John Gilbert, Maurice Gilson, John Glasscock, Pat Goodheart, Eric Goose, John Gough, Andy Green, James Griffin, Barry Grimsey. **H:** Douglas Halloway, Liz Hargreaves, Simon Hargreaves, Bryan Harman, Dawn Harris, Guy Harris, Thelma Harris, Brian Harvie, David Hastie, Eric Hayward, Bob Head, Sheila Hemsley, Ted Hemsley, Jock Heron (A), Tony Herring (a), Keith Hertzenberg (a), Frederick Hewitt, Merlin Hibbs, Richard Hickey, Peter Hickman, Vince Higbee (a), Reg Hippolite, Keith Hobbs, Chris Hodson, Gordon Hodson, Derek Holden, Doc Holliday, Ralph Hooper, Linda Hopkins, Paul Hopkins, Mike Hoskins, Gerry Howard, Dawn Howes, Terry Howes, Simon Howison, Gordon Hudson, Gavin Hukin. **I:** Pete I'Anson, Len Illston, Maive Impey, David Ince (A), Brian Indge. **J:** Keith Jackman, John Janes, Gordon Jefferson, John Johnson, Brian Jones, Ian Jordan, Trevor Jordan, Robin Jowit, Alf Justin. **K:** Brian Kent, Dennis Ketcher, Bill King, Dave King, Martin King, Charles Kirk, Ralph Kuhn. **L:** Barry Laight, Mike Laker, Charles Lamb, Richard Lane, George Latham, Paul Latham, Pam Lawrence, Andrew Lawson, Ron Leader, Geoff Lee, Gordon Lewis (A), Mark Lewis, Vernon Lidstone, Gary Lillistone, Andrew Lloyd, Gary Lockley, David Lockspeiser, Norman Long, Gordon Lorrimer, David Lovell. **M:** Albert Magee, Al Mahoon, Mick Mansell, John Marsh, Bill Marshall, Bob Martin, Dennis Mason, Brian Maton, Don McGovern (a), June McKeon, Ronald Mears, Mike Mendoza, Hugh Merewether, Jim Middleton, Kit Milford, Robert Millar, Jack Mills, Brian Monk, Pat Moon, Leslie Moore, Pauline Moore, Nicholas Morland, Pete Munday, Carole Murphy, Gloria Murphy. **N:** Jennifer Nicholas, Anthea Newman. **O:** Roger O'Brien-Hill, John O'Sullivan, Robin Owen. **P:** Les Palmer, John I Parker, John L Parker, John Partridge, Bernard Patrick, John Pearce, Barry Pegram, Martin Pennell, Bill Phillips, Ted Pincombe, Dick Poole, Don Pratt, Dave Priddy, Mike Pryce (A). **Q:** John Quinn. **R:** Clive Radley, Raharto (a), Frank Rainsborough, Colin Raisey, Brian Ralton, Paul Rash**,** Diane Raymond, Vanessa Rayner, David Rees, Peggy Remmington, Francis Rhodes, Geoff Richards, Bill Richardson, Chris Roberts, John Rodd, Eric Rubython, Malcolm Ruscoe-Pond, Peter Ryans. **S:** Helen Sadler, Roger Samways, Bernie Scott, Alex Seaman, Ray Searle, Arthur Sharpe, Peter Sibbald, Bill Sherwood, Jack Simmonds, Sadie Simmonds, Duncan Simpson, Derek Sims, Gerry Sims, Charles Smith, Don Smith, Harold Smith, John Smith, Karl Smith, Pete Smith, Selwyn Smith, Roy Sparrow, Peter Spragg, Cora Stanbury, Vivian Stanbury, June Stephens, John Strange, Carroll Stroud, Mike Stroud, Christine Strudwick, Tony Strudwick, Douglas Stubbs, Bill Swinchatt. **T:** David Taylor, Stuart Taylor, Brian Tei, Reginald Thompson, Geoff Tomlinson, Graham Tomlinson, Rod Tribick, Peter Trow, Ron Trowell, Frank Tuck, Bert Turner, Michael Turvey. **U:** John Underhill. **V:** Herbert Valk. **W:** Terry Walker, David Ward, Harry Webb, Patrick Webb, Graham Weller, Rob Welsh, AP West, Bryan West, Judith Westrop, Jenny Wheatley, Phil Wheatley, Jan White, Mick White, Roy Whitehead, Annette Williams, John S Williams, Don Williams, Ron Williams, Sally Williams, Colin Wilson, George Wilson, Paul Wilson, Dick Wise, Helen Woan**,** George Woods, Len Woodward, Alan Woolley.

WALTER JOHN BIGGS

John Biggs is looking for information about his grandfather, Walter, who started a five year apprenticeship with Sopwith from April 1914. He also served in the RFC but it is not known if he returned to Sopwiths. If anyone knows anything about Walter Biggs career with Sopwiths please contact John on 07985 806 885 or by e-mailing <jbiggs@bun.com>

JOE TURNER

I am Joe Turner's son who was works manager at AST Hamble in the fifties to 1961 (ish!). I am researching some history to do with him and his work. I remember accompanying him walking round the factory and looking with pleasure at the aircraft in various stages of production. These experiences contributed to my education and fueled my interest later in life in aviation, flying and sailing. If any of your members have information on my father and the work done at AST, I would be grateful if you could contact me by email <johnturner04@mac.com> or by letter to:- John Turner, Laburnum Cottage, 2 Back St., Clophill, Beds., MK45 4BY.