

SIR SYDNEY CAMM, CBE, Honorary Fellow

5th August 1893 — 12th March 1966

From **SIR THOMAS SOPWITH**, *Honorary Fellow*

WITH THE death of Sydney Camm the country has suffered an immense loss.

He was an outstanding man who started at the bottom of the ladder and—without any apparent effort found his way to the top. He was not only a very great designer but a wonderful personality and as well as finding time for a prodigious number of new creations he was always ready to lend a helping hand to others genuinely interested in aircraft design.

I will not start to enumerate his many successes, knowing that they will be referred to by colleagues who were even more closely connected with all the details of his work.

Personally I have lost an old and valued friend for whom I always had the greatest affection and gratitude for all that he did for so many of his friends and associates.

I would just like to say, as I did in my short address at his Memorial Service. Thank you, Sydney.

From **R. H. CHAPLIN**, *Fellow*

TO MY WAY of thinking, Sydney Camm was the last of the band of classical Chief Designers who were still in harness.

At the time of his death all his peers were either in retirement or were deceased.

I say with conviction that he was first and foremost an artist and everyone will agree that all his aeroplanes were "good lookers." He had an outstanding eye for line which I am afraid irritated some of us when he would persist in modifying and re-modifying some fin and rudder profile or a shape of body until he himself was satisfied.

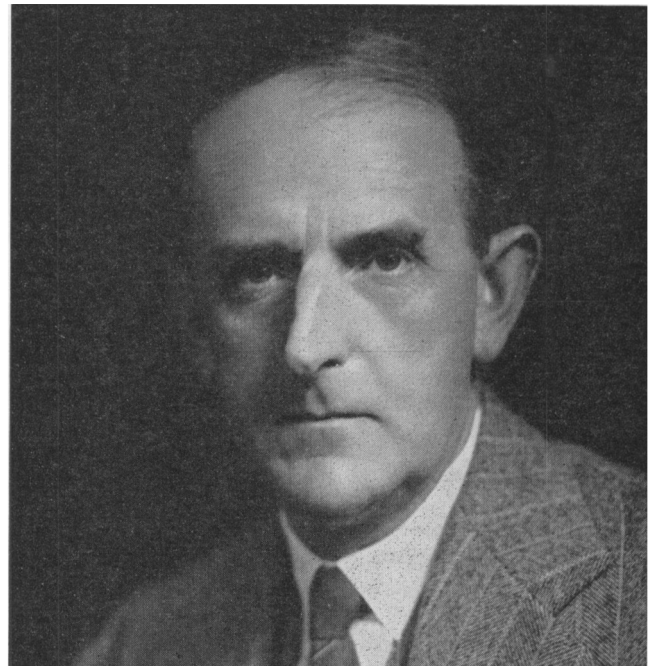
Although I would say he was more an artist than an engineer, he had an almost supernatural gift of observing immediately a design fault which one of us might have had on a drawing board for days.

There is no doubt that aircraft design was his life—nothing else really meant much to him. It is true as time went on his form at golf loomed large in his spare time, but right from an early age his world had been aircraft.

Before the First World War he had formed the Windsor Model Aeroplane Club and it was only natural that he should go to the nearest aeroplane factory, Martinsydes, during that war. Not content with working six days a week in the factory he spent his seventh day by going up to the Agricultural Hall in London with his notebook, to sketch design features of captured German aircraft.

Having gained experience, first in construction and then in design at Martinsydes, he had no difficulty in being accepted by the H. G. Hawker Engineering Co Ltd in 1923, his own firm having closed down.

Here his capabilities were soon recognised when Carter, who was then Chief Designer, handed over to Camm the full responsibility for the design of the Cygnet, a very successful light aeroplane. This dainty two-seater biplane



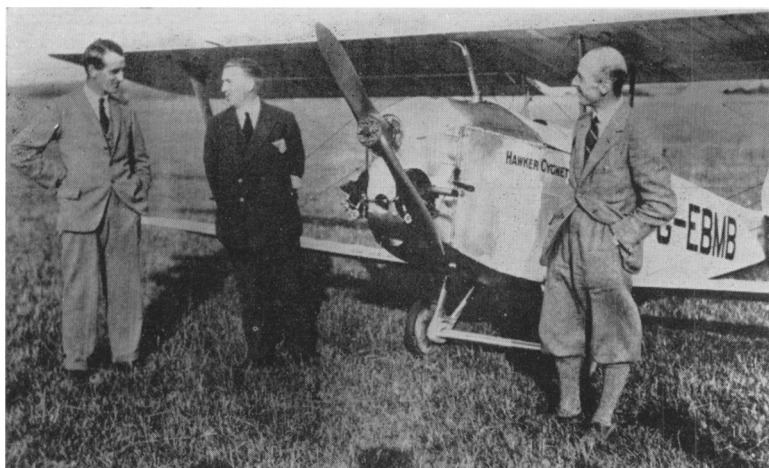
Photograph by Navana (London) Ltd.

with folding wings, which had an empty weight of only 375 lb was typical of Camm's artistry. This outstandingly light weight was only achieved by painstaking perseverance throughout the design. For instance, the longerons which were $\frac{3}{8}$ inch square spruce, were spindled out between fuselage joints! The saving of weight on the drawing board was almost a mania with him but I am quite sure this gave us just the edge over our competitors which ensured success. Rather to the despair of the shops he insisted on plates being shaped around each bolt in a row of holes instead of a simple straight edge to the fitting. His use of HTS ferrules secured by tubular rivets instead of solid bolts was typical of his influence in weight saving and so on, as in dozens of other examples I could give.

He quickly won the confidence of Mr. (as he was then) T. O. M. Sopwith and in 1925 Camm was made Chief Designer. The very next year I joined his Staff and worked with him without break until my retirement in 1964.

When I began at Hawkers our total Design Staff (or Drawing Office as Camm preferred to call it in those days) numbered no more than about 40, including the Print Room. In fact all his life Camm was a staunch advocate of the small design staff comprising a few selected all-round engineers with a minimum number of specialists.

Within a year or so of my joining him Camm started on the aeroplane which I always consider put Hawkers firmly on their feet, thus creating the original nucleus of the present-day Hawker Siddeley Group. This machine, the Hart biplane day bomber was so sound in its conception and so well received by the RAF that Camm saw that it could be used as a basis for aircraft to meet other requirements. Thus were born the Demon two-seater fighter, the Hart Trainer, the Audax for Army Co-



A young Sydney Camm with the Cygnet and, on the right, P. W. S. "George" Bulman, Hawker's chief test pilot from 1925-1945. In the centre, H. K. Jones.

operation, the Hardy for air policing overseas, the Hector with air-cooled Dagger engine and the Hind day bomber, not to mention a host of "specials" for foreign governments with a variety of engines. About the same time he conceived the Fury single-seat fighter which was not only his favourite, but was also loved by all who flew her. Closely related to the Hart and Fury were respectively the Osprey and Nimrod, both Fleet machines. It seems hardly creditable today, but this family of aeroplanes was so successful that at least half a dozen major aircraft firms had contracts from HM Government to build to Hawker's designs.

At one time in the 1930's no fewer than 84% of the aircraft in the RAF were of Hawker design!

Looking back I find it not at all surprising that these biplanes were so universally liked. In their day the performance was excellent and their record showed they were "safe" aeroplanes. Besides their structural integrity, which was universally recognised, they were noted for their docile behaviour at their lowest speeds. This latter feature I attribute to Camm's influence. Those who remember the fabric covering over the ribbed wing will know that the correct wing aerofoil section was actually only achieved at each rib itself. Between ribs the fabric pulled into the wing section and this was particularly evident at the leading edge, where it produced a sharper contour than elsewhere. Realising the deleterious effect on the stall of this condition, Camm had the leading edge of all our fabric-covered wings made in thin wood ply, thus ensuring the correct contour, which feature I am sure contributed largely to the absence of unpredictable stall behaviour in all our aeroplanes.

It may seem strange to some people today that Hawkers were still supplying biplanes as late as 1938 when the monoplane had established itself as a configuration which was not only suitable for high performance but was also reliable, as exemplified by the success of numerous monoplanes throughout the world, the victory of Mitchell's monoplane in the Schneider Trophy Contest and the fact that military monoplanes were being developed at this time on the Continent.

The reason is simple. For twenty years a succession of influential advisers at the Air Ministry had considered the monoplane fundamentally unsound as a military aeroplane; Camm's intuition told him, however, that this prejudice was unreasonable and as early as 1933 he started to think about a monoplane interceptor with which he could overcome the Air Ministry's apprehension. It was not unnatural that he based his first ideas on something derived from the Fury, a tapered low cantilever wing, the Rolls-Royce Goshawk steam cooled engine and enclosed cockpit

being the most important changes. Discussions on this proposal took place in that year with the Director of Technical Development at the Air Ministry and the Deputy Director, Major Buchanan. (In those days D.T.D. was a serving Air Force officer appointed for limited periods while D.D.T.D. was the permanent Civil Servant who provided continuity).

Perhaps at this point it might be appropriate to say a few words about Camm's attitude to official procedure on the one hand and on the other hand his feeling for the Royal Air Force.

Of this latter I can only say that throughout Camm's career he was always most anxious to see that the RAF got a good job and he was most outspoken when telling everyone that this was their particular duty also.

Regarding official procedure, many people think that a design starts with a specification from the authorities, but with Camm this procedure was reversed. He considered that the uninterrupted experience we had had in fighter design over a number of years enabled him to forecast the Air Force's next requirement better than they could themselves. In other words, he would produce a new design incorporating various features which he knew the Air Force wanted, discuss it at length with the Air Ministry (and later MoS) and in due course an official specification would be issued largely written around the tentative design he had submitted.

This happened time and time again and so in the case of the Hurricane, Specification F.36/34 was issued at the end of 1934. This actually replaced Specification F.5/34 which had been written around Camm's earlier proposal but in conjunction with us had been brought up to date, chiefly to include the replacing of the Rolls-Royce Goshawk engine by the newer P.V.12 which later became the famous Merlin engine.

Thus in February 1936 we received a Ministry Contract for "One High Speed Monoplane K.5083, to design submitted 4 September 1934, known as F.36/34 Single Seat Fighter."

Camm had always worked closely with the Air Ministry and among its staff was a Sqn. Ldr. Ralph Sorley (later of course Air Marshal Sir Ralph Sorley) who had much to do with the birth of the Hawker Hart.

At the time we received the above mentioned contract, Sorley who was on the Armaments Branch of the Air Ministry, had been working with Camm on the provision of heavier fire power for fighters (the biplane Fury had only two guns with interrupter gear for firing through the propeller arc). The outcome of this partnership was an amendment to this contract for the experimental machine to cover the construction of an additional set of wings with eight guns which could increase the fire power by more than four times, because the guns were firing uninterrupted outside the propeller arc.

Because of Camm's forward thinking in relation to the needs of the RAF and because of the enterprise of Sir Thomas Sopwith and the Company, production drawings were prepared and instructions were issued for the produc-

tion planning, jiggling and tooling for the Hurricane before a firm contract had been received from the Air Ministry.

Those few months saved in 1936 meant that several hundred extra machines had been manufactured by 1940 when they were so sorely needed. But for this I think we might well have lost the Battle of Britain in which the Hurricanes were responsible for shooting down more enemy aircraft than all the other British aircraft and ground forces combined.

Although we were busy devising variants of the Hurricane, Camm had already begun work on the next generation of fighters and here again his philosophy was to install the most powerful engine in an airframe with the heaviest possible armament. This resulted in the adoption of the Napier Sabre engine in a fighter covered by a 1937 Specification and called the Typhoon. Out of this were subsequently born the Tempests with both Sabre and Centaurus engines and the Sea Fury.

Although this series of piston-engined fighter absorbed much of the Design Staff's effort up to 1946, Camm had been toying with a jet powered project as early as 1941, but our first jet was not flown until 1947, the Hawker P.1040 with a Nene engine. This later led to experimental variants with swept-back wings.

Camm was very keen on minimum cross section for both wings and body and when Rolls-Royce built the A.J.65 engine (which later became the Avon) he saw how he could achieve this aim in a practical high performance fighter. Here again he submitted a design (P.1067) in January 1948 without waiting for official requirements to be issued. In March, Spec. F3/48 was issued and in 1951 the Hunter, as it was then named, made its maiden flight. It is very rewarding to reflect that this aeroplane, which first flew fifteen years ago, has been sold all over the world and is still in active service in the RAF.

Five years or so after the Hunter first flew Camm set about conceiving the next aeroplane for the Royal Air Force. Designated the P.1121 this was in the $M=2.2$ class with a potential for still higher speeds and was planned to have any one of the four big engines being developed at that time, although the Olympus finally became the chosen one. Camm and all of us were so sure that this would be required by the RAF that the prototype was more than half completed at our own expense in conjunction with our friends in the industry.

Finally it had to be abandoned through lack of official support. If only the Government at the time (and in this I include the Air Ministry, MoS, The Treasury and the Cabinet) had realised that there is a limit to the nation's pocket and had ordered the more modest P.1121, the TSR 2 debacle need never have happened.

With this particular market apparently closed to us, it is to Camm's lasting credit that he did not throw in the sponge (he was not that sort of man) but set about discovering new fields to conquer. We had seen America's expensive attempts to achieve Vertical Take-Off and Camm had the courage to think we could succeed where they failed. And he was right; we did achieve VTOL performance virtually on a shoe string of expenditure in a relatively simple aeroplane which performs even without autostabilisation. True it has now been complicated to a point when it is felt that the nation's pocket cannot stand the strain. But what a pity this country did not seize the opportunity to exploit the lead established when the P.1127 made its first Vertical Take-Off in 1960.

Sir Sydney Camm (knighted in 1953) was first and foremost a designer. In later years he became President of the Royal Aeronautical Society (1954-5); he sat on the main board of the Hawker Siddeley Group and became



A meeting of the Hawker Design Council, 1957. From left to right, Sir William Farren, Sir Sydney Camm, Sir Frank Spriggs and Sir Thomas Sopwith.

Chief Engineer in 1959; he took the lead in Design policy to the end. He was a believer in personal contact with the work of the Design Office and to his dying day he still went round to the men on the drawing board or "doing the wards" (!) as he would often say.

From G. P. BULMAN, Fellow

OTHERS, more competent, will appraise the achievements of Sir Sydney Camm as one of the World's great aircraft designers, supreme perhaps in Fighters. I seek only to talk of the man, and a friend of over forty years, dating back to the Light Aeroplane Trials at Lympe, when his first design for Hawkers was being flown by my name-sake, but quite unrelated, "George" Bulman.

Camm was then, and was ever to remain, a shy individual, aloof, modest, self effacing, always critical of himself and never satisfied with his work. He indeed "shunned delights and lived laborious days" and was inclined to look askance at those who did not share his Spartan discipline and dedication.

During many years he would come to me in the Air Ministry for my personal opinion and background knowledge of some new type or Mark of engine he was being urged to adopt for his new prototype. He was terse at times about the engine firm's ideas of salesmanship! Months later, when in the inevitable toils and throes of a new installation he would ring me up to grumble about the engine's shortcomings, and the staggering ineptitude (if nothing worse) of its makers. As time passed I became prepared for these reproaches and would reply:—"Sydney, I'm putting the phone down until it has stopped buzzing and crackling with your fury, and then I'll pick it up after you've blown off steam." And so, literally, I'd do! When the telephone ceased to splutter I'd say, "Now then, Sydney, what's the trouble?" and he'd reply "Blast you, but I feel better now" and then we'd go on to discuss his immediate problem, with only minor undertones of his initial tirade. In these rather hectic exchanges he never forgot to emphasise his complete satisfaction with his earlier engines, which he had criticised with no less violence in their previous turn!

He had enormous pride in his staff, and whenever he talked about his work he would always use the Royal "We", to include and embrace the whole of his "team", in whom he inspired and maintained a tremendous loyalty and devotion.

It took much persuasion to get him to accept the Presidency of the Society, but in fact he enjoyed it hugely in his naïve way, and although often diffident in discharg-

ing the duties of the office, he always displayed the inherent dignity and absolute integrity which distinguished all he did.

As a Member of Council he was ever at pains to maintain his view of the standard of Fellowship of the Society, as a signal Honour to be conferred, rather than a high grade to be attained. Every President in his day, I think, has felt qualms of apprehension when they heard his *sotto-voce* whisperings erupt into explosive declamation that Council should be adamant about this or that, not always perhaps strictly relevant to the point under discussion. Unconsciously he was a "Melancholy Jaques", sombre in his judgment, wielding a rapier to puncture the balloons of pomposity and complacency. He grumbled with every one about most things, but we all loved him.

When the tide of affluence crept up and bore him along he was startled, and lost to know what to do with its rewards until he had thought how best he could help others not so fortunate. He never wanted anything for himself. He had quaint ideas about money. "Put it in the Bank" he'd say, "It will disappear probably if you invest it, through some idiot's mishandling." One often found it difficult to explain to him the benefits deriving from our cautious investments policy in augmenting the Society's income.

Throughout, and before, my Chairmanship of the Finance Committee he was a member of it, but rarely found it possible to attend its meetings. He kept a most vigilant eye on our proceedings, however, and would write to me fairly frequently, expostulating about what seemed to him to be "just a shocking waste of money." When I gently replied that if only he could have attended the meeting he'd have realised the arguments supporting the expenditure, he would answer by return "entirely satisfied . . . must apologise; . . . always happy to know you are looking after our money . . ."; so typical of his warm generosity of mind.

He lived very simply. For him there was "No dancing on the light fantastic toe." There was always so much waiting to be done. He had two diversions. Golf, which he shared with his wife; and photography. He was a good golfer, and would chuckle with boyish delight when he had beaten a rival or two in the Royal Aero Club Golf Tournament.

In photography he was an expert and catholic in his taste. To it he brought his scientific mind and meticulous care which were so evident in all his work. I remember once, at some official occasion to which he had been persuaded to come, he surreptitiously drew me aside as if he wanted to discuss some Top Secret of national importance. From his inmost pocket he drew an envelope and from it



With the Cygnet at the 1953 Garden Party.



Sir Sydney and Lady Camm receiving guests at the 1954 Garden Party at London Airport—one of the wettest on record. On the right, Capt. J. L. Pritchard. Many members will remember Sir Sydney on that occasion in his Wellingtons and with his gay golfing umbrella.

a bundle of prints, which he passed to me to examine. They were some delightful pictures he had taken of his beloved little, and only, granddaughter! It was very moving thus to be drawn, for a moment, over the threshold of his most shy inward being.

A few months ago he and Lady Camm were fortunate to have the joy of celebrating their Golden Wedding, a culmination one feels of a long, happy and perfect marriage and mutual understanding, without which Sydney could never have attained the company of the Immortals.

How better to commemorate and pay homage to this most unusual character than to affirm that he was one of the greatest nonconformists of all time, using that word in its literal sense and not in its usual connotation with religious creed and ritual. He was so utterly and consistently Different.

There must have been many at that unforgettable Memorial Service in St. Clement Dane's who would be picturing his puzzled look of bewilderment and humility that such things should be done in his honour; that his old Chief, Tommy Sopwith, should be so inspired to pay tribute to him in a wonderful Address; that so many had gathered, in their variety, in deep sorrow and great pride, to bid him Farewell; that there should be such a to-do at the Passing of such a humble man into Valhalla; he had only done his best, not only in "the beginning, but the continuing of the same unto the end, until it be thoroughly finished"; and who had acclaimed throughout his life:—

"There's no discouragement
Shall make him once relent
His first avowed intent
To be a pilgrim."

From A. W. BEDFORD, Fellow

IN the field of fighter aircraft design Sir Sydney Camm's name ranks as one of the world's greatest. His contributions to aviation are legion and the Company and country will always be indebted to him.

Imagine a career starting with a £50 rebuilt Martinsyde aircraft, an old engine purchased from Mrs. Hawker and a £5 propeller purchased from the well known scrap dealers—Coleys! A career which blazed a trail, taking one technical breakthrough after another in its stride—biplanes,

monoplanes, jet engines, sweepback and vertical take-off—always looking with uncanny intuition into a hazy future to see what line to follow next.

His first design—the two-seater *Cygnets* in 1924—only weighed 375 lb empty. It took first and second prizes in the 1926 Lympe trials. Sir Sydney's team were first with the production fighters to achieve 200, 300, 400 and 700 mph and first with a fighter able to fly supersonically and backwards. One success followed another; strong, smooth powerful craft with graceful flowing lines, superb handling qualities and inevitably the right aircraft at the right time. Typical of this was the *Hunter*, of which 2000 were made, serving 14 different air forces—an aircraft still in big demand 14 years after its initial flight.

His genius, foresight and experience brought sanity and reality to the modern world of aviation. He injected such a refreshingly human atmosphere in this age of automation. He set an example of zestful living to us all with his golfing ability, his E-type *Jaguar*, his knowledge of cameras, chronometers, gardening, art, and so on. He was a man respected and loved by all who worked for him and his loss is a big one to us all. Working for Sir Sydney gave one a feeling of confidence and security since the pilot's safety was of major concern to him. There was never any question of sacrificing structural strength to gain performance at the expense of safety. When the P.1127 arrived on the scene and excess weight assumed even greater importance he was the first to insist that it was equipped with the latest, but somewhat heavier, rocket ejection seat immediately they were available.

The unselfish concern for the pilot together with his deep interest and understanding of the practical problems of aeroplanes led to a warm and happy atmosphere in which to work.

Fittingly, Sir Sydney's career finished on a climax in the form of the government's assurance of a substantial order for P.1127's for the RAF. Let there be no doubt that V/STOL is here to stay and it will play a progressively important role in world military and civil projects in future years. Having steered the design ship so brilliantly in the past, Sir Sydney has now left us at the beginning of the right road and history may well acknowledge that this advance in V/STOL is a step forward as important as the jet engine itself.

On behalf of the Test Pilots in particular, I would like to pay the highest tribute to Sir Sydney for the outstanding designs we have enjoyed over the years, together with a happy and close relationship.

From S. D. DAVIES, *Fellow*

ALMOST any engineer in looking back over his early days in the profession will recall, with gratitude, intimate contact with some outstanding individual who profoundly influenced the course of his career.

In my case that individual was Sir Sydney Camm who was my mentor during a very formative period at Hawker Aircraft from 1931 to 1936. Although we had many contacts thereafter, both professionally and socially, it is of the impressions gained during this period that I wish to write.

For me the outstanding qualities which I will always remember were his terrific engineering instinct, his great sense of humour and his humanity and of these qualities I am inclined to put his sense of humour first, since this helped to lubricate the wheels in that hectic period in which I was most closely associated with him.

Our very first meeting was on the occasion of my being interviewed by the great man for a job as Aerodynamicist in the Spring of 1931. During the course of this interview,

the matter of technical qualifications and suitability for the job was soon disposed of and we settled down to the really serious business of salary. I was asking for the princely sum of £4 10s. 0d. per week and Sydney thought that £4 was nearer the correct figure. He then proceeded to argue that since I lived in London and would have only half the distance to travel to work from my existing job (which was at Weybridge), I was already at least 10/- a week in pocket and should not be greedy. I for my part countered with the proposition that I was buying a *Morris Minor* on the H.P. and relied upon a fare-paying passenger to Weybridge to help me meet my commitments; I would therefore be worse off than before in coming to Kingston! This argument so tickled his fancy that he immediately offered me £4 5s. 0d., I accepted and the interview ended on a note of great good humour, which was somewhat unusual in that age of scarce jobs and massive unemployment.

Sydney Camm's great sense of humour, including an outstanding ability to deflate egos could be illustrated by many little anecdotes which, however, are too personal or trivial to bear repetition outside the circle of those immediately involved.

One such story I will relate, however, since it illustrates one part of his basic philosophy. It was, I think, in 1934 that the SBAC first held an exhibition of aircraft on the Monday following the RAF display at Hendon. At the first of these exhibitions the organisation was somewhat improvised and no special arrangements had been made at Hawker Aircraft for visiting the show. On the Monday in question, the sun shone brilliantly and on coming into work I had the bright idea that it would be more pleasant to sit on the grass at Hendon than at one's desk in the office. Prompted by one or two other colleagues I therefore tackled Sydney Camm and suggested that certain members of the staff should be sent to Hendon for the day. He thereupon wanted to know why we should waste the firm's time and money on such an expedition, to which I mumbled something to the effect that we could learn something by close examination of our rivals' products on the ground. He immediately retorted "Don't we make enough mistakes of our own, without copying other people's." This certainly silenced me and I went back to my desk. Ten minutes later Sydney appeared from his office, remarked that it was a very fine day, we would all be the better for a day out in the fresh air and immediately those of us with cars filled them up with passengers and were hot foot to Hendon!

He was a believer in small staffs of good quality, closely supervised and to his dying day was violently opposed to



Sir Sydney at Wentworth in 1956 during the annual match between the Aircraft Industry and the RAF. The two spectators in the centre are Sir Reginald Verdon-Smith and E. A. Chris Wren.

the modern concept of the large engineering organisations which are now so much admired by our political masters. He always regarded the design staff as a team and when he thought of a team he could not visualise an army.

During my time at Hawker Aircraft from 1931-6, this team was truly very small but, I like to think, of vintage character. There were those who remained with Sir Sydney to the end, and the others who like myself wandered about a bit, even though some eventually returned to the fold. These included R. W. Walker who became Chief Designer of Gloster Aircraft; P. B. Walker who went to the RAE; R. L. Lickley who went to the College of Aeronautics and eventually returned to Hawkers via Faireys; Maurice Brennan who became Chief Designer of Saunders-Roe and returned to the Hawker Siddeley fold via Folland and A. V. Roe's; J. V. Connolly who went to the Ministry of Aircraft Production and is now running a business school; Bob McIntyre who went to Scottish Aviation as Chief Designer; C. L. Cowdrey who was Chief Draughtsman in my time and eventually became Chief Engineer of Napier's Installations Department at Luton.

Sydney Camm used to take it as being the natural way of things that people would not necessarily stay in the same firm for ever and he did not *unduly* reproach those who departed from the nest. On the contrary, he retained affectionate and, I believe, proud feelings towards those who had passed through his hands and had achieved positions of distinction outside Hawker's. He always regarded them as "his" men.

I remember an occasion during the War when as Experimental Manager of Avro's at Manchester I was concerned with a scheme (which was later dropped) for producing the Hawker Tornado at our "shadow" works at Yeadon in Yorkshire. Our part was to check assembly of all the major sub-contracted components, and in the course of this the usual spate of drawing queries arose. The main Hawker drawing office was then located at Esher and probably due to other preoccupations did not give our queries the attention which I thought they deserved. In view of the very tight time scale this led to a policy of "alter first and tell the drawing office later." This naturally caused a certain amount of indignation at Esher and Sydney Camm was told that Davies was interfering with the sacred Hawker drawings without authority. W. W. W. Downing, who was acting as Hawker Liaison Manager in Manchester was duly called down to an inquest where he presented the Avro point of view. In the upshot Sydney is reported to have said that he "... would not have his man Davies, up in the Frozen North, Outpost of the Empire, etc. messed about ..." and instructions were given for much more rapid clearance of Drawing Office queries from then on.

We have all met Chief Designers who appear to have an instinct for spotting the only error on a drawing or unearthing the one doubtful fact in an otherwise plausible technical argument. Sydney Camm had this quality to an amazing degree. Added to this was his eye for a smooth line which seemed to make some aspects of aerodynamics almost redundant. His experience and instinct were more often right than wrong in any arguments with the more academically trained aerodynamicists. He had a particular dislike for thick wings at a time when it was fashionable chord ratios of the order of 18% and above. He instinctively felt that such layouts were wrong, and after the Typhoon, which for various reasons incorporated this thick wing thinking, he returned to the straight and narrow path of minimum frontal area, thin wings and a clean design exemplified in its ultimate subsonic form in the Hunter.

Although the success of the Hawker team was the envy

of his competitors, there was certainly very little complacency inside the organisation while Sydney Camm was around. He was a perfectionist inside the office and was extremely critical of the shortcomings of sloppy detail design. He was always a weight saver par excellence and perhaps for this reason it was fitting that his last great achievement was that of an operational VTOL aircraft where weight saving is so fundamental to success.

He also felt from time to time, with quite genuine modesty, that a particular project which had a chance of achieving great success was being over-sold by well-meaning supporters. The dangers of pricing oneself out of the market were ever present in his mind. He was very conscious of this during the early days of the prototype P1127 in 1960-1 and the way in which requirements were escalated outside the then present state of the art into the P1154 caused him much misgivings and events proved him right.

He was a strong believer in being able to walk before one started to run, but his great virtue was that he made his team walk at a pretty fast pace so that they were able to burst into a run at the appropriate moment. It is sad to think that we shall probably not see his like again.

We are privileged to publish this letter received by Lady Camm from Paul Petersen, of Denmark.

It was with deep sorrow I learnt about the sudden death of your husband and I here wish to express my most sincere sympathy with you and your family for the loss you have suffered.

May be your husband has mentioned me to you earlier, may be not, but anyway I wish to say how indebted I am to this great man who I admired so deeply. I remember when I, 15 years ago for the first time read about your husband as the designer of the famous "Hurricane" fighter. With all the frankness of a 13 years old schoolboy I just sat down and wrote him a letter, eager as I was to learn more about the Hurricane, Typhoon and Tempest aircraft. With the characteristic kindness and helpfulness which I later got to know so well, your husband not only answered my letter—which was written in halting English—personally, but even sent me photographs, drawings and a book about the Hurricane. Very impressed I started to build models of both the Hurricane and the Typhoon and soon wrote again for further details. By and by still more letters passed to and fro, and soon your husband invited me to come and see him at the factory, if I should happen to come to England some day, so he could show me the aircraft. I can recall very well how proud I was of that letter which I even brought to my school to show it to my English teacher!

However, four years passed before I actually could afford to go to England, but your husband had not forgotten his invitation. For the first time I met your husband in person, and it became a most unforgettable visit during which I even was taken all the way down to Dunsfold to see the aircraft fly.

At that time I wanted to be a pilot, but unfortunately I suffered a severe leg fracture shortly afterwards which upset those plans and prevented me from starting flying for the first couple of years. However, I had been so impressed by my visit to Hawker's that I decided to go on with aviation in another way, and the year after I began studying mechanical engineering at the Technical University of Denmark where I later specialised in aeronautics. All the time I kept contact with your husband and again and again he helped me with all my different problems and boosted my spirits towards aviation.

Early last year I finally graduated from the Technical University of Denmark with a master of science degree in mechanical engineering. Since then I have been with the Scandinavian Airlines System engineering department in Copenhagen and am very fond of my job. I am very glad indeed that I last summer again was able to come and see your husband in the new premises on Richmond Road together with my wife and to thank him for what he had done for me. I had hoped that it would not be the last time I saw him and yet it should be.

Your husband was not only a great aircraft designer but a very fine character too, a man who I shall never forget and to whom I shall always be deeply indebted. Every single letter I have received from his hand is carefully preserved, and in my library I have several books with his dedication, all of which will forthwith serve as a rich source of inspiration to me.

The Hawker Siddeley Group was so kind to send me an admission card for the Memorial Service held in St. Clement Dane's on 29th March and fortunately I was able to fly over to attend this service, thus showing your husband a last honour. I had to go back the same afternoon, so I did not find out where he had been buried. However, next time I come over I would like very much to go and visit his grave, so would you kindly let me know where your husband lies buried, please.

May he rest in peace!

Yours very sincerely,

PAUL AKSELSTAD PETERSEN.

13th April 1966.

The Daniel Guggenheim Medal for 1965 was awarded to Sir Sydney and he was to have gone to New York to receive it on 28th April 1966. Instead, it was received on his behalf by Sir Patrick Dean, GCMG, the British Ambassador, at a luncheon given by the Society of Automotive Engineers at the New York Statler-Hilton Hotel on 28th April 1966. The following are the tributes paid on that occasion to Sir Sydney by Mr. Grover Loening, Chairman of the Daniel Guggenheim Medal Board and Sir Patrick Dean, the British Ambassador.

Mr. Grover Loening:—The Daniel Guggenheim Medal Board for 1965, of which I had the honour to be Chairman, awarded this great Medal to Sir Sydney Camm "For over 50 years of continuous dedication to the design of military aircraft and pioneering of many new concepts and the creation of many successful aircraft, representative of the best tradition of British design skill."

It is, of course, with great regret that we must note how God has taken Sir Sydney from our midst, a short two months ago. But there has been left an inspiring monument of his great contributions and achievements, which will enshrine his name in Aviation History.

Sir Sydney, when he died, was 72 years old. From his earliest age he was dedicated to aviation; first, making models, taking much technical and engineering training, and at the beginning of the First World War era, joining as a woodworker and engineer with the Martinsyde Aircraft Company. By the end of World War I this outfit had developed the 300 hp Martinsyde F-4, the fastest single engine British fighter of its day. A further development of this plane, by then mostly designed by Sir Sydney, won the Hendon Aerial Derby of 1920 with, up to then, the unapproached speed of 153 miles per hour, piloted by the great pioneer aviator, Frank Courtney.

At this time Sir Sydney was already an Associate Fellow of the Royal Aeronautical Society, and had begun to take his place in the British Aircraft Industry as one of the outstanding, young and rising aeronautical engineers.

In a short few years he joined the Hawker Engineering Company, the parent, or perhaps—grandparent—of the present Hawker Siddeley Company, with which he remained identified the rest of his life.

During this distinguished career the Hawker aircraft production record is, indeed, an eye-opener. In the course of over 40 years up to this year some 52 types of Hawker aircraft were built, of which more than one-half went into extensive quantity production. So that during this period, the Company of which Sir Sydney was first an employee and then the outstanding engineering head, built a total of 26 000 aircraft of various types.

The distinguished types are numerous, but there are two that are conspicuously outstanding. The first is the famous Hawker Hurricane single seater fighter of World War II, 14 452 of which were produced—the very plane which had such a leading part in equipping those brave indomitable men with wings referred to by Sir Winston Churchill when he said of them, in the Battle of Britain—"Never in the field of human conflict was so much owed by so many to so few." It was Sir Sydney who designed the principal tool to finish that job.

The second outstanding contribution that at the moment has no equal is the most recent, most advanced type of fighter. It is the Hawker Siddeley VTOL Fighter Jet Aircraft, known in England as the P-1127 Kestrel and now known in America as the XW-6-A.

Sir Sydney's master hand therefore is still in the air right now, today, with us. It is this unique design in which powerful vectored thrust fan jet engines operate through controllable nozzles to give vertical lift for take-off, and then have the supreme versatility to gradually transform in the air into a supersonic fighter. Thus the long vulnerable runway is eliminated and the aircraft's home is any small open space.

A squadron of these planes is now in America. This type has been tested by the United States Air Force and the United States Navy pilots, and is now going through a final phase of evaluation that is likely to determine a large scale production program. In this plane there is being achieved at last the perfection of the air vehicle. The gap is closed on the imperfection of not being able to slow down and stop in the air. The 1127 can stop, back up, and land and take-off without charging up and down expensive runways, and then fly supersonic.

Among less distinguished but equally important and useful airplanes designed from Sir Sydney's drawing board were the Hawker Hart and Hawker Fury, the Typhoon of World War II, the Sea Hawk of the 1940s, so satisfactorily used in the British Navy, and the Hunter Single Seater Fighter of the early 1950s, which is still in world-wide use.

It is interesting to note that through these years of development, Sir Sydney's team was the first in England to produce fighters that achieved successively and successfully in their periods 200, then 400 and later 700 miles per hour.

I have seen many Hawker aircraft on the ground and in the air and ridden in some of them. Always one is impressed with their strong, smooth power, their graceful flowing lines, superb handling qualities, and inevitably the knack with which Sir Sydney had the right aircraft at the right time.

Sir Sydney was appointed a Commander of the Order of the British Empire in 1941, and Knighted in the Coronation Honours List in 1953.

He was an Honorary Fellow and Member of the Council of the Royal Aeronautical Society, having been also Vice-President in 1950/52 and President in 1954/55. He received the highest RAeS honour—the Gold Medal—in 1958.

We in the United States now give our highest honour, the Daniel Guggenheim Medal, to a great aeronautical engineer whose work has benefited all of us. Despite his untimely death we have not lost him entirely. His work lives on.

Sir Patrick Dean:—It is a very great honour for me to receive the Guggenheim Medal on behalf of the late Sir Sydney Camm.

It is an honour not only to Sir Sydney, but to the British aircraft industry and to Great Britain as well.

Sir Sydney Camm was a very great figure in British aviation: indeed, he was a man with a world reputation. He was President of the Royal Aeronautical Society in 1954, and I have no doubt he was very proud still to be a member of the Council of the Society when its hundredth birthday was celebrated on 12th January, this year.

We have just heard some very gracious remarks about him from Mr. Loening. I should like to add to those remarks my own tribute and, in particular, my great admiration of the part which Sir Sydney played in the British Aircraft Industry.

He was a notable designer and a natural artist. While he was prolific in his designs he always produced a good-looking aircraft. He was responsible for the design of a number of very famous aircraft, in particular the Hawker Fury before the war, the Sea Hawk during the war and, of course, the Hurricane, which was one of the aeroplanes of the "First of the Few" in the Battle of Britain. He started to design the Hurricane in 1933, and it was one of those aeroplanes that is recorded as having fired the first shot in the Battle of Britain. Nearly 15 000 Hurricanes were produced, and Hurricane pilots are credited with having shot down at least 1300 of the enemy. It was an amazingly efficient and effective aeroplane.

After the war, Sir Sydney designed the Hawker Hunter, which has been a staple fighter of Britain and of many other countries, and the P-1127, which represented a new approach to the vertical take-off fighter.

His place not only in the history of my country but also in the history of world aviation is assured. The achievements of Sir Sydney Camm covered a large span in the achievements of the British aircraft industry and I think it would be appropriate to say something here about that industry. It has been in the press a good deal of late with the Plowden Committee report.

There may be perhaps in some quarters a rather easy assumption that the day of this industry is over and that it can no longer play a part upon the world stage. That is quite wrong. This is a great industry with a record of quite remarkable successes.

I do not want to go too far back in history, but perhaps it is worth reminding ourselves that the first non-stop Atlantic crossing was made in 1919 by a British Vickers Vimy machine. It was the Supermarine S.6B which was the first aeroplane to fly at more than 400 mph. It was a team led by Sir Frank Whittle who pioneered the gas turbine engine. The first turboprop air liner was the Vickers Viscount, one of the most successful aircraft in history. There was the de Havilland Comet series, and the Comet 4, in 1958, which inaugurated the first trans-Atlantic jet in Commercial service. There were the Canberra, the Vulcan and Victor bombers.

So much very briefly for past achievements. What of the present and the future? Today, in the present generation of aircraft, British industry is represented by some highly successful and sophisticated aircraft.

We have the BAC One-Eleven short-haul jet, which is in service with Braniff and Mohawk and starting service with American Airlines; the H.S. 125, a very successful executive jet which is selling well in North America; and the Super VC 10, the biggest air liner ever built in Western Europe and the only trans-Atlantic jet to have been built outside the United States. There is the V/STOL P-1127 which enters service with the Royal Air Force in 1968, and

the use of lightweight lift engines for other V/STOL applications. Then we have the Lightning and the Hovercraft, the invention of Mr. C. S. Cockerell.

For the future we are developing the Concorde with the French, the world's first supersonic air liner.

Running through this record of achievement is the very significant fact that about half the aircraft of the non-Communist world have British aero engines, and about 24% of the turbine-powered aircraft in airline service in this country are Rolls-Royce-powered.

Naturally, it has not been a success story all the way. But one thing the British aircraft industry does not lack is the brains and design skills required to create the most up-to-date aircraft. Indeed, we can match any country in the world in this respect.

On the other hand, in a real sense the British aircraft industry has been the victim of its own successes. The pace of technical innovation in aircraft is faster than in perhaps any other industry. The difficulty for us has been that these changes have taken place against a background of a limited domestic market, both civil and military, for the products of the British aircraft industry. This is a fact of geography due to the size of the country.

It was against this background that the British Government set up the Plowden Committee to examine and report on the future place of the British aircraft industry in the British economy. The Plowden Committee has produced a full, though not uncontroversial, report and the British Government announced some weeks ago the action which it would take as a result. I emphasize that this action is designed to ensure a continuing place on the world scene for the British aircraft industry and its products. . . .

True, there will be changes. The industry will not be quite as large as before and we shall have to concentrate carefully on projects for which the development costs are not disproportionate to the market. In particular, we shall have to aim to collaborate with European partners on future airframe projects. Indeed, our objective will be to collaborate on all major military and civil aircraft which have good economic prospects as European projects for the simple reason that the more costly the development of the project, the greater the markets will have to be.

We shall also continue to collaborate with the United States on suitable projects. The agreement on the Advanced Lift Engine, signed last October, is a good example of such collaboration and we hope that there will be many others. . . .

We see a great and continuing future for the British aircraft industry. The object of the changes which are following the appearance of the Plowden Report are to strengthen the industry and certainly not to bury it. . . . I would emphasize that the fact that the British Government have decided to arrange their proposed partnership with the airframe industry on a mutually-agreed basis shows that they intend that the reorganization shall be carried out with a minimum of disturbance to collaboration projects and to exports. This means that there will be no disturbance to aircraft deliveries and to the continuity of spares and maintenance.

We hope, therefore, that the British aircraft industry, for which men like Sir Sydney Camm did so much, will continue to play as great a part in the future as it has done in the past. The role may be rather different and there will certainly be more collaboration with others.

This is the pattern of the future which offers scope for real achievement. It is a pattern within which the British aircraft industry should continue to play a role vital to our economic well-being and to our proved capacity to make an important contribution to the peace of the world.