

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

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FIRST AERONAUTICAL
WEEKLY IN THE
WORLD

DEVOTED TO THE INTERESTS,
PRACTICE AND PROGRESS
OF AVIATION

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Victory!

WE have won. Bravo Scott! Bravo Campbell Black! Bravo De Havillands! Bravo Ratier! Bravo all others who helped in the magnificent achievement!

This has been the greatest long race in the whole history of flying. It means so much that for the moment the brain almost reels in thinking out all that it does mean. Our first thought must be that British design has once again been vindicated. When Great Britain made the effort, she won the F.A.I. world's records for speed, height, and distance. Those records have been taken from us by foreign nations, and we have made no attempt to recover them. To that extent British prestige sank in the eyes of the aeronautical world. It is no use talking about what we could do if we tried. It is achievement and only achievement which counts, and those three records are held by foreigners. Now, in a new sphere of aeronautics, in conditions never before laid down, British design has won a victory which places it upon the summit in the eyes of the world.

We wonder if Sir MacPherson Robertson really comprehended all that he was doing when he offered his prizes for an air race from the Mother Country to his own Australia, and threw the contest open to the whole world. Probably he did in the main, though he may not have foreseen all the results. We may not foresee them all yet. This race is going to have tremendous consequences. It set a definite problem, and it gave all nations a chance of seeing how others set about solving that problem and comparing notes. It forced everyone to think about the varying merits of speed, and range, and pay load; and from consideration of these points many results are likely to come about. Some competitors, it is true, apparently hoped to win by fitting as many extra fuel tanks as possible into a fast machine. The rules very wisely defeated such ambitions in the interests of safety. From such attempts to solve the problem of the race no useful lessons can be drawn.

Three types, it may be said, were entered with definite objects and policies—the "Comets," the "Douglas," and the "Boeing"—and each of them has made good and practically proved what their entrants set out to prove. The "Comet" was designed specifically to fulfil the conditions of the race, and it has fulfilled them completely. The other two set out to prove that the new types of fast commercial aeroplanes which have been developed in America (both the "Douglas" and the "Boeing" are American designs), Holland, and elsewhere, could make a brave show even in such a race as this. They, too, have proved their point.

Some of the Lessons

SPEED is expensive and has to be paid for. One great question of the moment is what is a fair price and what is an excessive price to pay for speed. When the aeroplane has no serious competition from the ground or the sea, it is reasonable to fly at the speed which gives the best results for the most moderate expenditure. When, as in the Outback of Australia, the only rival of the aeroplane is an occasional coasting steamer or perhaps a camel train, a speed well below 100 m.p.h. is quite worth while. Once aeroplane meets aeroplane over the same route, speed must be forced up by the competition. Once the public in any country gets a taste for speed, it will not be content with anything except the best possible. This race has made it certain that for the future Australia and Great Britain must be brought as close together in time as the best aeroplanes can bring them. Mails can be got to Darwin in a trifle over two days. Passengers can be taken there in reasonable comfort in under four days. The "Comet" has proved the point for the mails; the "Douglas" for the passengers. Henceforth a journey of over a fortnight cannot be regarded with complacency.

Two features, among many others, have contributed notably to the splendid results of this race—the retractable undercarriage and the controllable pitch propeller.

Unless these two are coupled to a really "clean" aerodynamic design, they do not give full value for their weight and cost. In the De Havilland "Comet," as well as in the "Douglas D.C.2" and "Boeing Transport," we have aeroplanes in which drag-producing excrescences have been eliminated completely. Moreover, every possible care has been taken to see that drag due to "interference," the upsetting of the airflow where two surfaces meet, has been reduced to a minimum. All three are low-wing cantilever monoplanes.

Until the full details of the race become known, it is not possible to estimate accurately the degree to which complete success has been approached. As far as can be ascertained, the controllable pitch airscrews on the "Comet," "Douglas," and "Boeing," have given no trouble. Those on the American machines have been in use in America for a long period, but the Ratiers (we gratefully acknowledge our debt to France) fitted on the three "Comets" have not had the same extensive testing on British aircraft. During one of the practice landings at Mildenhall it became obvious that conditions may arise when it is very desirable to be able to change quickly from coarse to fine pitch. But no actual trouble appears to have arisen during the race.

Results with retractable undercarriages have not been altogether satisfactory. It would seem that there is still room for improvement in the method of indicating to the pilot whether or not his undercarriage is completely retracted or completely extended. But that is a matter for detail development, and the retractable undercarriage can be said to have established its claim.

The Men Behind the Machines

IT is with the deepest regret that we have to record the deaths of F/O's H. D. Gilman and J. K. C. Baines, the New Zealand entrants of one of the Fairey "Foxes." Every man and woman in the race knew that risks would have to be run, in spite of all that the rules could do to minimise them, and everyone cheerfully faced those risks. Naturally, the danger was magnified when a machine with only one engine flew over mountains or open sea, and this "Fox" crashed in the Appenine Mountains. If the "Comet" had not been able to fly on one engine, perhaps there would have been another tragedy in the Timor Sea. We offer our sympathy to the relatives of those two gallant officers.

For the rest, only pilots of great skill, great judgment, great experience, and great endurance could expect to get through to Australia with any chance of a prize in either race. The company which set off from Mildenhall was a galaxy of such pilots. In giving the fullest admiration to the winners, Scott and Campbell Black, we do not in any way depreciate the pilots who followed behind them or were obliged to stop on the way. Cathcart Jones and Waller, and the Mollisons, too, might have been racing neck and neck with Scott and Campbell Black at the finish if they had not had mechanical troubles. Parmentier and Moll in the "Douglas," Roscoe Turner and Clyde Pangborn in the "Boeing," all did magnificently, but the race actually was between the ideas and execution of the designers.



ROYAL INTEREST IN FLYING: Their Majesties the King and Queen paid a visit to Mildenhall on the eve of the Australia Race. In the background is Mr. and Mrs. Mollison's "Comet."

MAKERS of HISTORY

*C. W. A. Scott and T. Campbell Black—Winners of
the World's Greatest Race*



IF Jules Verne, who at the end of last century wrote "Round the World in Eighty Days," could have foreseen such an achievement as this . . . a journey half-way round the world in *under three days!* Yet this is the magnificent achievement of Charles William Anderson Scott and Thomas Campbell Black and the aeroplane entered for them in the England-Australia Race by Mr. A. O. Edwards—the De Havilland "Comet" with two Gipsy Six engines.

By their achievement in winning the Speed Race they secure Sir MacPherson Robertson's Trophy and cash prize of £10,000 (£7,500 in Australian currency).

Scott, who has a wife and little daughter, is only thirty years old, but three times before the Race he had beaten the record between England and Australia—twice in 1931 and once during the following year. He was educated at Westminster School and joined the R.A.F. in 1922. At one time he served with No. 32 (F.) Squadron and acquired a reputation as an aerobatic pilot. As a commercial pilot in Australia he frequently made long air taxi flights, perhaps the best known being a 4,000-mile trip across Central Australia.

Campbell Black served during the War in the R.N.A.S. and the R.A.F. During his career as a pilot in Africa he flew H.R.H. the Prince of Wales, who was on a big game hunt. He has flown between London and Nairobi thirteen times, and in 1932 reached the latter town from Croydon—a distance of 5,000 miles—in eight days. In 1931 he rescued Herr Ernst Udet, the German pilot, who was stranded on an island in the Upper Nile. Black is now personal pilot to Viscount Furness.

A description of the winning D.H. "Comet" will be found elsewhere in this issue.

Associated Press copyright

The Story of

*v. similar to 14697*

ZERO HOUR: The crowd watches the competitors line up. In the foreground is the unlucky Mollisons' "Comet," and behind it Col. Roscoe Turner's Boeing.

(Below). **TOEING THE LINE:** Another view over the heads of the crowd. The nearest machine is the "Puss Moth" flown by Mr. C. J. Melrose, next to it are the Airspeed "Courier" A.S.5. (Sqd. Ldr. Stodart and Mr. K. G. Stodart), and Flt. Lt. Shaw's British Klemm "Eagle." These machines were in the Handicap Race.

NEVER, in the whole history of aviation, has there been such a vitally impressive hour as that preceding the bewitched moment on October 20, 1934, when the familiar little Union Jack was dropped for the first machine off in the England-Australia race. Many great flights have begun at dawn, and thousands—nay, millions—of people have waited for the first light, their mouths dry with excitement.

Imaginations had been fired. The roads for miles around the little village of Mildenhall were choked with motorists, cyclists, and walkers who had struggled out of bed at four o'clock or who had never been to bed at all. Cars were driven recklessly into ditches while the occupants prepared to walk across ploughland to the bright hangar lights which could be seen in the distance. Yet, to be entirely matter-of-fact, there was little or nothing to be seen but a score of heavily loaded aeroplanes droning out of the aerodrome and turning gingerly towards the dawn on the first leg of a long trip.

The scenes and sounds on the tarmac an hour before the start were entirely unforgettable. Hundreds and hundreds of people walked or ran in the dim light.

Beside the floodlit south hangar the big Boeing Transport gleamed dully, while mechanics crawled, climbed and were given orders. One of the metal airscrews moved fractionally, stopped, moved again, and suddenly became a glistening disc while foot-long jets of orange flame played from the exhausts and the hangar reverberated.

Yet above the clamour could be heard the monotone

from one loud speaker and the faint echo from another on the apron. "Clouds at three thousand feet; visibility two miles; wind two sixty-two degrees, twenty-eight miles an hour . . ." and so on, with weather reports from all the principal aerodromes on the first section of the course.

In the hangar itself the Douglas D.C.2 was slowly being moved, and the *Panderjager* was already on the tarmac.

Presently, against a background of a dawn fit for the occasion—layer upon layer of jagged orange clouds climbing into starlit purple—the Douglas and the Pander were being taxied along the front of the aerodrome enclosure. A flutter of handkerchiefs from the cabin windows and an answering wave from the crowd.

Probably more effective



the Australia Race

How C. W. A. Scott and T. Campbell Black Scored their Magnificent Victory with the De Havilland "Comet": A Flight Half-way Round the World in Less Than Three Days: Game Pursuit by Parmentier and Moll's Douglas and Turner and Pangborn's Boeing Transport: Steady Progress by the Handicap Race Competitors

than anything for the average sightseer was the realisation that the Royal Dutch Air Lines were taking fare-paying passengers and mails in their new 200-m.p.h. Douglas. This was business, not racing, and they were seeing the last word in high-speed transport machines—the result of many years of steady research and development.

Judging from the weather reports, things were not too good over Europe, and the few pilots taking the Great Circle course directly to Baghdad or to Bucharest were likely to have rather less trouble than those flying to Marseilles or to Rome. But the whole matter lay in the lap of the gods, and it was inevitable that those without wireless would need to take risks over the European section.

Sir Alfred Bower, Acting Lord Mayor of London, was to start the first machine; he had been asked by the Lord Mayor of Melbourne. The crowd waited, saw that the Gee Bee, green and fearsome, was on the line, saw, too, with dismay that the Bellanca was not, and wondered why the big Boeing had not yet taxied up to the line of machines on the aerodrome boundary. They were to start at 45-second intervals.

Meanwhile, thirteen picked Press photographers had been taken in an R.A.F. "float" (not a Black Maria), carefully guarded by four marshals, to the starting line; and almost immediately after they had been allowed to disembark, in the words of one of the more cynical of the photographers, "thirteen thousand spectators raided the line-up." Panic. The just and the unjust were smitten by incredulous and unnerved officials, an S.O.S. for

mobile police was broadcast, and a fire engine used to force back the surprisingly meek "rioters." At the other end, special correspondents prepared to see what they could of the start from behind serried ranks of ordinary spectators. In other words, no arrangements whatever were made for those who were expected to tell the rest of the world what had happened.

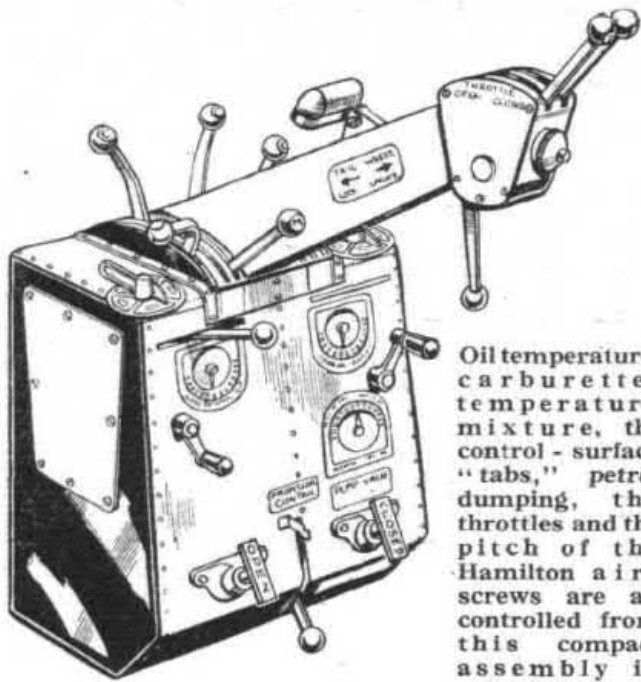
Ten seconds to go. The first starter, Mollison, was opening the throttles of his "Comet." "He's off!" For a moment the machine remained on the line, while the airscrews became a disc of light and, from the antics of one Broad, it was surmised that the wheel-brakes were still partially on. Then the machine slowly moved away and gathered speed, tail down; there were 260 gallons of fuel on board. At last, with a final bounce, *Black Magic* became airborne and climbed away with the high-pitched sing-song drone peculiar to the "Comet." Incidentally, the "Comet" pilots were definitely holding their machines down for the take-off, so long runs were inevitable.

The big Boeing, which had taken its place almost at the last minute, was away on its tail, appearing slow by comparison.

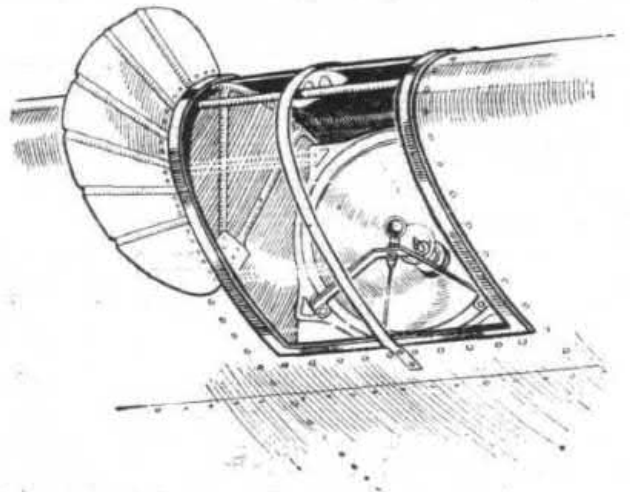
When "Comet" Number 19 moved away (with a copy of *Flight* for Australia!) it seemed almost that Cathcart-Jones must have had a spell placed on him. After running less than two hundred yards, the watchers at the hangars saw the machine swing suddenly towards them, and simultaneously there appeared a jet of white flame from the port engine as the pilot cut the throttles.

V. S. ... h 10492 - This is ...





Oil temperature, carburetor temperature, mixture, the control - surface "tabs," petrol dumping, the throttles and the pitch of the Hamilton air-screws are all controlled from this compact assembly in the Douglas.



(Above) The installation of one of the landing lights in the Boeing 247-D, showing the neat method of screening.

(Below) A case of maps and charts, complete with pencils, protractors and compasses in the Panderjager.

Evidently one engine had failed to pick up, but everybody wondered whether things were quite right after the late mishap and the repairs. But Cathcart Jones taxied back and opened out again after losing nearly two minutes.

After the Pander S.4 had gone, the crowd wondered again, for Stack's "Viceroy" turned back after taxiing a few yards. He had made a start according to the rules and was returning to pick up films of the start, delaying some thirteen minutes. Not much in 11,000 odd miles, but, perhaps, enough to make a difference in the final placings.

The big Douglas was tucking its wheels up before it had flown over

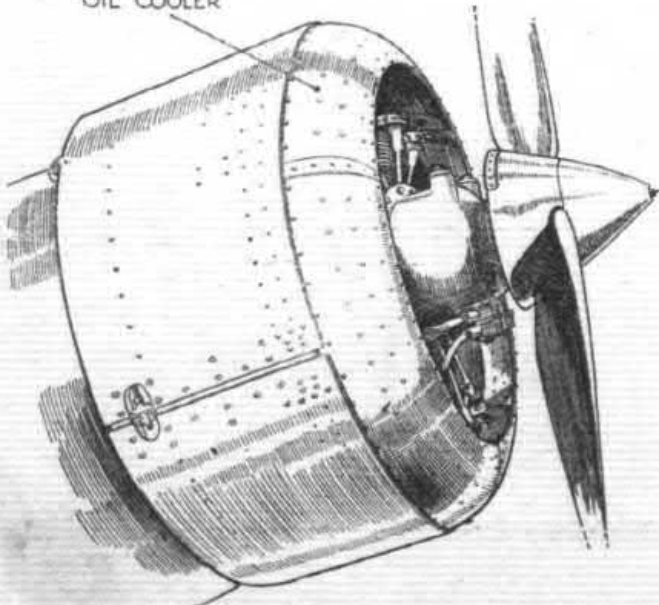


the boundary of the aerodrome.

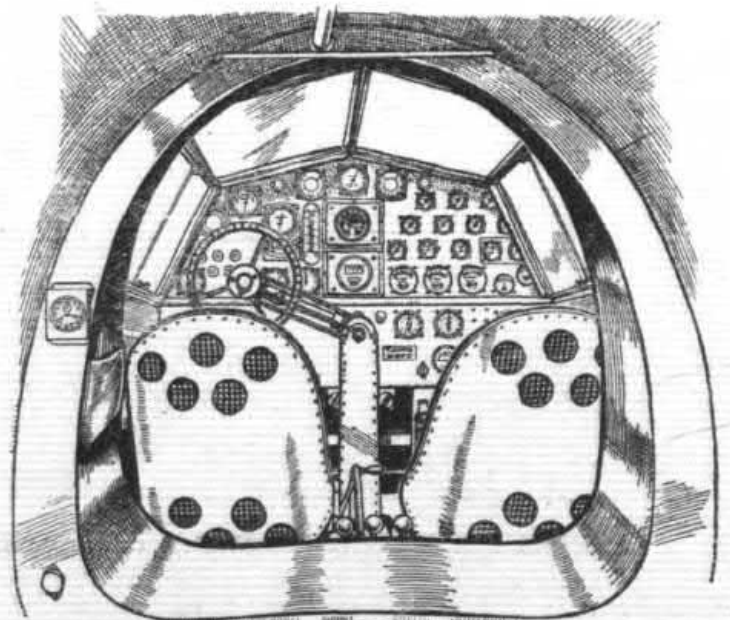
Then came that mystery machine—the Granville monoplane. Nobody was quite sure whether Wesley Smith and Miss Cochran were trying for Baghdad non-stop, but as the machine bounced and bounced again with the big engine making the most satisfactory bellow, it was obvious that it was heavily loaded. However, all was well.

The Fairey III F went away, but where was Baines' "Fox"? Evidently the engine could not be started. Woods' "Vega," comparatively lightly loaded, turned on to its course right off the ground in a steep climb, and was obviously fast. Brook's Miles "Falcon,"

OIL COOLER



In the Airspeed "Viceroy," or A.S.8, manned by Stack and Turner, the oil coolers for the Siddeley "Cheetah" VI engines form the leading edge of the cowlings.



There are between forty and fifty dials on the Panderjagers' instrument panel.



SPOTTING A WINNER!: Mr. Bellamy, the Hon. A. Hore-Ruthven, Lord G'anely, Lady Furness and Lord Furness chat with Scott and Campbell-Black, crew of the "Comet" *Grosvenor House*, who scored such a notable victory. (*Flight* Photo.)

too, went up like a lift and just as if it had no passenger and no special tank, and Capt. McGregor's "Hawk Major" went off in a climbing turn. The Klemm "Eagle" had its wheels tucked up before it had left the boundary.

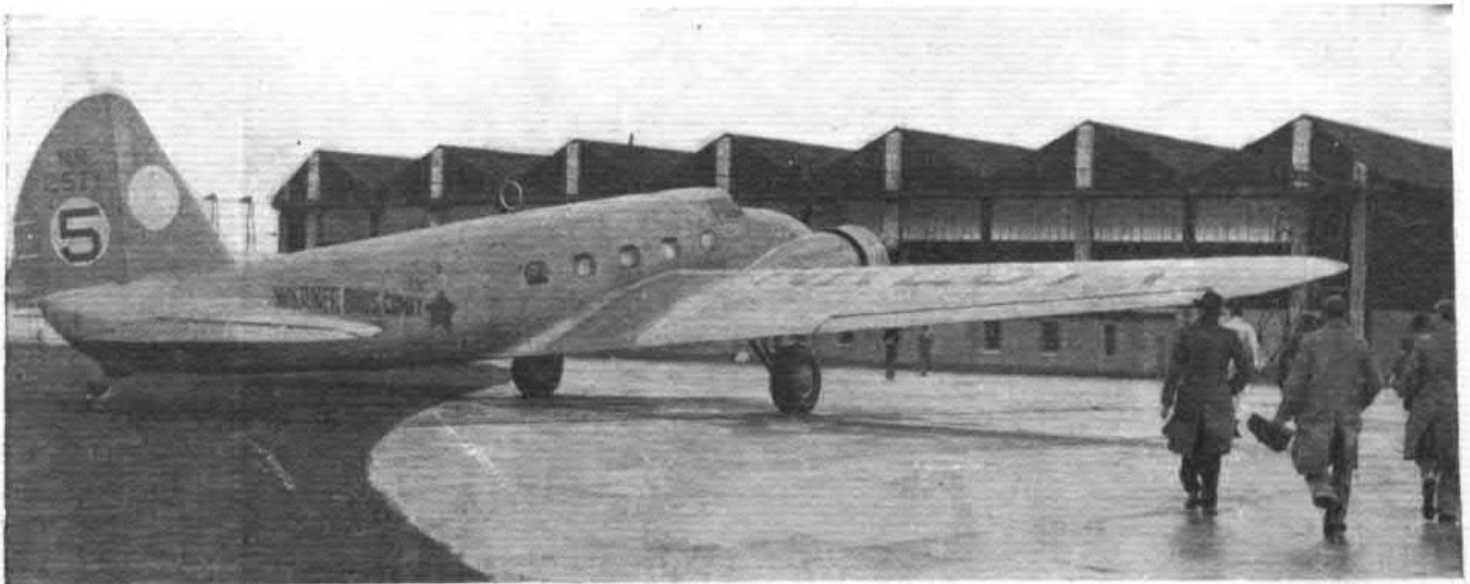
At last Baines' "Fox" was away after a series of fearful bounces, and Stack took on his films. Twenty fully loaded machines had taken off safely.

The race was on, and the world waited for the first news.

It was bad news. A machine of which great things were expected, Stack's Airspeed "Viceroy," was reported down at Abbeville, and the trouble which had caused

Parer and Hemsworth so much worry at Mildenhall, a persistently leaking radiator, caused them to put down the Fairey "Fox" near Boulogne, also. Stack and Turner pushed on to Le Bourget at 3.22 p.m., but it seemed that Parer could not hope to get away before dawn on Sunday.

Slowly—painfully slowly for a race for which the fastest machines were cruising around the 200 m.p.h. mark—more news trickled through. Fog plus installation troubles appear to have delayed Stack. H. L. Brook's "Falcon" was down at Plessès, near Paris, owing to bad weather; F/O. C. G. Davies had landed somewhere south of Paris for fuel; and Hewitt's "Dragon Six" somewhere near Boulogne.



THIRD TO ARRIVE IN AUSTRALIA: The Boeing 247-D (2-SIH1-G "Wasp"), taxiing in at Mildenhall after flying over from Martlesham Heath, where it had been weighed. (*Flight* Photo.)

The big Douglas came into Baghdad airport at 11.10 p.m. (G.M.T.), and the *Panderjager* just three-quarters of an hour afterwards. Parmentier and Moll had travelled to such good effect that, in spite of three stops, they had averaged something like 170 m.p.h. over the longer course. They left at midnight.

The Boeing arrived at 2 p.m., and left for Karachi in half an hour after the shortest of refuelling stops. Col. Roscoe Turner appeared to have had some difficulty during the last section, and failed to get Baghdad on his transmitter. Incidentally, there was absolutely no trace of oil on his engine cowlings after nearly three thousand miles of flying.

At last the third "Comet" arrived soon after dawn; the waiting crowd had been more than anxious about Cathcart Jones and Waller, knowing that their fuel supply must have been exhausted. They had overshot Baghdad, and, landing about a hundred and twenty miles beyond, had awaited daylight, and finally landed with a bare two gallons in the tanks. Flying for long periods at 17,000 feet and often by instruments alone, the ground had been seen only an hour before reaching the Black Sea.

They left at 5.57, only to return after a few minutes with no oil pressure showing for the starboard engine. Apparently, the lubrication trouble caused a partial seizure, for a cylinder and piston in that engine were changed, and No. 19 did not leave until 12.14 p.m. (G.M.T.). The weather was then overcast, and looked as if it might be difficult for the remaining competitors.

That morning Woods and Bennett had "cracked up" while landing at Aleppo, the "Vega" going over on to its back. Possibly the trouble at Heston before the start and at Athens later on had precipitated the trouble, but in any case they were out of the race. A pity, after the very excellent time they had made. Stack and Turner had withdrawn from the actual race after several delays, and were following on in due course. Shaw's "Eagle" had reached Rome at 2 p.m., shortly after Gilman and Baines, on the ill-fated "Fox." The "Dragon Six" and Melrose's "Puss Moth" were now on their way to Aleppo,

which had already been reached by Hansen's *Desoutter*

But all the excellent shows put up by the pilots of slower machines were completely eclipsed by those of the leaders who were already a quarter of the way round the world

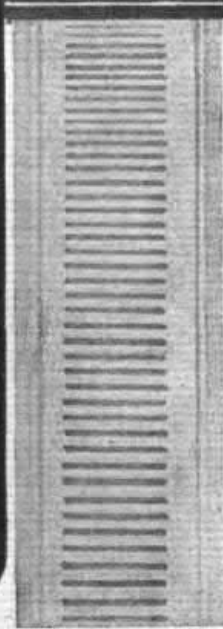
Scott and Black had made the 2,300-mile flight from Baghdad to Allahabad at an average of something like 190 m.p.h., in spite of a long detour. They had left for Singapore in a straight line over the Bay of Bengal in bad weather, had been sighted at Alor Star, and had reached their objective at 10.23 p.m. (G.M.T.), leaving again after a stop of little more than an hour. It was altogether too miraculous for comment. The "Comet" had flown 7,040 miles in forty hours with two control stops and one emergency stop, and were now comfortably ahead.

The Mollisons had lost their lead after making a "record" to India, arriving at Karachi at 5.45 on Sunday morning. They left an hour later, but returned almost immediately with an undercarriage which would not retract—apparently a heavy landing had damaged it. Apart from the added resistance, the "Comet's" engines overheat if the wheels cannot be drawn up, at least partially. The trouble was temporarily rectified, but fog then delayed their departure until 9.5 p.m. (G.M.T.).

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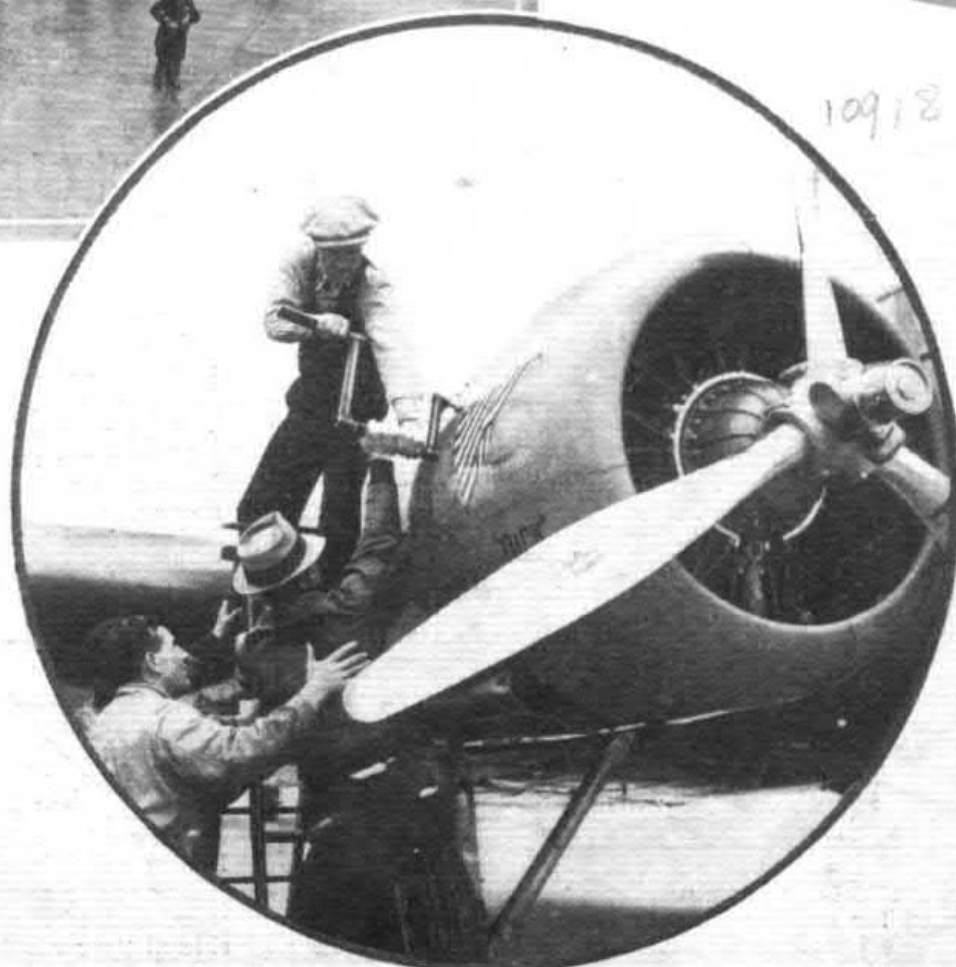


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(Above) GRACEFUL — BUT UNLUCKY: A rear view of Asjes's and Geysendorfer's *Panderjager* (three Wright "Whirlwinds"); an undercarriage failure at Allahabad put them out of the race.

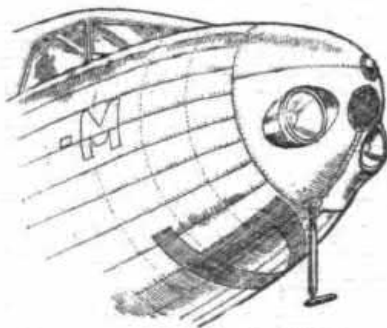
(Centre) A NETHERLANDS PAIR: The big Douglas D.C.2 (two Wright "Cyclone" Fs) flown — with three fare-paying passengers — by K. D. Parmentier and J. J. Moll, and, behind the *Panderjager*.
(*Flight* Photographs.)



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(Left) ON MACROBERTSON EVE: An impressive scene on the apron at Mildenhall. On the right stands Jones's and Waller's "*Comet*," with its undercarriage undergoing last-minute repairs; *Baby Ruth* is at the compass base; in the centre is the Mollisons' "*Comet*"; behind it are Hewett's and Kay's "*Dragon Six*" and a D.H. service "*Dragon*"; and in the background the "*Gee-Bee*" is being run up, while the ill-fated Fairey Fox can be discerned.

(Right) "LET ME HELP!" Competition to give a helping hand with the crank of the inertia starter on the Boeing.

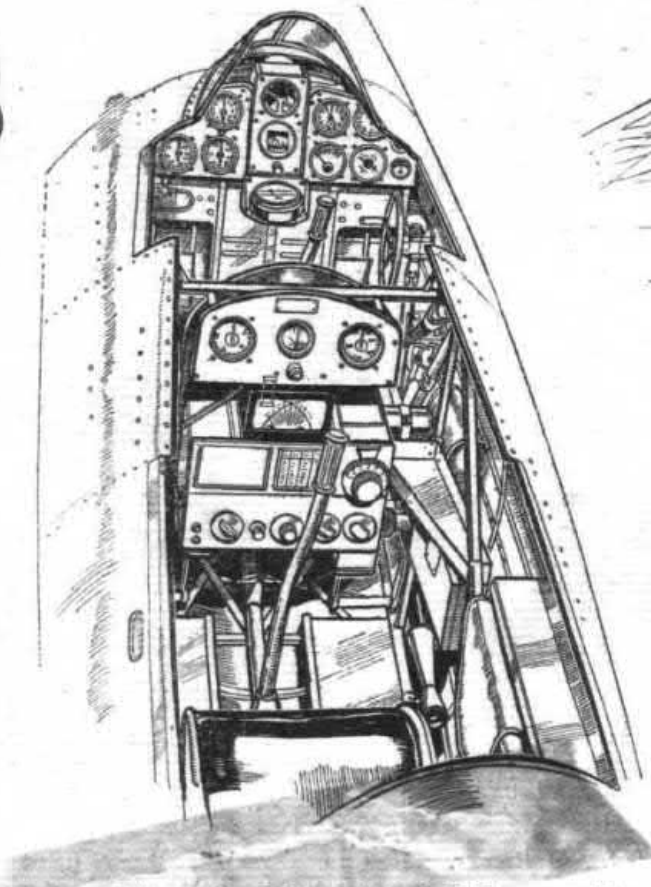


Air vent, landing lights and pitot head on the Douglas O.C.2.

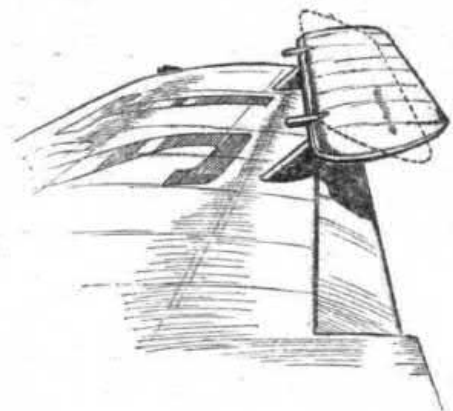
In the meantime the Douglas D.C.2 had made landings at Jask, Karachi, and had reached Allahabad at 2.11 p.m., leaving again in exactly an hour. So they were more than a thousand miles behind the leaders. Anything might happen, and the Dutchman was running to schedule just as K.L.M. had planned—like any good transport service. It had even returned to Allahabad to pick up a straying passenger!

The Pander S.4 had left Karachi, and were flying third in the speed race. But luck was against them. Either one or both of the "retractiles" failed to come down properly, and the big machine touched on one wing tip and a propeller blade. So Asjes and Geysendorffer were out of the race after being less than two hours behind the Douglas.

Col. Roscoe Turner's Boeing was running third, at least for the time being. He had left Karachi and reached Allahabad at 10.5 p.m. after a worrying journey. With his fuel supply running short, Turner had been well off his course and had only reached the aerodrome at the last minute. Allahabad had received several messages, but evidently Turner had then heard no reply, otherwise he would have brought his own D./F. equipment into action and "led himself in." However, Allahabad eventually guided them in. The Boeing was soon



The cockpits of the *Irish Swoop* (which was withdrawn at the last moment) with the transparent roof removed. The D./F. equipment is of U.S. Navy pattern.



Unusual aileron arrangement on the *Panderjager*.

on its way after the leaders

At 9.30 a.m. (G.M.T.) the leading "Comet" was sighted over Timor Island—a little more than five hundred miles from Darwin. It appeared as if, with eight hours' lead, Scott was almost a certain winner, but, as Mr. Bruce remarked at the pilot's banquet, "when a competitor reaches Australia he has only just begun the race!" Parmentier and Moll left Singapore at 7.30 a.m. and stated that they were going "all out" after Scott. As the Douglas cruises a 180 odd on sixty per cent

of the throttle opening, this might be taken to mean nothing or everything. They reached Batavia, the last of their "known" route, at 10.30 a.m. (G.M.T.), and Roscoe Turner was reported as having passed Rangoon on his way to Singapore. The second "Comet" arrived at Allahabad at 8.40 a.m. (G.M.T.).

It seemed that the unlucky Mollisons were definitely out of the race, though there was still hope of a place—anything might yet happen to the leaders. The changing wind on the route between Karachi and Allahabad had worried them as well as the crew of the Boeing, and they had landed at Jubbulpore after flying part of the way on one engine. The oil trouble that was to cause such anxiety in the later stages of Scott's winning flight had begun. At Allahabad it was discovered that two pistons were cracked and the cylinders scored.

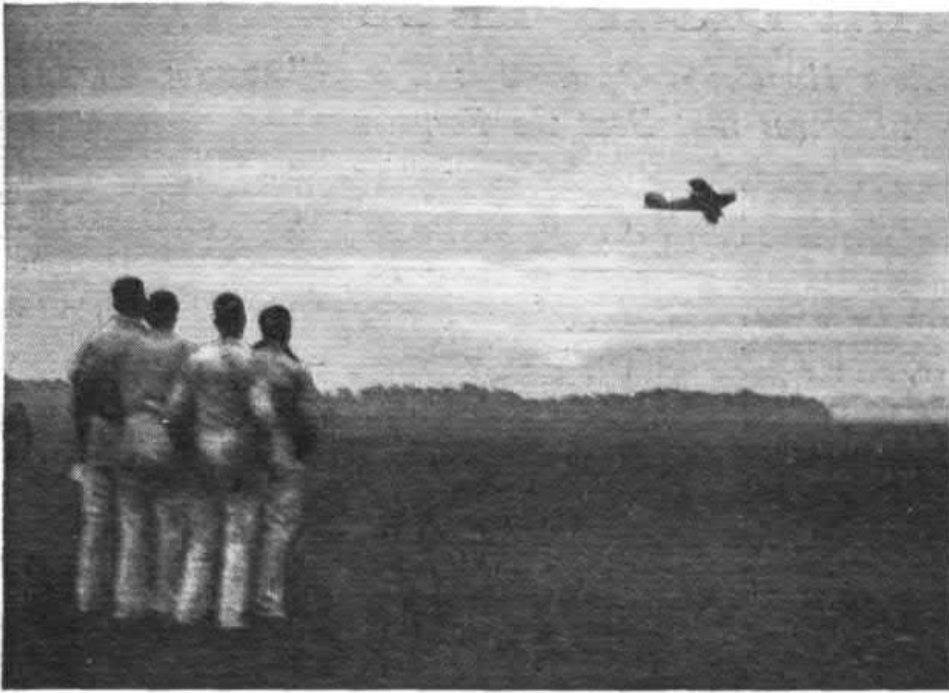
Then came the magnificent news. Scott had reached Darwin at 11.8 a.m. (G.M.T.) after flying for two days, four and a half hours. The record had been "quartered." Half an hour later, when fuller details came through, the facts were more than disquieting. For two and a half hours the "Comet" had been flown over the Timor Sea on one engine; the other had seized up. Would it be possible to do anything about it, and could Scott get off on one engine with a lighter load? It was known that the "Comet" could fly comfortably on one motor.

Within two and a half hours, the engine had been at least partially freed and the "Comet" was bound for the next control. But how much could the Douglas gain while Scott was nursing his damaged engine? Parmentier and Moll were flying between Batavia and Rambang, and the Boeing had left Alor Star.

Among the comparatively slow people—many of whom were, incidentally, making flights which would be considered "records" in normal times—the amazing "Hawk



A BRUSH-UP: The primitive but satisfactory means used for making Mildenhall an aerodrome fit for heroes to depart from. (*Flight Photo.*)



DAWN OF ADVENTURE: A striking impression captured by the camera as the sun broke through at Mildenhall. The machine is F/O. Davies's and Lt. Com. Hills' Fairey III F.

Major" had reached and left Karachi, the "Dragon Six" had left Baghdad for Karachi, the Airspeed "Courier" had left Aleppo for Baghdad, and the Desoutter was on its way to Bushire. Parer was definitely out with the "Fox" after innumerable delays.

Finally and, it would seem, almost inevitably in such a race, tragedy intervened. The Fairey "Fox" Number 62, after taking off from Rome for Athens, crashed in Apulia and the machine caught fire. F/O H. D. Gilman and Mr. J. K. C. Baines both lost their lives. Reports received up to the moment of going to press are so varied that it is difficult to discover whether the machine simply stalled or whether it actually caught fire in the air. Apparently, however, they were making for an emergency landing ground—a fact which automatically suggests trouble.

At 10.40 p.m. (G.M.T.) the leading "Comet" had reached Charleville after averaging 154 m.p.h. over the penultimate leg—flying on one engine for much of the distance. The Douglas was still a thousand miles behind and was being almost harried by the Boeing. Col. Roscoe Turner, with the Boeing, left Singapore eight hours after the K.L.M. cruiser and was making directly for Darwin. Cathcart Jones had left Allahabad for Singapore, McGregor was at Jodhpur, and Hewitt had left Baghdad.

The whole world waited for the news of Scott's arrival at Melbourne. He had left Charleville. Turner was reported at Koepang and Cathcart Jones at Singapore.

At last came the expected confirmation. C. W. A. Scott and T. Campbell Black brought the D.H. "Comet" Number 34 over Flemington Racecourse, Melbourne, for the two stipulated circuits at 5.30 a.m. (G.M.T.). Two days, twenty-three hours since they had left Mildenhall! They put down at Essendon and were carried back to Flemington in two "Gipsy Moths" for the reception.

More than three hours later, the Douglas D.C.2, complete with passengers, mail and larder, cruised into and out of Charleville, and no one doubted that, in the ordinary course of routine, Parmentier and Moll would be at Melbourne some seven hours or so after the "Comet."

At the eleventh hour, as far as the K.L.M. entry was concerned, a message was received to say that the Douglas had been safely forced landed at midnight on Albury racecourse at 3.17 p.m. (G.M.T.). Parmentier had been off his course since leaving Charleville, and had asked for his position several times while circling in the Wodonga district. And the Boeing was on its way to Charleville!

On the racecourse at Albury the Dutch pilots decided to wait for the daylight before flying on to Melbourne. With the Boeing still thirteen hundred miles away, the Douglas appeared to be safely enough in second place. But could it take off comfortably from a relatively confined space? It would be tragedy indeed if the big machine had to be dismantled when less than an hour's flying from the finishing line. Parmentier and Moll would certainly take no risks if there was any doubt about the ability of the two engines to pull the machine out.

The bulk of the field, scattered amazingly over the face of the eastern hemisphere, were pushing along at their own separate paces. In the face of the winners' extraordinary performance their own efforts appeared puny, though several were on a schedule that would have spelt a "headline" record only a few years ago. Ross Smith took twenty-seven days over his flight to Darwin in 1919.

Cathcart Jones and Waller had arrived at Batavia, but were likely to be held up with trouble for several hours. They, too, had suffered a

portion of the troubles that had caused *Black Magic* to be withdrawn at Allahabad and *Grosvenor House* to be flown for long hours on one engine. All the testing in the world cannot be a facsimile of the gruelling which is received in a race.

McGregor and Walker, though entered only for the handicap race on their standard Miles "Hawk Major," were running fifth on Tuesday evening and had left Calcutta for Rangoon at 7.12 a.m. (G.M.T.)—a completely amazing effort. Actually they had beaten any time put up by a similar machine on the first half of the route. Their all-in average was in the region of 84 m.p.h.

Hewitt and Kay, with the "Dragon Six," were, comparatively speaking, close on their heels, having reached Allahabad at 12.10 p.m. Remembering their forced landing near Boulogne, they had done extraordinarily well.

And So To Bed!

The one and only Airspeed left in the race, the Stodarts' "Courier," had left Jask, and Hansen's Desoutter had reached Karachi. Considering the fact that the Desoutter's normal maximum speed can have been very little more than 120 m.p.h., Lt. Hansen's show was one of the best.

The Australia-England "record" breaker, C. J. Melrose, was living up to his statement that his race was to be a tour, but, nevertheless, he was reported as having left Jask at 9.27 a.m. (G.M.T.).

Jack Wright had left Baghdad, with Polando and the Lambert Monocoupe, after some trifling troubles along the route and a lot of worry over the weather in Europe. Shaw with the Klemm "Eagle," had made up a great deal of time since his forced landing in Spain, and was at Baghdad, but with a damaged undercarriage, and Brook with the "Falcon" had left Rome for Athens, where he also suffered damage. Davies' Fairey III F was down in Cyprus.

The De Havilland "Comet" had won, the victorious pilots were in bed enjoying a well-earned rest, but the race was still in progress. Other places were waiting to be filled, and the handicap race was an event of its own—and no man could forecast the result. All day and night anxious crowds awaited the second and third men, particularly as their positions in the Commonwealth were known, and there was general disappointment when it was learned that the Dutchmen, who were second, could not complete their remarkable run until Wednesday morning.

THE HANDICAP RACE

How the Australia Race Handicaps Operated : The Allowances given : Machines that Beat the Formula

NO one has yet succeeded in evolving a formula which is fair to all types of aeroplane for purposes of handicapping, and the formula used in the England-Australia race is no exception. Probably it is no better and no worse than other formulae which have been tried, but it does appear to under-estimate the speed generally. So long as the percentage under-estimation is the same for all types, it matters little, as each machine will "beat" the formula by the same amount. In the table of handicap, speeds, etc., the column of speeds shows, of course, the speeds which the different types will do according to the formula. The fact that the Airspeed "Viceroy" is calculated to be faster than the De Havilland "Comets" is an indication that the formula does not and cannot take into account differences in design such as the relative size of fuselages, the degree of fairing and streamlining, and so forth.

Where the Formula Failed

The "Viceroy" is a heavier machine than the "Comets," but has more powerful engines. These features are brought into the handicap speed formula, as is also the quantity known as "wing power," i.e., the horse-power per square foot of wing area. But whereas the "Comets" have very slim fuselages, with diminutive cabin roofs, the "Viceroy" is an ordinary passenger cabin machine, with a pronounced break in the lines where the windscreen rises from the forward decking. In the circumstances one would expect the "Comets" to be quite a good deal faster than the "Viceroy," which is the case in actual fact, but the formula does not allow for such differences. All it attempts to do is to take into account the loaded weight, the pay load, the horse-power, and the wing area.

It is, perhaps, doubtful if any other machine in the race "beats" the formula by such a wide margin as that of the "Comets" (about 50 m.p.h.). But it is worth remembering, in this connection, that the "Comets" were specially designed for the race, and were, in fact, the only machines to have this distinction. To achieve a speed of more than 230 m.p.h. when carrying two people and enough fuel for a flight of 2,500 miles (with a fair margin for head winds) with engines totalling but 460 h.p. is a performance which no formula based upon average values could be expected to cope with.

In addition to the sixteen starters shown in the table there were four starters in the speed race only: No. 5,

The Allowances

Racing Number	Machine and Engine(s)	Pilots.	Speed	Flying Time	Handicap Allow.
7	Desoutter Gipsy III.	Hansen and Jensen.	m.p.h. 113.18	h. m. s. 106 48 0	h. m. s. 42 2 2
10	Puss Moth, Gipsy Major.	Melrose ...	114.32	107 43 48	40 58 1
47	Klemm Eagle, Gipsy Major.	Shaw ...	114.44	106 40 12	39 54 3
31	Miles Falcon, Gipsy Major.	Brook ...	119.29	103 13 12	36 27 3
2	Miles Hawk, Gipsy Major.	MacGregor and Walker.	120.57	102 7 48	35 22 1
60	D. H. Dragon, 2 Gipsy Six.	Hewett and Kay.	140.08	87 54 36	21 9
14	Airspeed Courier, 2 Cheetah V.	S. odart and S. odart.	140.54	87 37 12	20 51 3
35	Fairey Fox, Fairey Felix.	Parer and Hensworth.	143.43	85 51 0	19 5 2
15	Fairey III F. Napier Lion.	Davies and Hill	146.08	83 56 24	17 10 4
33	Monocoupe Super-Scarab.	Wright and Polando.	154.02	79 57 0	13 11 2
44	Douglas DC2, 2 Cyclone.	Parmentier and Moll.	168.06	73 16 48	6 31 1
36	Lockheed Vega, P. and W. Wasp.	Woods and Bennett.	177.71	69 17 24	2 31 4
19	D. H. Comet, 2 Gipsy Six.	Cathcart Jones and Waller.	182.81	67 21 36	36
34	D. H. Comet, 2 Gipsy Six.	Scott and Campbell Black.	182.83	67 21 0	35 2
63	D. H. Comet, 2 Gipsy Six.	Mr. and Mrs. Mollison.	182.83	67 21 0	35 2
58	Airspeed Viceroy, 2 Cheetah VI.	Stack and Turner.	181.44	66 45 36	Scratch

the Boeing monoplane (2 P. and W. Wasps) piloted by Roscoe Turner and C. Pangborn; No. 6, the Pander jager (3 Wright Whirlwind), piloted by Geysendorfer and Asjes; No. 46, the Granville Gee Bee (P. and W. Hornet) piloted by Wesley Smith and Jacqueline Cochran; and No. 62, the Fairey "Fox" (Felix), piloted by Baines and Gilman. The Bellanca monoplane (No. 29) (P. and W. Wasp Junior), to be piloted by Col. Fitzmaurice and Mr. Bonar, did not start, as the range with the petrol permitted was considered insufficient.

THE AIRCRAFT ENGINEER

Owing to the number of pages devoted to the Australia Race this week it has not been possible to include our usual monthly technical supplement, *The Aircraft Engineer*. This will be published in next week's issue of *Flight*.

TRAINING AERONAUTICAL ENGINEERS

A very interesting paper under the title "The Training of an Aeronautical Engineer" was read before the Royal Aeronautical Society by Professor A. J. Sutton Pippard last Thursday. A summary of the paper will be published in *Flight* next week.

THE COMPRESSED-AIR TUNNEL

The compressed-air tunnel at the National Physical Laboratory has now been working for a little over a year, and many are looking forward with interest to an account of the work which has been done. This evening (Thursday) Mr. E. F. Relf, Superintendent of the Aerodynamics Department of the N.P.L., will lecture before the Royal Aeronautical Society on the results from the compressed-air tunnel. The lecture will be illustrated and delivered in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m. The compressed-air tunnel undoubtedly gives results which are a far better guide to designers than the ordinary tunnels.

Many of the results which Mr. Relf will give in his lecture have not yet been published, and will be given for the first time before the Society by special permission of the Aeronautical Research Committee.

WESTLAND AIRCRAFT SOCIETY

The following is a list of lectures, etc., arranged by the Westland Aircraft Society, Yeovil Branch of the Royal Aeronautical Society:—1934: October 25, "Some Pioneers of the Aeroplane," by J. E. Hodgson, Hon. Librarian, R.A.C.5; November 1, "Aircraft Undercarriages," by G. H. Dowty; November 15, "Aircraft Production Methods," by W. C. Gibson; November 29, "The Modern Trend of Civil Aircraft Design," by B. B. Henderson; December 13, "The Trend of Development in Military Aircraft," by Sir Ernest W. Pette; December 20, "Cheap Light Aeroplane Design and Construction," by Leak. 1935: January 3, "Compression Ignition Engines," by A. R. R. Fedden; January 17, "Small Engines for Road Transport," by H. O. Farmer; January 31, "The Autogiro," by Señor de la Cierva; February 1, "American Aviation," lecturer to be announced later; February 21, "Turbulence"—dealing with the work of the Compressed Air Tunnel, by E. F. Relf; March 14, "Test Flying," by H. J. Penrose; March 21, Annual General Meeting.



THE WINNER: Scott and Campbell Black's "Comet" (two Gipsy Six Racing Engines) at Mildenhall. (Flight Photo.)

THE SUCCESSFUL MACHINES

*Points of Interest in the Specifications of the De Havilland "Comet,"
Douglas D.C.2 and Boeing Transport*

WHEN the details of the route over which the England-Australia Race was to be flown were made known, there were many who held that it was impossible to produce a machine capable of a flight of more than 2,500 miles non-stop and yet capable of passing the I.C.A.N. take-off requirement, which demands that an aeroplane in the "normal" category, i.e., not stressed for aerobatics, shall be able to clear, from standing start, a barrier 20 metres (66ft.) high in a horizontal run not exceeding 600 metres (656 yards). The De Havilland Aircraft Company, Ltd., designed and built the "Comet," and in a test flight Capt. H. Broad, the firm's chief test pilot,

cleared the barrier by as much as 120ft., carrying full load.

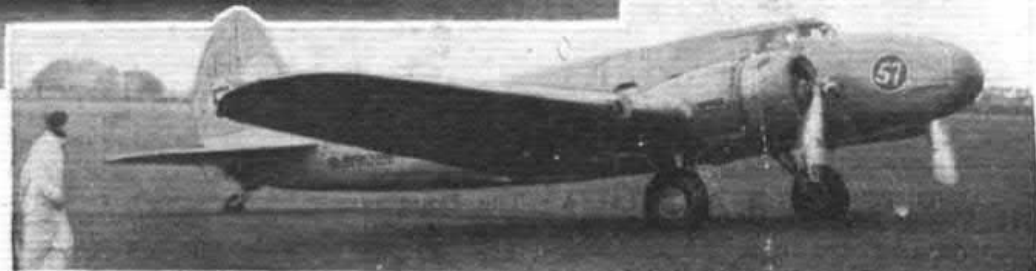
It still remained to be proved whether or not the machine would do the flight from Mildenhall to Baghdad non-stop. The Mollisons provided the proof by leaving Mildenhall at 6.30 a.m. last Saturday and landing at Baghdad at 7.10 p.m. the same day without having landed en route. Moreover, they covered the distance at an average speed of 200 m.p.h.

The De Havilland "Comet" is a very small low-wing cantilever monoplane of all-wood construction. One of its most interesting features is the wing construction. A very thin wing section was chosen because of its low drag, but



The Boeing Transport (two Pratt & Whitney "Wasps") piloted by Roscoe Turner and Clyde Pangborn. (Flight Photo.)

The Douglas D.C.2 (two Wright "Cyclones") piloted by Parmentier and Moll. (Flight Photo.)



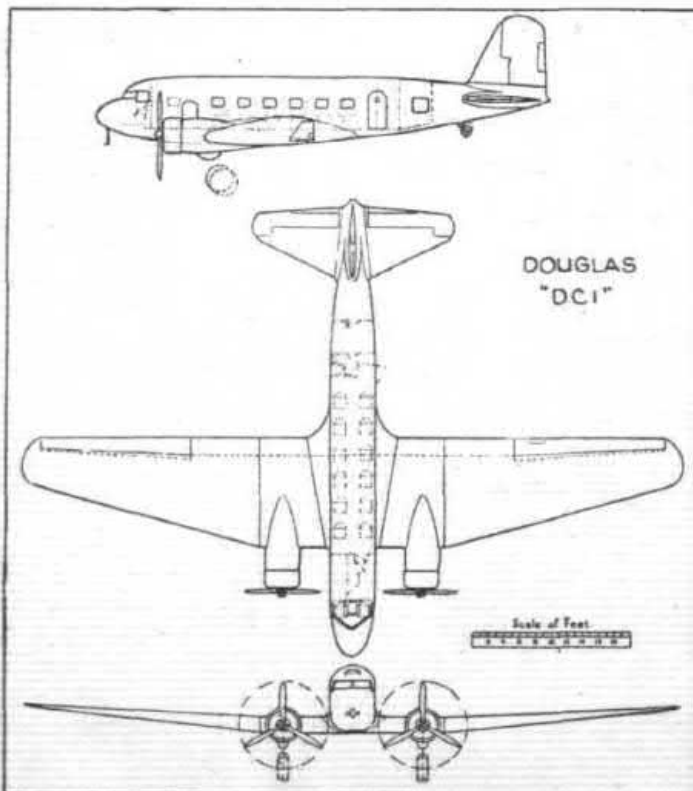
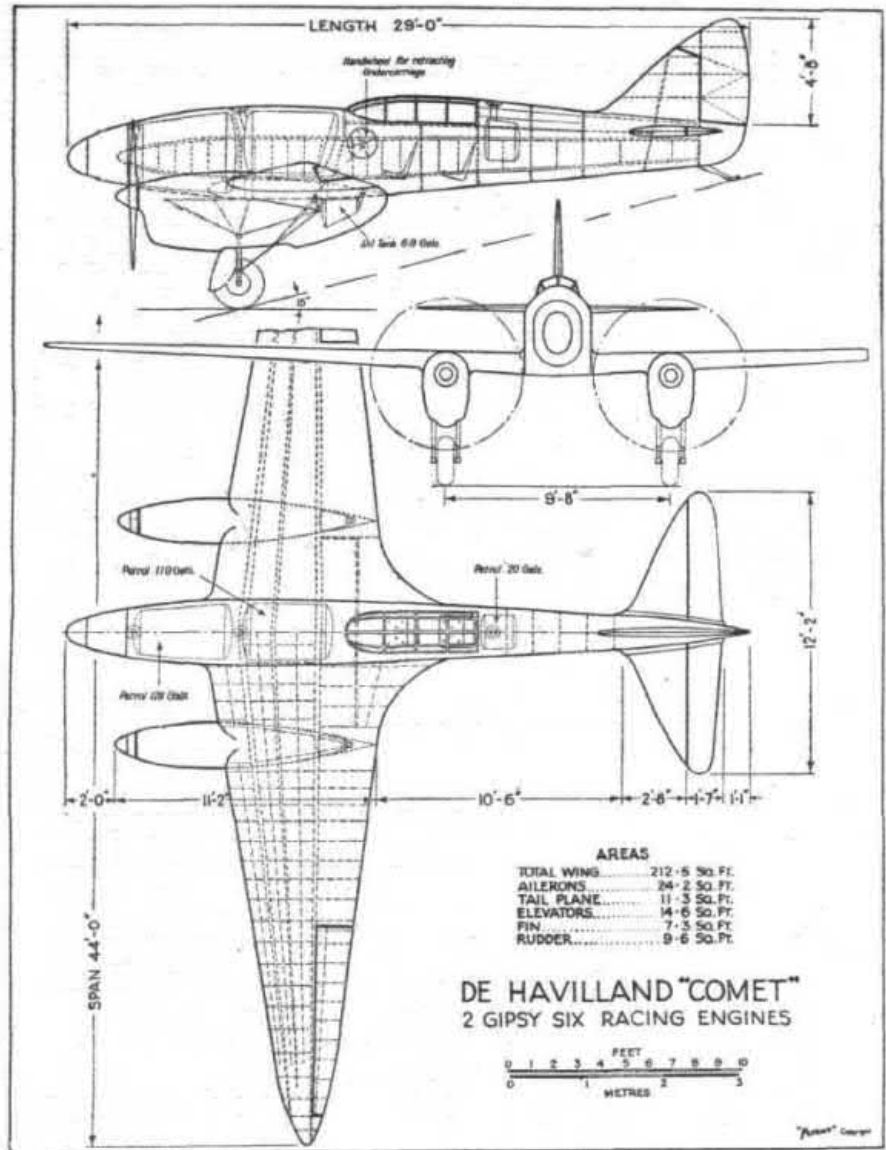
the problem of providing the necessary strength in so small a thickness was a serious one. It was solved by planking the wing with spruce strips some 2in. wide, the strips of one layer crossing those of another layer at approximately right angles. A similar form of construction is often used in boat building, and is known as the "double-diagonal" type of planking. Near the wing roots of the "Comet" there are several layers, and the thickness of the planking is more than half an inch thick.

The streamline fuselage is of somewhat similar construction, and by placing the crew far back the "break" in the lines which is caused by the windscreen has been reduced to a minimum.

With two special high-compression "Gipsy Six" engines placed outboard on the wings, it was logical to fit retractable undercarriages, as these would go nicely into the engine fairings. This was done, and the combination of a small fuselage of small cross-sectional area and nearly perfect streamline form, with a cantilever wing of very small thickness, and streamlined engine nacelles housing also the wheels, has produced what is probably the most efficient aeroplane ever built.

Accommodation in the tiny cabin is of necessity somewhat cramped, as there is no room for the occupants to get up and stretch their legs, nor is it possible for them to change places. In a racing machine something has to be sacrificed, and in this case it had to be comfort. As far as one can ascertain, Scott and Campbell Black were no more tired than other competitors who were flying larger machines in which it was possible to change seats and alter position, so that the strain of sitting in one position for ten or twelve hours cannot have been altogether excessive.

Although built as a racing machine, it is obvious that by taking out the large petrol



SECOND TO REACH AUSTRALIA: The Douglas D.C.2 is similar to the D.C.1 shown in these general arrangement drawings. The engines are Wright "Cyclones" of 700 h.p. each.

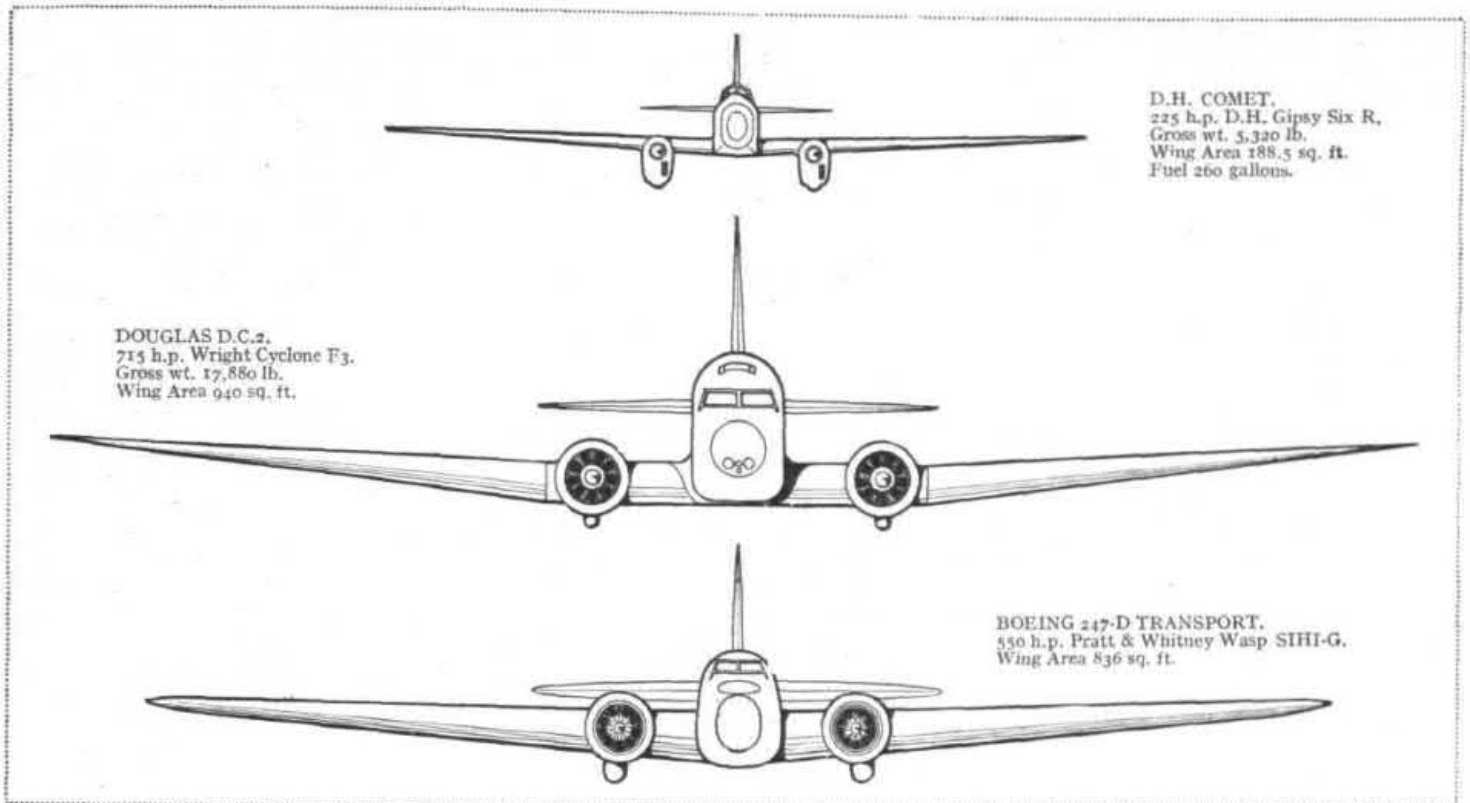
WINNER OF THE SPEED RACE: The de Havilland "Comet" low-wing monoplane. These general arrangement drawings show main dimensions and areas.

tanks and fitting smaller ones, reducing the range to, perhaps, 1,000 miles, and possibly transferring the cockpit to the nose of the fuselage for better view, the "Comet" could be turned into a very useful mailplane with quite a good payload and relatively economical in operation.

The Douglas D.C.2.

Designed and built by the Douglas Aircraft Company, Inc., of Santa Monica, California, the D.C.2 piloted by Parmentier and Moll was probably the aeroplane which caused the greatest admiration at Mildenhall during the days before the start of the race. Not only was the clean aerodynamic design appreciated, but the workmanship and finish of the all-metal construction came in for very favourable comment by all the technical experts who saw the machine. What has undoubtedly helped to make this very fine piece of aircraft engineering possible is the fact that initially an order was placed for sixty machines. This gave the Douglas works a chance to get down to manufacture on a quantity production basis. In Great Britain, unfortunately, aircraft constructors do not receive orders for large commercial aeroplanes on any such generous basis, the largest order ever placed being for eight machines.

In the construction of the Douglas D.C.2 use has been made of what is known as the "stressed skin" system. This expression is used to denote a form of structure in which the outer covering is not a mere fairing used to give the desired form, but actually also takes part of the



D.H. COMET.
225 h.p. D.H. Gipsy Six R.
Gross wt. 5,320 lb.
Wing Area 188.5 sq. ft.
Fuel 260 gallons.

DOUGLAS D.C.2.
715 h.p. Wright Cyclone F3.
Gross wt. 17,880 lb.
Wing Area 940 sq. ft.

BOEING 247-D TRANSPORT.
550 h.p. Pratt & Whitney Wasp S1H1-G.
Wing Area 836 sq. ft.

BIG CLAUS AND LITTLE CLAUS: Front elevations, to the same scale, of the De Havilland "Comet," the Douglas D.C.2, and the Boeing 247-D. These machines were first, second and third respectively to reach Australia.

stresses. In the Douglas the metal covering (light aluminium alloy) is applied in fairly small panels riveted to the internal framework. A very smooth skin has resulted, and the actual riveting has been very carefully done, so that it is impossible to find a rivet which has not been clenched properly, or which has been clenched too hard, thereby bruising the metal skin.

With an empty weight of 12,200 lb., the Douglas D.C.2 carries a disposable load of 5,880 lb., bringing the total loaded weight up to 18,080 lb. The disposable load can, of course, be varied in accordance with the service to be operated. For the Australia race the machine was flown

in its standard form as a fourteen-passenger transport, with a crew of four. During the race three passengers only were carried, but the standard cabin equipment was retained.

With normal tankage the D.C.2 has a range of about 600 miles when carrying fourteen passengers, but when only eight passengers are carried the tankage suffices for about 1,200 miles at a cruising speed of 170 m.p.h.

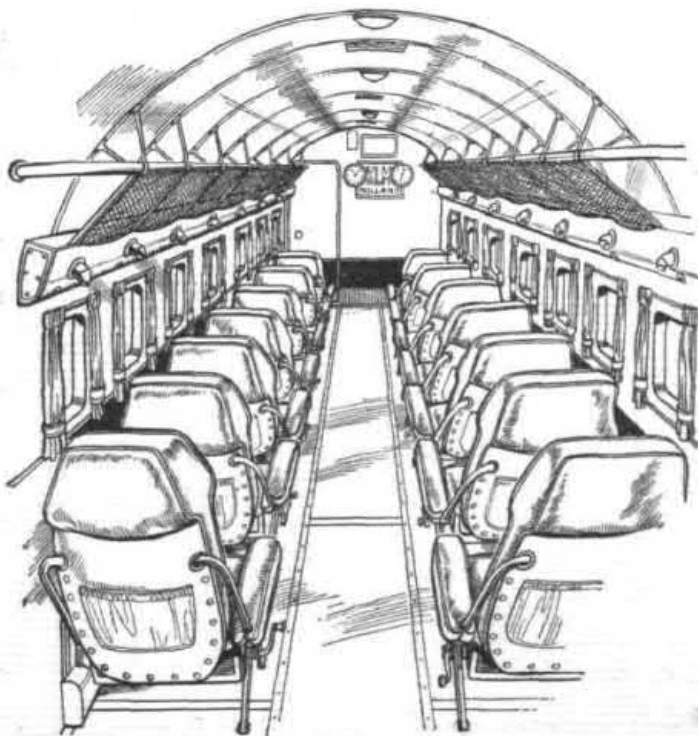
Two American Wright "Cyclone" engines of 700 h.p. each are mounted in nacelles projecting forward from the leading edge of the wing. They drive three-bladed Hamilton controllable pitch propellers with duralumin blades. The advantage of this type of propeller is that its pitch can be set to a fine angle for maximum revs. and power when taking off and to a coarse angle, corresponding to "top gear" for speed, once the machine is in the air.

Retractable undercarriages are provided, and, when raised, the wheels are housed inside the engine nacelles.

The Boeing 247-D

Developed from the Boeing 247 described in *Flight* of June 15, 1933, the model 247-D flown by Col. Roscoe Turner and Clyde Pangborn differs from the original model in that it is fitted with two 550 h.p. geared and supercharged Pratt & Whitney "Wasp" S1H1-G engines, with three-bladed Hamilton Standard controllable pitch airscrews and long chord cowlings instead of S1D1 "Wasps" with cowlings short chord. These modifications have added 20 m.p.h. to the top speed of the machine and a general increase in efficiency. Col. Turner's machine is the first 247-D to be flown.

Semi-monocoque type construction, with duralumin bulkheads, longerons, skin stiffeners and skin coverings is used for the fuselage. A cantilever type wing with a span of 74ft. is employed, consisting of spar trusses of square and rectangular aluminium alloy tubing, ribs, and smooth metal skin. Tail surfaces are of cantilever construction with front and rear spars braced with ribs of channel section, and smooth metal skin covering. Tests made by the U.S. Army Air Corps have shown that the fuselage can support a load 60 per cent. in excess of requirements. "Tabs" are used on elevators, rudder and one aileron to trim the machine and to correct unbalanced airscrew thrust.

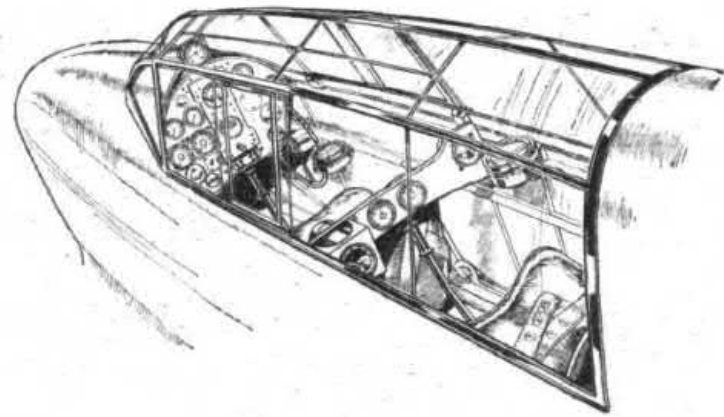


A COMFORTABLE CABIN: Seating accommodation is provided in the Douglas D.C.2 for fourteen passengers. The seats are adjustable for height and angle.

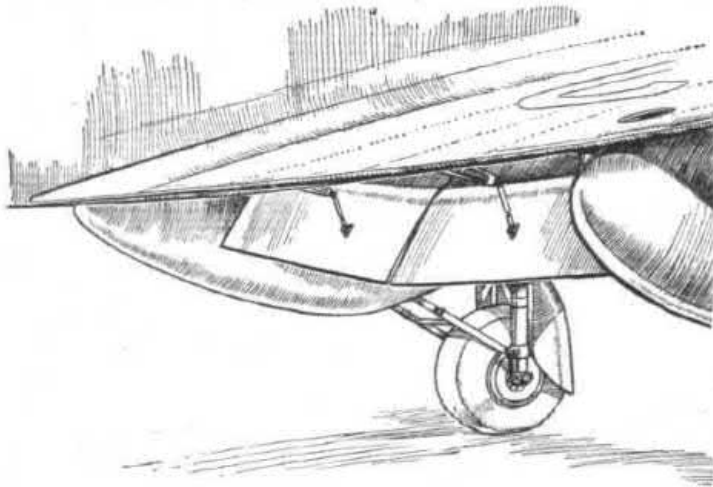
Forty-five seconds are required to retract the landing gear, which is of the divided type, using Boeing oleo shock absorbers and hydraulic brakes. Standard night flying equipment includes navigation lights, landing lights in the leading edge of the wing, and parachute flares. Dual controls are provided, and the main instrument board is equipped with thirty-five different devices. In the commercial version of the machine two-way radio-telephone equipment is located forward of the pilot's compartment. For racing purposes the wireless and D/F equipment has been placed well to the rear of the fuselage. Of the instruments provided there are three sets, whose functions are duplicated, including the directional gyro and compass, the sensitive altimeter (which records height in hundreds as well as thousands of feet) and the rate of climb indicator, the turn and bank indicator, and the artificial horizon.

Normally the cabin, which is 20ft. long and 6ft. high, contains ten seats, heating and ventilating system, dome lights, reading lamps, lavatory facilities, and is insulated against noise. In Col. Turner's machine the extra fuel tanks for long-range flying are arranged along each side of the forward portion of the cabin with an aisle between.

Figures supplied by the Boeing Airplane Company for the standard 247-D give a maximum speed of 202 m.p.h., a cruising speed at 5,000ft. of 184 m.p.h., and a landing speed of 60 m.p.h. A



ROOM ENOUGH, BUT ONLY JUST: The diminutive cockpit of the "Comets." On the left, the landing light in the nose of the fuselage.



FOR STEEPENING THE GLIDING ANGLE: The air brake flaps on the De Havilland "Comets."

THE ENGLAND - AUSTRALIA RACE

INCLUDED in our lengthy description of the Australia Race in this issue of "Flight," are cables from our own representative, Lt. Com. C. N. Colson, R.N., who flew to the Baghdad control.

Interesting technical details of the winning machines also appear in this issue, together with sketches and photographs, as well as a review of the activities at Mildenhall on the eve of the start.

A regular order should be placed for "Flight."

EVERY THURSDAY - SIXPENCE.

useful load of 4,710 lb. is carried, of which 2,582 lb. represents pay load. The empty weight is 8,940 lb., and the gross loaded weight 13,650 lb.

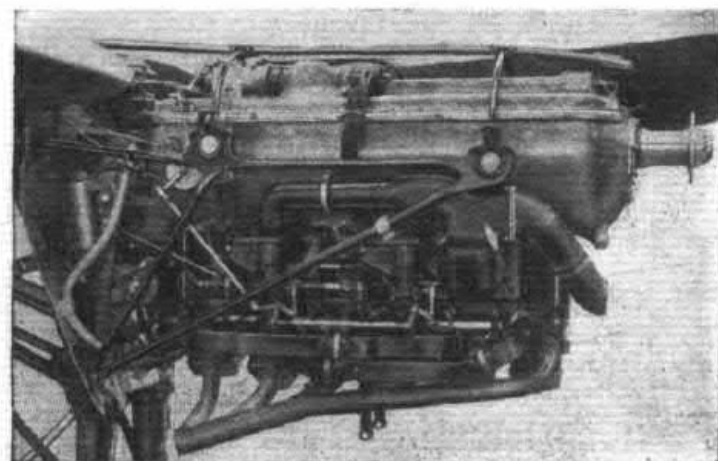
The Winning Engines

Time did not permit Major Frank Halford to design new engines for the "Comets," but a most successful power plant was produced by redesigning the overhead-valve gear of the standard air-cooled Gipsy Six, increasing the compression ratio from 5.25:1 to 6.5:1, and increasing the normal speed to 2,350 r.p.m. These modifications resulted in an increase of power, from the 200 h.p. of the standard engine to 224 h.p. of the racing version.

Although the inverted racing Gipsy Six is not supercharged, a slight degree of boost is obtained by the pressure on the carburettor intake which results from the forward speed of the machine. Probably this increases the power to about 230 h.p.

Flying at a height of 10,000ft., the engine develops 160 b.h.p. at 2,250 r.p.m. at full throttle. The fuel consumption is then 0.48 lb./b.h.p./hr.

It is of interest to note that, in spite of the increased compression ratio, the Gipsy Six racing engines run on standard service fuel to D.T.D. specification 224.



THE SPECIAL RACING ENGINE: The De Havilland Gipsy Six inverted six-cylinder air-cooled engines in the "Comets" had the compression ratio increased to 6.5:1 and develop 224 b.h.p. at 2,400 r.p.m.



NIGHT PHANTASY : Mechanics at work on two of the "Comets" a few hours before the race

THE EVE OF THE RACE

AT six o'clock on "MacRobertson Eve" there were twenty-one machines in the brightly lit hangars, and work was still going on. All but one—the Granville monoplane—had been in the air at least once since their arrival at Mildenhall, and there was little reason then to suppose that any would be excluded or would fail to start.

But there had been trouble over the Bellanca's airworthiness certificate. Apparently the machine had a general American C. of A. for an all-up weight of 5,458 lb., but full tests were not made at 8,350 lb. The question was—could the committee allow it to start with the full load?

During the night the inevitable decision was reached: Fitzmaurice's appeal failed, and he withdrew the *Irish Swoop* from the race. All his plans had been based on the machine's ability to reach each of the controls non-stop, and the decision was made too late for their alteration, even if the pilots had been prepared to make the journey in six-hundred-mile hops.

There was nothing more to be said, but it was more than a pity that the unfortunates should be flying one of the most interesting machines in the race, and one that might or might not have given us a new conception of speed and range. It was later said that Col. Fitzmaurice intended to try a full-load take-off and landing, and to make a

Last-moment Work at Mildenhall : A Royal Visit : Difficulties over the Take-off Load : "Irish Swoop" Withdrawn

private attack on any Australian record that was set up in the race.

Earlier in the week both Baines' Fairey "Fox" and Penny's Vultee V-1 had been given a definite extension until Wednesday evening, and Molinier's Blériot III would doubtless have been accepted. The Bergamaschi had been definitely scratched, though the machine had been built, and appeared to be more or less ready. But Wednesday was a day of weights and measures, and there were no arrivals.

Incidentally, "doughnut" wheels were not at all happy on the microscopic Avery scales used for weighting, and those of the *Cee Bee*, for instance, positively "boiled over."

Miss Cochran's machine had dropped in—using the fullest sense of the term—on Tuesday evening just as dark was falling, and Baines' "Fox" was given a further extension until noon on Thursday. Actually, there was trouble with the tank arrangements, and it was eventually brought in by the light of a bonfire on Thursday night. Late arrivals were rather fashionable, but Mildenhall is surely not the easiest place in the world to find in the dark.

On Wednesday it was learnt with regret that the Blériot had damaged its undercarriage, apparently when on the point of departure for England. The Airspeed "Envoy," to be flown by George Lowdell and Flt. Lt. D. F. Ander-



THE PRINCE'S VISIT : His Royal Highness chats with Messrs. Campbell-Black and Scott (on left); on the right are Lt.-Com. H. E. Perrin, Secretary of the R.Ae.C., and Mr. Lindsay Everard, M.P. (Flight Photo.)

son, had suffered a forced landing at St. Neots, due to a minor oil-feed trouble, on the way to Mildenhall, and the machine had been scratched.

But there was a world of interest in the new types and those which had not previously been seen in this country. The design of the unlucky Bellanca monoplane, for instance, has been based on data for a long-range reconnaissance machine for the American Navy, and the engine was, in fact, developed for Service use, and is the only one of its kind to be found on a civil aircraft. It develops 700 h.p. at 8,500 feet, though the best cruising power is obtained at between 12,000 and 14,000 feet. It weighs, without equipment, only 994 lb.

With 300 gallons of fuel on board, the *Swoop* has, according to Bonar, taken off in six seconds, and the whole 500 gallons can be dumped in 44 seconds. Bonar also gave the range, with full tanks, as 3,220 miles at 235 m.p.h., the full-out speed as 265 m.p.h., and the landing speed, with rather less than half-load, as 56 m.p.h.

The Bellanca has a welded steel fuselage, faired to an oval section, and, as the machine is a wire-braced monoplane with an inwardly retractile undercarriage, a pair of kingposts take the lift wires. The cockpits are placed well back, and Bonar can lower his seat so that Fitzmaurice may see the flying instruments when he takes over. Special D/F equipment, of visual and aural type, developed for the U.S. Navy, is used. Rollasons, incidentally, were attending to all the work on the machine.

Gradually, the number of entrants who might have hoped to reach Baghdad in one hop were being ruthlessly cut down by the race officials. Col. Roscoe Turner's *Boeing 247-D*, actually the first of its type and used by United Air Lines in America, had been licensed in the U.S. to carry 950 gallons, but three tanks were sealed to comply with the regulations, and it appeared on Wednesday that the machine could hope to get no farther than Athens without refuelling. Capt. Stack's *Airspeed "Viceroy"* was another unfortunate. It began to appear as if only the three D.H. "Comets," the Bellanca, and the Granville monoplane were likely to attempt to travel directly between all the controls.

The Pander S.4's performance remained something of a mystery, and Slot, the designer, claimed, when questioned, that "his memory was bad." Few people realise that this machine, renamed *Panderjager*, was originally designed as a bomber with a pair of two-row 700 h.p. Wrights before being taken over as a long-range, high-speed mail carrier and fitted with three Wright "Whirlwinds," each giving a maximum of 420 b.h.p. Apparently, the designer was not satisfied that the *Panderjager* was properly equipped for the Australian race, but all the minor troubles appear to have been cured. In its present form it cruises at a speed between 180 and 190 m.p.h.

Miss Jacqueline Cochran's original entry, the Northrop, had been withdrawn owing to trouble with the



A DISTINGUISHED VISITOR : Lord Londonderry, Secretary of State for Air, is conducted round the aerodrome by (left) Mr. Lindsay Everard, M.P. (Chairman of the Organising Committee), and Lieut. Col. F. C. Shelmerdine, D.C.A. (Flight Photo.)



COMPASS SWINGING: The "Comet" flown by Lt. O. Cathcart Jones and Mr. "Ken" Waller undergoes an important ceremony. (Flight Photo.)

Curtiss "Super Conqueror" engine, and many people felt that the Gee Bee was an unlikely starter, simply because it never appeared in the fresh air. The machine is a cross between the "International Courier" and the "International Supersportster" R5, so that, at a guess, its cruising speed can be taken as being quite 230 m.p.h. Flaps are fitted, and the engine is a Pratt and Whitney "Hornet" S.D. of 675 h.p., this power being developed at 6,000 feet. The machine could carry 400 gallons.

Thursday had turned out to be a bad day for the De Havilland hopes, and only continuous work for twenty-one hours had enabled the damaged "Comet" Number 19 to be completed in time for final testing and the start. Capt. Broad

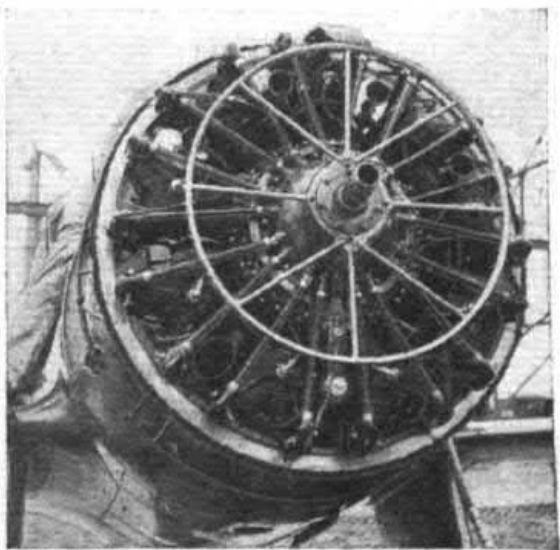
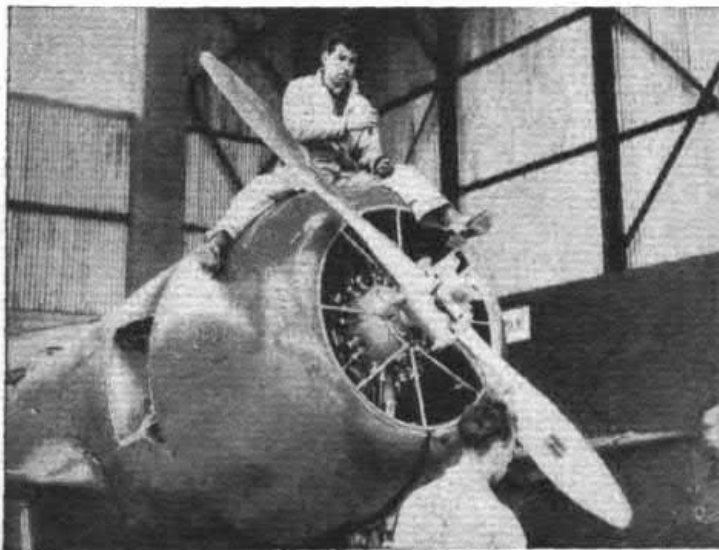


IMPRESSIVE: An ant's-eye view of the K.L.M.'s big Doug'as. (Flight Photo.)

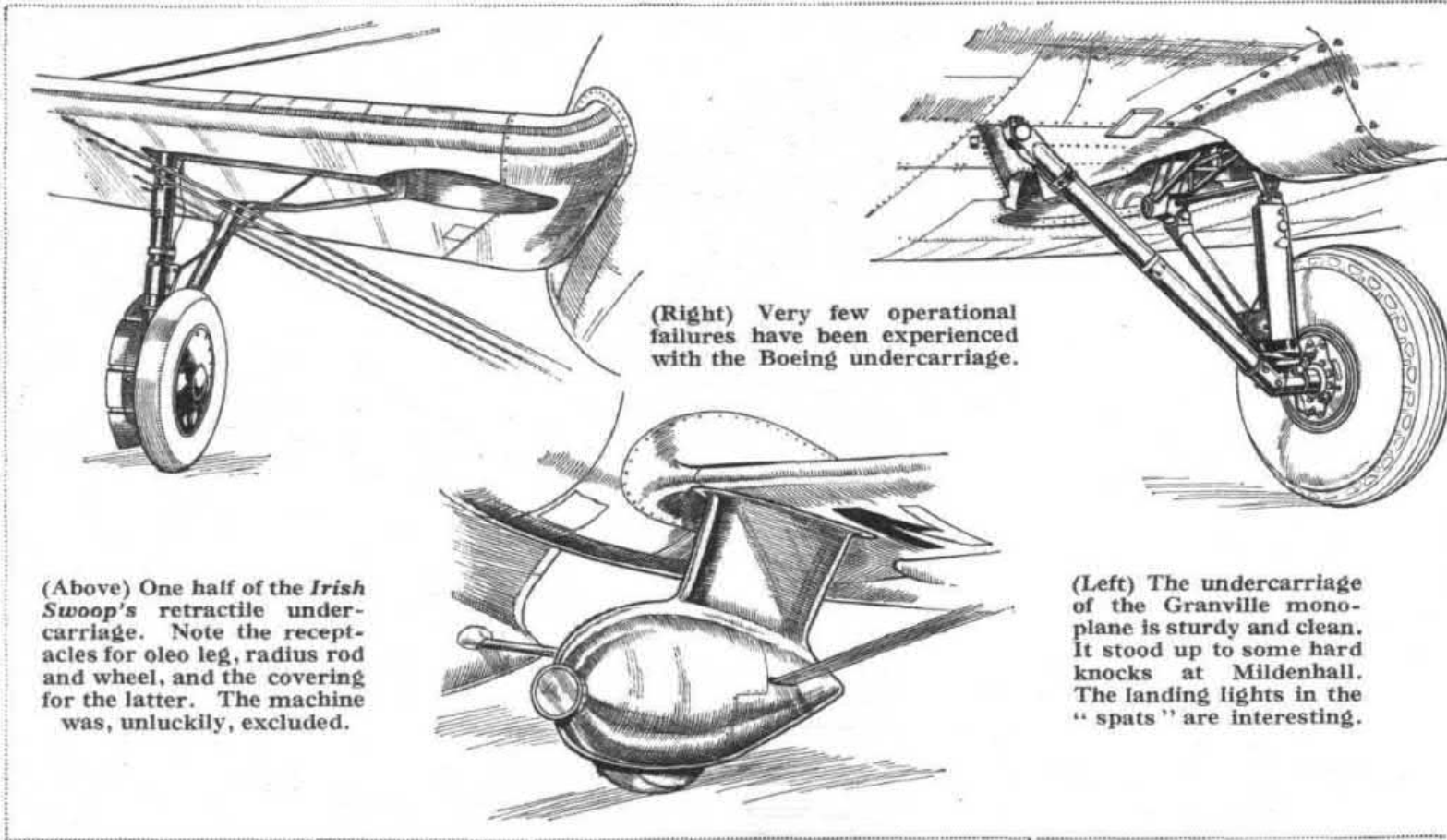
had, incidentally, been making a habit of flying the night shift from Hatfield in a "Dragon."

So far as the spectators were concerned, this "Comet," in the course of a practice landing, swung slightly on touching, pulled up with significant suddenness, and flashed on its landing light. The fire-engine hurried out, and everybody waited tensely to learn the worst. Slowly the facts leaked out, and it was learned that there was just about a fifty-fifty chance that all might be well for the race. Both Ratier airscrews were damaged, but nothing had been really seriously disturbed. One spare was fitted, and the other damaged airscrew was rushed off to the Fairey works to be straightened out.

The whole affair was the result



RIDE HIM, COWBOY! A mechanic secures the cowling of Miss Cochran's Granville monoplane. On the right is the Pratt and Whitney "Hornet" uncowed: Note the four venturis for the duplicated Sperry Artificial Horizons and Gyro-Compasses. Miss Cochran unluckily got no farther than Bucharest. (Flight Photo.)



(Right) Very few operational failures have been experienced with the Boeing undercarriage.

(Above) One half of the *Irish Swoop's* retractile undercarriage. Note the receptacles for oleo leg, radius rod and wheel, and the covering for the latter. The machine was, unluckily, excluded.

(Left) The undercarriage of the Granville monoplane is sturdy and clean. It stood up to some hard knocks at Mildenhall. The landing lights in the "spats" are interesting.

of an unfortunate slip of memory and a combination of circumstances. When the wheels are right down engine cooling is slightly impaired, and during practice landings and circuits the "Comet's" undercarriages were lifted, when in the air, to the extent of four turns of the operating wheel, and Lt. Cathcart-Jones neglected to put his fully down for the landing. A new technique of "rumbling" approach had been developed, and, as the throttles were being opened at intervals, the warning light, which operates in conjunction with the throttle position, failed to warn. The "Comet" just did not nose over, and only the radius rods were damaged. The landing light, incidentally, was switched on accidentally, but it certainly acted as a very efficient "SOS" signal.

Meanwhile, troubles with Press permits had been



FILLING-UP: The Lockheed "Vega" (Pratt and Whit and Bennet were unlucky, the "Veg

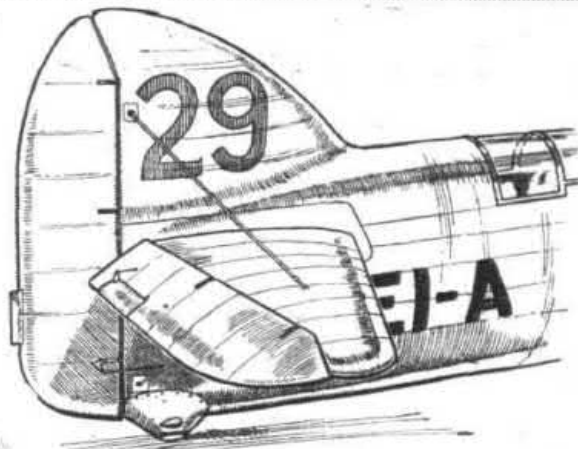
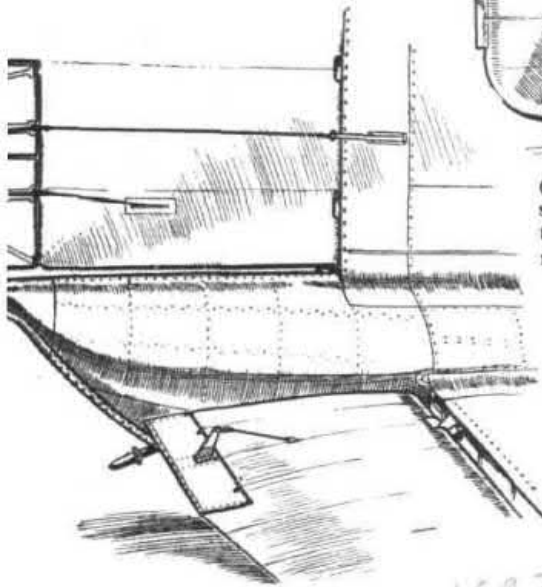


THEY SHALL NOT PASS! Mr. J. J. Leffs, Aero-drome Control Officer, and Capt. A. G. Lampiugh on the watch for gate-crashers. (Flight Photo.)

practically smoothed over, and the time had passed when one or other of the many officials would burst into a hangar and order everybody out with "I-don't-care-whether-you've-got-a-pass-or-not" methods and pugilistic facial expressions. Panics only occurred when crowds of more than ten people were noticed to be examining a machine, and the general public was taken around in carefully shepherded flocks.

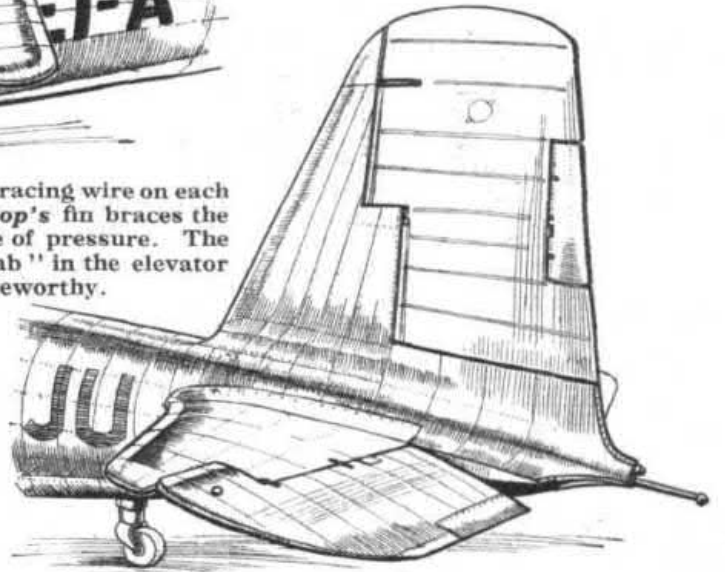
Parer's Fairey "Fox" was suffering, it appeared, from a relentlessly weeping radiator, and life was not at all a simple matter for the crew. The modifications, incident-

(Below) The fuselage line blends into the trailing edge of the rudder on Roscoe Turner's Boeing. Of the two auxiliary surfaces in the rudder one is a "servo rudder" and the other a "tab" for trimming. Note also the "tab" in the elevator.



(Above) A single top bracing wire on each side of the Irish Swoop's fin braces the tailplane on the centre of pressure. The rudder shape and "tab" in the elevator are also noteworthy.

(Below) Each fixed surface in the empennage of the Douglas D.C.2 is carefully filleted where it joins the fuselage. This skeleton shows also the balancing of the movable surfaces and a portion of the trailing antenna.



Wasp" S.C.) being fuelled for the start. Messrs. Woods ting the dust at Aleppo. (Flight Photo.)

quarter past two, but most of the visitors were taken by surprise when they learnt that the King and Queen were expected.

Lord Londonderry, too, arrived from Hendon during the morning in a Hawker "Hart" of No. 24 (Communications) Squadron, escorted by another "Hart" of No. 601 Squadron A.A.F., and the party travelling in the Douglas arrived in an F.VIII with the mails. K.L.M. were making the most of a very wonderful opportunity.

As the sun sank on this fateful day, the Lockheed "Vega"—only representative of a very fast family—was taken out for a crisp airing; the long-awaited Number 19 was successfully and very effectively tested after repairs; and Miss Cochran's Gee Ree was run up on the apron emitting a healthy note.

The stage was set.

ally, conceived by Shackleton and carried out by N. F. S., include extra tanks—one between the cockpits and the other faired in below the fuselage, and a filed-in "cut-out"—doubtless by way of increasing the wing area in the handicap formula. As was mentioned in last week's issue, a Dove "Cloutring" is mounted in the pilot's screen.

The last day of the preparations was one of surprises. Visits were paid to Mildenhall, both by Their Majesties and by the Prince of Wales. His Royal Highness was, of course, expected, and his D.H. "Dragon" came in at a



THE FLYING DUTCHMEN: Moll and Parmentier, who, with the big Douglas D.C.2., reached Australia second. (Flight Photo.)