

# Farnborough Afterthoughts

By JAMES HAY STEVENS

**F**ARNBOROUGH is over once again: all the frantic preparation is past until next year; the excitement of the first morning with the white tents, the office staff unaccustomedly wielding their feather dusters on the stands and the ground crew their polishing cloths on the aircraft; the hurried greeting of old friends whom one will not see for another year—all this is finished and one is left wondering how to sum up the Twelfth SBAC Display. Certainly there were not so many new types as some other years, but what was to be seen after the veil of security had been (reluctantly) lifted was of the very first quality.

Despite this excessive security, there was an amusing lapse that is worth

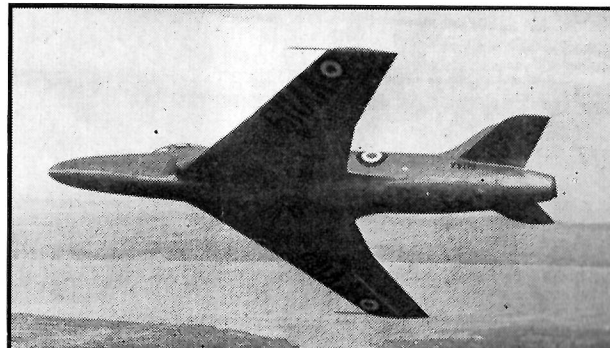
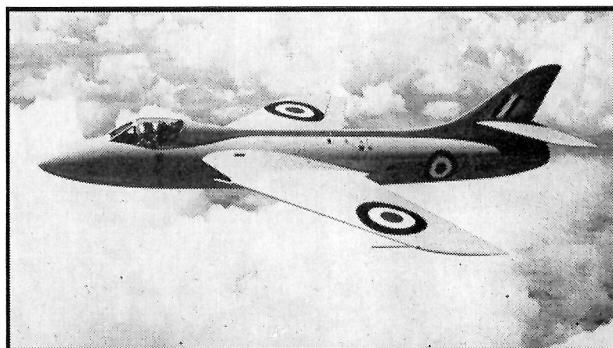
recording. For some years we have had had to be content with a few handouts about the "flexible deck" (MAT) which was being developed for the Royal Navy. No photographs could be published and nothing said, yet when I arrived at Farnborough, there beside the runway was the whole equipment—an area of heavy rubber ballonets with a wooden ramp, pressure gauges and inflating equipment. Then, early on Wednesday morning, before most of the guests had arrived, a Sea Vampire came in with its arrester hook down and landed on the flexible deck with its wheels up, stopping in a cloud of dust in a very short distance. Apparently there was an arrester cable in use, but one was not allowed a close-up

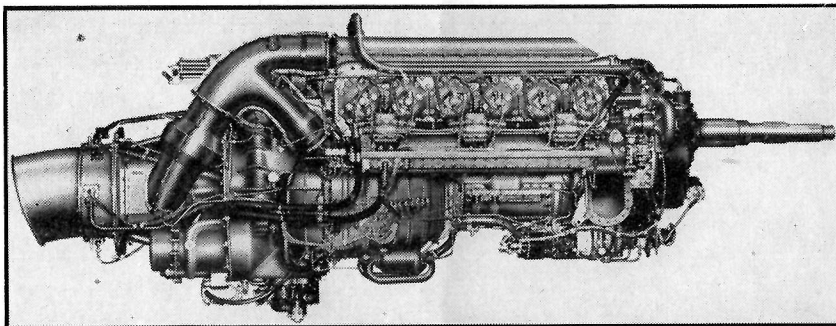
after the demonstration. The idea of the flexible deck is to provide an emergency landing area on which wheelless aeroplanes can be put down safely at 100 mph or so. If this were used in conjunction with catapults for take-off and convenient handling trolleys, all the weight and complication of the undercarriage on fighters could be avoided—with a consequent increase in performance or endurance.

## the static display

**T**HE SHADOW of security prevented most companies from showing their latest work in the Static Exhibition. Napiers, however, were a happy exception. It was generally known in the Industry that they had

TOP IS THE VICKERS VALIANT; BELOW, LEFT, THE HAWKER P.1067; RIGHT, THE SUPERMARINE 535





#### NAPIER NOMAD

for several years been working on the practical application of Dr. Ricardo's theory of the "compounded" engine. They were allowed to show one of their first development Nomad units and to demonstrate another in the nose of a Lincoln. It is a rather curious looking affair; large, of a queer incongruous shape and covered with many pipes—but, in fairness, it should be considered in comparison with the Whittle W/1, for it is in the same early stage of development.

The "compounded" Nomad engine should not be confused with the American "compound" radials; while the latter are adaptations of existing engines in which the waste exhaust gas energy is trapped by turbines and fed back to the propeller shaft, this new design starts from scratch as an attempt to combine the best features of the piston and the turbine. The objective in each case is the same, and that is to improve thermal efficiency.

**Half and Half:** The Nomad consists first of a horizontally-opposed, flat-twelve, two-stroke diesel which drives one half of a counter-rotating propeller. The exhaust from the cylinders is passed through a turbine which drives the other half of the propeller. A combined axial and centrifugal compressor supercharges the diesel. Take-off or emergency power is obtained by burning fuel in two auxiliary combus-

tion chambers and passing the gases through the auxiliary turbine. Dry weight is 4,200 lbs.; take-off power 3,000 shp plus 320 lbs. thrust; length 10 ft. 6½ in.; width 4 ft. 10¼ in.; depth 4 ft. 1¼ in. A specific fuel consumption of 0.36 lb./ehp/hr. is quoted, which is about that of the U.S. compound engines and not much lower than the best diesels. I feel that this must be a figure for full power and that a much lower consumption is possible for cruising—or at any rate will be after a little more development.

In the form shown the engine is too complicated to be very welcome to users, but there are probably more compact and tidier engines already on the way. The simplicity of the turbine is sacrificed for the low fuel consumption and there is the complication of liquid cooling to remember. On the other hand, being a diesel, ignition is required only for starting and all the bother of dual ignition goes overboard. As a means of getting high power for long range, whether in Atlantic transports or ocean reconnaissance aircraft, it is a development to be watched.

**Rockets and Wings:** The Ministry of Supply permitted themselves to show one of their bi-fuel rockets on which they have been working in secret for some time, one of their systems for investigating wing drag by the use of rockets at Mach numbers of 0.7 to 2.5,

as well as various electronic metering equipment. A moulded plastic wing was interesting, but although it was claimed to be light and cheap to make, few details were available. A new type of suppressed HF aerial in which the aircraft wing or fuselage is made to resonate in sympathy with the required frequency is an interesting technique too complicated to be dealt with here.

The aircraft which had either flown at Farnborough before or had not achieved the qualifying ten hours before the Display were arranged in a special static park. In this last group were the Hawker P.1072, which is the old P.1040 with an Armstrong Siddeley Snarler 2,000 lbs.-thrust rocket motor. The vivid orange Avro 707A delta-wing with root air intakes was on show here and rows of tiny knobs on the wing caused comment—these turned out merely to be split pins that were being used to plug pressure-plot holes when these were not in use.

The Auster Ambulance/Freighter is a curious "pod-and-boom" variant of a well-tried theme. The idea is to be able to push in a stretcher or other baggage through a rear door. When no special load is being carried it is arranged as a four seater. The way in which the familiar Auster fuselage has been lopped off behind the wing and the typical tail mounted high on a welded tube fabric boom is ingenious, but it is not pretty. With a 180 hp Cirrus Bombardier engine, a payload of 550 lb. can be carried for 300 miles at rather over 100 mph. The Miles Aerovan did a good deal better on very little more power five or six years ago.

**Inside the Comet:** The de Havilland Comet, fully furnished, was the dominating feature of the static park. The Vickers seats are remarkable for comfort and adjustment, but a foot rest would, I think, bring them to perfection. The windows, which look small

HAWKER P.1072



DE HAVILLAND VENOM F.B.1





from outside, are ample and give the passengers an excellent view despite the large wing. The dark blue upholstery and toilet fittings all look outstandingly good, although the pale grey roof struck me as being a little chilly.

The Airspeed Ambassador, in the furnishings of BEA's Elizabethan Class, made an interesting comparison with the Comet, for its interior is furnished in a warm reddish plaid pattern, and there are large cream plastic window frames to relieve the grey of the walls and ceiling. The high wing and large windows promise a good view to the passengers, save for the inner ones in the three-tier seats on the starboard side. Seating is almost aircoach standard, with just enough leg room and not enough elbow room for real freedom—on the other hand, despite adjustable backs, a convenient hinged table is fitted. An unusual feature is a pair of rearward-pointing lamps in the nose for detecting ice on the wings . . . this is unusual because in so few air liners today can the pilot see much of his wings.

A Vickers Attacker loaded with auxiliary tanks, rockets, and 1,000 lb. bombs showed how sleek jet aeroplanes can be made to suffer by the military, while an effective piece of cannibalism was a Bristol Freighter standing with its nose doors open revealing a Bristol 171 helicopter stowed inside.

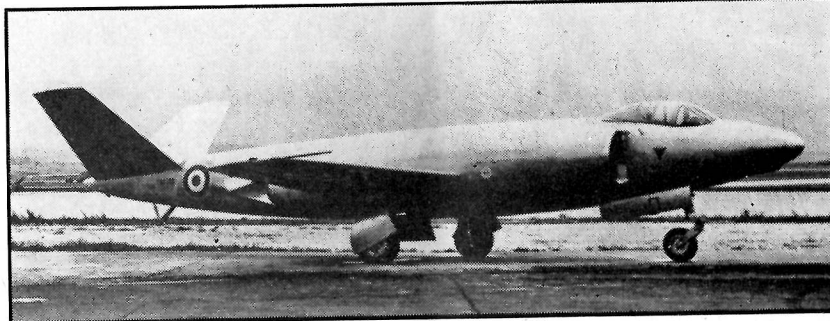
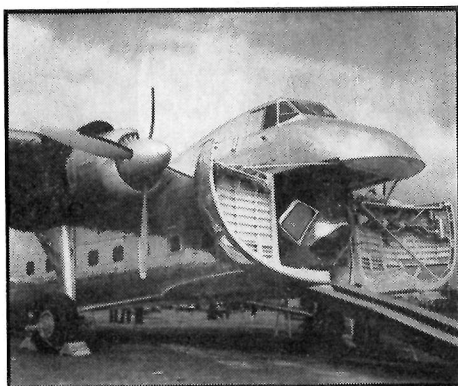
In the centre of the aerodrome, brooding over the smaller fry like a very shapely hen, was another static type, the Brab, which provided the climax to each day's flying last year.

#### in the air

**B**UT IT is in the air, after all, that an aeroplane proves itself, so now I am going to try and give an idea of how some of the various aeroplanes impressed me.

The raval turbo-props flew well.

#### BRISTOL FREIGHTER



#### SUPERMARINE 508

The Westland Wyvern repeated its past performance with a full load of torpedo and rockets, showing a remarkable turn of speed and doing some exquisite slow rolls on a perfect centreline. The Fairey Gannet did not roll quite so smoothly, because it is, after all, far removed from a fighter in design, but its slow flying and single-engined handling were outstanding. A curious feature of the Gannet is that the main wheels tuck up quickly, there is then a longish pause before the nose-wheel flicks up smartly—a process that is reversed on landing.

The Blackburn and General Universal Freighter, designed by F. F. Crocombe, making its second appearance at Farnborough, provided good evidence in its own favor as a heavy transport capable of landing in and leaving small spaces. Since last year, reverse pitch aircrews have been fitted and the landing run, as demonstrated at Farnborough on light load, was only a fraction of that of the other aircraft—even with full load the Universal Freighter can operate from grass fields impossible for any other aircraft carrying 15 tons.

**Comparisons:** Some of the "old brigade" produced interesting comparisons. The de Havilland Vampire trainer showed that its lower speed and wing loading allowed it to turn more tightly than its descendant, the Sea

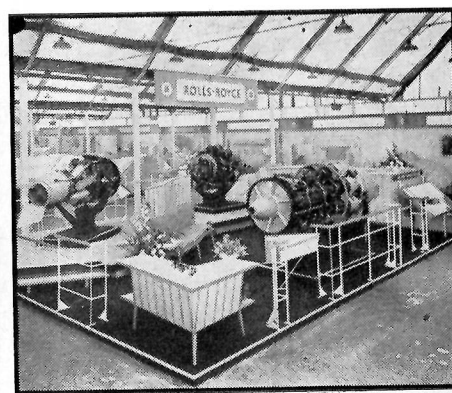
Venom, or the navalized P.1052. It was noticeable that the air brakes of these two were in use during many of the manoeuvres, particularly the tighter turns. Another Venom brought re-heat back to the Display, after two years' absence, with all its assorted horrid noise! Take-off and climb were markedly good and, after the initial burst of flame and smoke as the gear was started, it was fascinating to see the ring of blue-white flame flickering inside the jet pipe.

The perennial Meteor proved that Gloster's ten-year-old design work is far from being a back number. This particular model is a development of the Mark 8 for ground attack and it was located with 24 rockets and two wing-tip tanks—albeit the latter were empty. Despite this load the take-off and climb were good and manoeuvrability fully up to standard; but it was left for Zurkowski to produce the surprise of the flying display—a new acrobatic. Pulling up in a vertical zoom until his speed dropped to zero, he cut one engine and let the other pull the Meteor over on one wing-tip into a "catherine wheel" of two or three turns. That the manoeuvre is tricky can be judged by the fact that on one occasion it did not come off and the Meteor fell away in a spin, on another it did a straight stall, and on a third it did a tail slide. It is possible that the shield-

#### PLASTIC WING



#### ROLLS-ROYCE DISPLAY



ing effect of the tip tanks are a help in preserving the airflow and making possible this new aerobatic.

### the new types

**T**HE REAL event of the year was, of course, the revelation of the new types; the Vickers Armstrongs Valiant, Hawker P.1067, and Supermarine 508. This was something of a disappointment, however, for in the first place we had not been allowed near enough to the special park to see more than is perfectly obvious from photographs and secondly, the pilots had obviously been told not to show the machines off to the full. Also, the Swift had a belly landing and the externally similar Nene-engined Type 535 deputized.

The Valiant is remarkable for having very large double-slotted flaps, which certainly seem to give it a good take-off and landing, though one must always remember that bombers have a great weight advantage over fighters at such demonstrations. Its grace in the air was remarkable and the change in wing sweep from the broad root was reminiscent of the Comet. Like so many of the very efficient, well-streamlined types, the Valiant was very quiet in flight. I was particularly impressed by the Valiant's slow approach to land and the S-turns which her pilot made at low speed.

The Supermarine 508 carrier fighter, which arrived late on Tuesday evening, is a most curious aeroplane. Basically a "blown up" Attacker, it has two Avons and *straight wings*. One would have expected sweepback as the logical accomplishment of the enormous power of the two big axials. The reasoning behind the layout is probably that the machine is supersonic anyway and, therefore, by having a straight wing it is possible to meet the troubles earlier—for they exist only at the critical speed—and, in any case, it is extremely difficult to make a folding swept wing. Leading edge flaps in conjunction with plain flaps give a high-lift section to the very thin profile wing for landing—the first time this thirty-year old RAE invention has been used in Britain! The butterfly tail, with its "vaw-pitch" controls, is an effort to reduce tail unit drag and, at the same time, to clear the twin jets. It is a system that has not before been used on a fast or large aeroplane, although it has been tried successfully on several civil types, notably the Beech Bonanza and the aerobatic Fouga light jet aircraft. No

attempt was made to demonstrate the climb of this aeroplane, which ought to be exceptional.

**Fastest Fighter:** Most spectacular of all was the Hawker P.1067—claimed as the fastest fighter in the world. More tubular and less graceful than the earlier jets designed by Sidney Camm, this one has all the performance one could wish. The half dozen SBAC Displays since the War have gradually inured us to low, high-speed beat-ups, but this one by Neville Duke was easily the fastest yet — *and looked it*. Flying straight along the runway at about fifty feet, he was past and out of sight almost before one had time to appreciate the roar of his passage. The

## CF-100 Delivered

The RCAF took delivery of its first CF-100 on October 17 and the occasion was marked by an official presentation ceremony at the Malton, Ont., plant of the designers and builders, Avro Canada. This aircraft, fourth of the type to be completed, is powered by Avro Canada Orenda engines. Of the other three aircraft, one crashed; the original prototype is being kept by Avro Canada to carry out gun firing trials, and the first Orenda powered version is also being kept by the company for use as a flying test bed. The aircraft on which the Air Force took delivery is being used at the RCAF Experimental Proving Establishment at Rockcliffe.

effect on the eardrums was more like that of a sudden change of pressure than of a loud sound—which may well have been the passing of the shock wave. Unlike the other types, this machine was put through its paces, so that one could appreciate its deep roar (which suggested re-heat) and a very rapid rate of roll that could only have been obtained from power-boostered ailerons. Landing and take-off runs seemed average for a jet fighter, climb above average. This new production fighter, like the Valiant, looks like giving the RAF another winner.

It was a great pity that Swift could not appear for comparison, for the lower thrust of the Nene did not let the 535 compete with the P.1067. Since the machines are externally similar, I will comment on one feature of the 535 which is curious and that is a marked lateral instability on the ground. Just before unsticking and just after touch-down the machine oscillates from one main wheel to the other.

**The Flying Triangles:** Last in each

day's program came the most unique item of all, the flying of the deltas: the Avro 707B and the Boulton Paul P.111 ... the tiny Fairey FD-1 was not present. This layout, which may well be common in the future because of its many structural and aerodynamic advantages, was a new one to be seen in flight. Ignoring minor differences, the 707B and the P.111 are different in conception, the former has a small raked fin and separate ailerons and elevators, while the latter has a large fin and elevons. These basic differences were reflected in the handling—allowing also, of course, for pilot technique. The Avro had a very rapid roll, but seemed to lack the fin area to keep quite straight, while the Boulton Paul rolled more slowly but kept straighter. Neither did much manoeuvring in the looping plane and I suspect that, like all the tailless types, this is the weakest feature.

But it was in slow flying that we looked for the most spectacular advance, and we were not disappointed. The 707B came by, sitting up at about twenty degrees and doing less than 100 mph in level flight. When landing, Roland Falk brought her in at this angle and almost stopped in about half the distance of the other jets, then opened up to go round and land again with his tail parachute. With this the technique is to come in at low incidence and release the chute as the wheels touch, which results in a landing run little more than that of the Universal Freighter, say three or four hundred yards. The Boulton Paul used its tail parachute, but did not stop quite as short. One other point was noticeable about the Avro and that was that it seem directionally slightly unstable at take-off, since it veered right or left once it was in the air.

**To Sum Up:** The newest fighters and bombers shown are already scheduled for production, the delta wing experiments and the compounded engine point to the designs of the future, and Britain's lead in jet development has been maintained. In air transport the position is more confused; the Ambassador is only just going into service after many delays, the Comet is also nearly ready, the Viscount further off. The Bristol 170 and the de Havilland Dove still hold the field in their classes and are joined by the de Havilland Heron and the Percival Prince—perhaps also by the Universal Freighter.