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DINNER TO MISS AMY JOHNSON, C.B.E., B.A. HON.F.S.E., TRAFALGAR DAY, 1930.

SPEECHES

DELIVERED AT A DINNER GIVEN TO

MISS AMY JOHNSON, C.B.E., B.A., Hon.F.S.E.,

COMMEMORATING HER LONE FLIGHT TO AUSTRALIA,
MAY 5-24, 1930.

Held at the Holborn Restaurant, London, W.C., on Trafalgar Day (Tuesday, October 21, 1930).

W. M. BECKETT, ESQ., M.B.E., F.S.E., A.M.Inst.C.E.,
PRESIDENT,
IN THE CHAIR.

The President : My Lord, ladies and gentlemen, before proposing the first toast this evening, I am sure that you will all agree that we should pay our token of respect to those 48 brave men who lost their lives in the terrible disaster which overtook our latest airship R101 sixteen days ago. Two, at least, of that gallant company had been invited to be present at our gathering this evening. We hoped that they would have borne testimony to the brave deeds which we have met to commemorate. The whole country mourns their loss and from all parts of the world messages of sympathy have poured in. Our friends and allies, the French nation, have especially touched our hearts by the wonderful expression of regret and the high military honours which they paid so generously and spontaneously to the victims.

I ask you to stand for a moment to mark our deep feeling of sorrow and sympathy with the friends and relations on whom this terrible blow has fallen.

(The assembly stood in silence for a few moments).

(The loyal toasts were enthusiastically honoured).

The President, in proposing the toast of " Johnnie," said that the English were not a demonstrative people, but a deed involving so much bravery and many risks as the solo flight from England to Australia undertaken in a diminutive Moth aeroplane by a young girl only 27 years of age was such an outstanding feat that they were filled with admiration. They were very proud to think that such a flight had been successfully accomplished by an English girl. Two years before her flight, Miss Amy Johnson knew very little about aeroplanes. She had just taken her B.A. degree at Sheffield University and soon afterwards she accepted an appointment as private secretary to a solicitor in London. She was fond of sport of all kinds and especially keen on swimming and hockey.

One day, passing the Stag Lane Aerodrome, she decided to become a member of the Flying Club. She took to flying like a duck took to water, and under the able instruction of Mr. Stuart Humphreys, who was present that evening, she soon became proficient in the art of flying and in all the mechanical details of construction of the aeroplane and its engine. Miss Amy Johnson was the first woman in England to be granted a ground engineer's licence under categories A. and C., the former entailing practical experience in aircraft construction and maintenance, and the latter a similar experience in regard to aero engines. Miss Johnson's father encouraged her to give full scope to her love of flying and he presented her with a small second-hand Moth aeroplane, in which she subsequently made her wonderful flight. He thought that they should pay tribute to the high courage and unselfishness which prompted Mr. and Mrs. Johnson to consent to their daughter undertaking a flight full of so many dangers and risks.

When she had safely accomplished her task, the King sent a telegram expressing the thankfulness and delight of the Queen and himself at her safe arrival, and congratulating her on her great achievement. Her flight from Calcutta to Rangoon included 200 miles across open sea in a terrible storm, and on landing at Insein the propeller was broken and a wing damaged. This necessitated two days delay and thus made it impossible for Miss Johnson to beat Mr. Bert Hinckler's record time for a solo flight to Australia. Up to Calcutta Miss Johnson was two days ahead of Mr. Hinckler.

As soon as they heard of Miss Johnson's safe arrival in Australia, the Council of the Society of Engineers sent her a cablegram of congratulation and made her an honorary fellow of the Society, that being the highest honour at their disposal.

It was not proposed to have any other toasts this evening, but he thought that they ought to congratulate Messrs. de Havilland, the makers of the wonderful little Moth machine which carried Miss Johnson half way round the world. He thought that they should also express their thanks to the *Daily Mail* for the valuable help and encouragement given to aviation during the past twenty years.

He would like to refer once more to the wonderful bravery and iron energy which enabled Miss Johnson to face all the dangers of the flight. The subsequent reaction and strain had proved very trying to her and she had been ordered to take a complete rest for a time. She had come there that evening against her doctor's orders to give them her long promised address. He was sure that everyone would wish Miss Johnson a speedy return to her normal health and strength.

Rear Admiral Murray Fraser Sueter, R.N., C.B., M.P., in seconding the toast of " Johnnie," said that it was a very great honour for an old air pioneer to be asked to second the toast of their very distinguished guest. He approached his task with much diffidence, because he was a member of " The Silent Service." He then outlined his connection with the Royal Naval Air Service from the time when it was started in 1909.

During the last 21 years that air development had been going on, tremendous strides had been made. The first little seaplane could remain for only a few seconds in the air, and now the record was 67 hours. The altitude of the first seaplane was a few feet and now it was 42,000 feet. The first seaplane could do something like 30 to 40 miles an hour and now the speed was 357 miles an hour. For this remarkable aviation development they had to thank those pioneers who set up the great records, and people like Miss Amy Johnson, who made these wonderful flights. They also had to thank men like Mr. Fairey, who were the designers of these machines, but however good the designers and pilots were, they were of no use without an efficient engine. They had to thank gentlemen of the engineering profession for the way in which they had developed the aero engine. What he asked them to develop now was a silent engine.

He would like to pay tribute to the fine work done by the late Sir Sefton Brancker, whose death was such a loss to civil aviation. He was delighted that tribute had been paid to the gallant men who were lost in the R101, because most of them were the boys that he trained in the Royal Naval Air Service. He felt perfectly certain that if Lord Thomson and all his gallant crew could be asked the question whether the airship development should go on or not they would say " Press on ; do not go back." When his old submarine, the A.1 was sunk with all hands off the Nab lightship, and every one of them was drowned, Lord Fisher ordered six more submarines and sent the submarines out into the Channel for more manœuvres. He hoped that they were not going to turn away from airship development. The argument was sometimes put forward that airship development cost too much money, but the country spent £12,000,000 sterling per annum to keep fifteen battleships, which were of doubtful value, in commission. That money would be far better expended in encouraging civil aviation and the airship development.

As an old air pioneer, he wished to pay a tribute to Miss Johnson's wonderful flight. She had forged an imperial link, which helped to bind the Empire together, as had those other great fliers, such as Squadron Commander Kingsford Smith, who had done the air trip to Australia in ten days. Mr. Matthews took a little longer and he hoped that Mr. Hill would do it.

All these people were forging links connecting up the British Empire, and he congratulated Miss Johnson on forging a very big link.

He had the honour of seconding the toast.

(The toast of " Johnnie " was then enthusiastically honoured)

Miss Amy Johnson, C.B.E., B.A., Hon.F.S.E., in replying to the toast of " Johnnie," delivered the following address on " The attention that I gave to Jason's engine during my flight."

Mr. President, ladies and gentlemen, thank you very much indeed for your kind reception of me to-night, and for giving me this great honour.

I am here because I esteemed it such an immense compliment that I was made an Honorary Fellow of such a Society as that of The Society of Engineers, and it was because I felt this compliment so deeply, that I responded to the invitation of the President to talk about the care that I gave to my engine. I prepared this talk because I thought that it was a talk to The Society of Engineers, and I hardly realised that it was going to be a function such as this to-night. I am very much afraid that some people here may be rather tired with the technical aspects of my paper (Cries of " No,") but I beg you to be patient as I try to make parts of it as interesting as possible. All the statements in the President's speech were excellent, but they were not quite true I am afraid, so that I ask that too much notice should not be given to them. I hope that some day I shall be able to publish my own account of my flight, which I wish to be true in every respect.

My flight was carried out for two reasons : because I wished to carve for myself a career in aviation, and because of my innate love of adventure. My first object has not been realised exactly as I would have wished ; the second object is still open to me. What I crave for more than anything else is adventure. I am, therefore, going to try to bring into my book, not only the construction and care of my engine, but little bits of the romance and adventure of my flight.

I also wish to pay tribute to the great flyers who have just reached Australia. They have totally eclipsed my flight, and I pay them the very greatest tribute for their bravery in the face of all difficulties. In common with the rest of the world, I look upon Kingsford Smith as the greatest living airman, and I give Hill his due for being so brave and courageous against all odds. My heart is with Hill, situated there in Atamboea, because I know what a place it is. If there were not ladies present I would say that in stronger language.

I will now begin my talk on the construction of my engine. It is a Gypsy Mark 1, manufactured by De Havilland's. I

am afraid that some of this will interest only the engineers present.

(**The President :** There are a good many of them.)

It is a vertical 4 in line, air cooled, direct drive left-hand tractor. Compression ratio is 5 to 1, normal B.H.P. 90 ; maximum 98 ; normal revolutions per minute 1,900 ; maximum 2,100 (with standard propeller,—my revolutions varied greatly with the two different propellers I used—I will refer to this point later). It had 2 B.T.H. magnetos, one spigot, one sprocket —mounted. I used K.L.G. plugs. Oil pressure 30-40 lb. per square inch.

Normal oil consumption 0.5 to 0.75 pint per hour.

Normal petrol consumption 0.59 pint per B.H.P. per hour (in actual practice it is found to use less).

Weight of engine 285 lb.

My engine and machine were standard except for stub exhaust and fairing on the ailerons, rudder and elevator ; and front cock-pit covered in. This I had done to gain a little extra speed and probably gained a further 5 miles per hour ; all of which was probably lost again by carrying my spare propeller strapped on to the side of the machine, but I dare not go without it, and events proved that my advisers were wise.

I carried two extra petrol tanks, one in the front cock-pit to hold 35 gallons, and one in the rear locker with a capacity of 26 gallons. The top gravity tank held 19 gallons, so I had a total petrol capacity of 80 gallons which should keep me in the air for 13 hours at a cruising speed of 90 miles per hour, and in temperate climate. Kingsford Smith had 100 gallons. You can, therefore, see that he was better off than I was, because in the hotter climates I used more petrol, and, therefore, I could not keep in the air for so long. He had a great advantage over me.

I could carry two gallons of oil which was more than enough for that amount of flying. The propeller I was advised to take was the heaviest of the 3 weights provided for a Gypsy engine. It only gave 1,700 revolutions per minute on the ground, and 1,800 " all out " in the air. Even though I was told I could safely fly at full throttle with so heavy a propeller yet I did not like to do so, and the result was that with my throttle $\frac{3}{4}$ advanced, my speedometer showed only 65 miles per hour (this I knew was reading slow as my shut indicator showed 70). When I pushed the throttle full forward neither speed nor revolutions altered, so I pulled it back to $\frac{3}{4}$.

The first day I had slight head winds, and only reached Vienna after 10 hours flying, but after that, until I reached India, I had following winds, which was just as well, because my calculations had been based on a cruising speed of 90 miles

per hour, and at this speed I was due to reach each stopping place before sunset. Doing such a slow speed I could not carry them out quite as planned, but fortunately I had these following winds, and my calculations came out about right.

It may interest you to know the history of my engine before it came into my possession.

It was No. 12, that is, the 12th engine made by De Havilland's, and was bought from them by Captain Hope in August, 1928. He had the extra tanks fitted, and it did nearly 400 hours flying, during which time it flew approximately 36,000 miles, and was in Africa, Germany, France, Italy, Ireland, etc. It had been completely overhauled on the return from Africa. When I took it over it had done 50 hours after its last top overhaul. Being an old engine it had the now obsolete method of lubricating the tappet gear, that is, the oil pipe breather, instead of coming out underneath the engine was turned up in such a way that the escaping oil was squirted over the valve springs, stems, rocker arms and tappets (and, incidentally, over as much of the engine and cowling and machine as it could reach ; the rear part especially getting filthy as the oil was thrown back from the bulkhead, and collected in a nice sticky mess on the rear cylinder plugs and high tension leads). Some of the oil reached my windscreen, and I had to clean it several times a day whilst in the air.

I shall never forget that one day I was flying in a terrific heat with the sun pouring down upon me. I suppose that, being up in the air for a long time, my imagination wandered. I could see that there was some dithering going on on the front of my engine. I could not make out what it was, and it worried me the whole day through. It was so absurd, something going like that for the whole day. I found that it was only oil, which had collected in enormous bubbles on the air intake, and it was giving this funny impression for the whole of the day. It was not very surprising.

Several modifications had been put into force since the engine was made, and most of these had been carried out on " Jason," so I had no doubts at all about its old age proving a drawback.

Captain Hope had had the engine cowling cut so as to give the sump more efficient cooling, and as the machine had already won its spurs in tropical countries I was sure it would do me all right.

Before buying the machine I took it up for a few minutes test, and as time was so short, and it had to go straight away into De Havilland's for re-painting, a parachute seat, etc., I never had the chance to fly it again, and was unable, therefore, to test its performance with the heavy propeller, or its petrol

and oil consumption. My plans were, therefore, perforce taken from book data, and did not always come out just as I thought they would, as I will tell you later.

I had worked for eight months on Gypsy engines, and felt quite *au fait* with the ordinary routine work of daily, 30 hour and top overhauls. My experience was not wide, and I was not sure how I should get on if anything really serious happened. The view I took though, was that if I faithfully carried out all I had been trained to do nothing serious ought to happen, and I certainly was lucky.

As I was to do about ten hours flying per day I was advised to carry out a daily schedule every night. I was sternly told not to think of going to bed until everything was done, and the machine all ready to take off in the morning. An ordinary daily schedule consists (briefly) of :—

Cleaning the exterior.
Checking holding-down and all other bolts.
Examining and oiling engine controls.
Examining all locking devices.
Examining and testing the airscrew.
Checking tappet clearances.
Cleaning petrol and oil filters.
Examining cylinder heads and valve gear.
Greasing rocker-arms, and valve stems, and oiling valve springs.
Checking compression.
Examining all pipes, nuts, and bolts, high tension heads, contact-breakers and plugs.
Opening drain cock of petrol tank.
Filling with oil and petrol.
Running up on ground and testing both magnetos.

That sounds an awful lot. It certainly was a lot, and it took about five or six hours a day to carry out.

There was an equally comprehensive daily schedule for the machine, but I have no time to go into that here.

After the machine had been repainted, it was taken over by my engineer friends of the L.A.C. who took out the engine, washed it thoroughly, and gave it a quick top overhaul, including all new modifications. The new Arens controls were fitted to the throttle, the seat altered to take a parachute and everything was examined, checked, and tested. The list of renewals is too long to give here. It was run up on the ground, but not taken into the air until I flew it over to Croydon on the Sunday evening before my departure. I flew the engineer in the front cock-pit, and he was not happy. He got all the oil which should have gone on my windscreen, and he had in the cockpit with

him the 35 gallon tank, no cushions, and my engine tools and spares. Just a word on these. The machine itself, empty, weighed 923 lb. Maximum total load allowed by the makers was 727 lb. for straight flying. My own weight was 126 lb., my parachute 22 lb., petrol 600 lb., oil 20 lb., and my spare propeller 22 lb., making a total of 785 lb. I was therefore already overloaded by 58 lb., and the question of tools and spares was a most important one, namely, what to take, and what not to take. In the end I took :—

2 sets of plugs.

A right hand and left hand contact-breaker, spare valve, set of springs, push-rod, dope fabric, needle and cotton, varnish, hermetic spare inner tube, puncture outfit.

Oil relief valve spring, rubber tubing, insulating tape, locking wire, Vickers clips, assortment of split pins, nuts, bolts, screws, torch, screw pickets, foot-pump, safety pins, C. & A. washers, and a complete set of tools, most of which were souvenired en route.

All these I tied into cockpit covers and carried in the front cockpit as my locker was occupied by a petrol tank. My tools and kit weighed approximately 100 lb. so I was about 150 lb. overloaded, which is not too funny, as I found when I tried to take off.

On the morning of May 5th at 4 a.m., I rose and breakfasted, and then went on the aerodrome, where two of my friends had been working all night, filling up, trying on the spare propeller, greasing, and oiling. As dawn broke the machine was run up, and I settled myself in the cockpit. Whilst fastening my belt and parachute straps I smelt petrol strongly, and tracing it I found one of the petrol pipe connections dripping badly. There was nothing to be done but stop the engine, and let my friends see the trouble. I soon saw it would be a fairly long job, so I went back to bed till the connection was repaired. It was 8 o'clock before I finally took off.

The journey to Vienna was uneventful except for my slow speed and pumping petrol. This was not at all funny. My pump was an ordinary hand air-pressure pump, and I had to pump 40 times (there and back counting as one) to pump one gallon into the gravity tank. There is no need to enlarge on the subject, but the only thing that kept me pumping was the ignominy of giving up my flight because " pumping petrol made me sick." However, my muscles grew harder, and although I never grew to like it, yet later on I used to be glad of the job as a means of keeping me awake.

At Vienna the mechanics absolutely refused to let me do anything on my engine, and I danced hither and thither explaining what must be done, my head full of my last promise to my engineer tutor to do everything myself. The mechanics meanwhile endeavoured to amuse me by a story of their last lady pilot visitor who changed into overalls and mounted a ladder, insisting on looking over the engine herself. Now if there is one thing I cannot stand, it is the idea of being laughed at behind my back, so I left them to it, and went off to see about my passport, finding somewhere to sleep, as there was not time to go into Vienna. In the morning at 4 a.m. I rose, and went to my machine. I thought I was fortunate to find anyone up so early to open the hangar doors, but later I never wondered at this, because in other countries it seems the custom to start work early. We started up the engine, but she did not sound good. On running up, she dropped revolutions on the impulse magneto, so out had to come my tools (more of a job than it sounds—undo the front cover, heave out all the cockpit covers until the required tool was found) and the plugs were cleaned. This rectified the trouble. The rear plug was badly " oiled " up. After this experience I examined the plugs every day as I did not like early morning delays.

In case there are any aeronautical engineers present I should like to explain that in an aero engine what usually happens with plugs is that they get " petrolled up," because when an engine is ticking over on the ground for a long time too much petrol gets to the rear cylinder as it is sitting on the ground. The rear plugs receiving too much petrol, they get " petrolled up," as we call it. " Oiling up " on an aero engine is very unusual, but this was decidedly the case in my engine, because of the thick layer of carbon over the plugs on the rear cylinder.

Vienna to Constantinople was fairly uneventful, except that the petrol pump had developed another leak, and as I pumped, petrol spurted into my face, and made me feel so sick I had to do all my pumping with my face over the side of the ship. Oil pressure went up to 50 lb. per sq. in.

I arrived at Constantinople with an hour's daylight to spare, but one and a half hours were wasted in the Customs, and by the time I was allowed to return to my machine it was pitch dark. A car was on the aerodrome, and I asked for its headlamps to be lit, and turned my way. By their light I cleaned and examined the engine (and generally carried out the usual daily overhaul), changed all the plugs, and drained the oil which was filthy. The Turks helped me fill up with petrol, and after about three hours' hard work the machine was ready. No one spoke English, and I made signs to ask if it could be put in a hangar for the night. I could see one at the other end of the aerodrome. Before I could protest several able-bodied Turks had lifted high Jason's tail, and over he went on his nose

—heavily weighted as he was in front with petrol and tools, etc. Intuition (or strict training) had caused me, two minutes before, to straighten the propeller (put it horizontal) as I passed in front of the engine, so no harm was done. I was a bit worried, and insisted on testing it for truth. You put a pair of steps, and turn the propeller over to see that it is a certain distance from the steps on each side of it. The Turks looked so shame-faced I was sorry I had been cross with them. Jason was then taken, oh so carefully, into a hangar, and off I went to find somewhere to sleep.

In the morning in the light of dawn my oil pressure dropped to 10 lb. per sq. in. I had to think of everything it might be —the most likely thing was that the oil release spring had weakened, or the plunger stuck up, so I tried this first. The plunger was stuck so tightly I had great difficulty in getting it out. The oil had got so dirty in two days running that it had stopped the free movement of the plunger. After that I vowed not only to examine the plugs every day, but to change the oil every day, and examine the plunger and spring. This put the trouble right to my immense relief, but no sooner was I installed in the cock-pit than the ominous smell of petrol reminded me of the leak I had noticed the previous day. This had become worse, but as I wanted to reach Baghdad I would probably have pushed on with it. However, it was then long after dawn, and I knew I could not make Baghdad anyhow, so I went to rest whilst a French mechanic (conveniently working on a visiting French plane) mended the leak for me. Whenever there was a suitable man mechanic near I always left it to him.

When at last I was in the air I felt anxiously for vibration, because it seemed too good to be true that no harm had come from the upsetting incident of the previous night. However, all seemed O.K., and I went on. Over the Taurus Mountains, which are about 15,000 feet high in parts, I tried to climb, but as I had no altitude control and was heavily laden, I could not get higher than 10,000 feet, and even then my engine coughed and spluttered until I came down to 9,000 feet. I watched the oil pressure gauge with anxiety, but it stoutly remained at 40, and I blessed it.

At Aleppo I found the French Air Force most kindly and efficient. Filling up was quickly carried out from pumps, which I was rather surprised to find in the desert, and as I had landed fairly early I had plenty of daylight, to finish the engine work by. With the aid of French mechanics I carried out an ordinary daily overhaul, including the plugs, changing the oil, and examining the plunger. Everything went well, and Aleppo was one of my happiest stops, as well as my first hint of romance. I shall never forget being at Aleppo, the very first time that I had been anywhere near a desert, and seeing the Sheiks there, or, as I learned to call them in Baghdad, the "Shakes."

I was off early in the morning, and everything went well until the dust storm (I am not going to say anything about that; I hope to tell the true story in my book), I forced-landed in the desert at about 110 miles per hour, and must have weakened the under carriage left-hand radius rod, because when I later landed at Baghdad it broke clean in two, and my landing there, though heavy, did not warrant that. I had what they call the old type of undercarriage, which, if you crash very badly, only breaks the undercarriage, and probably would not damage the wings. The new type of undercarriage is much better, and you can land more heavily on it without doing any damage, but if you land on it very, very heavily it will not only break the undercarriage, but the wings as well. I, therefore, thought that I was fortunate in having the old type, and I did not change it for a newer type.

The Air Force mechanics at Hinaid, bless them, worked all night long making a new strut, and it was all ready fitted for me when I came the next morning. I was fortunate at Baghdad, because Imperial Airways mechanics did all my work for me, and I went for a drive through Baghdad. I knew that proper men mechanics would do the job much better than I could, so I had no compunction in leaving it to them whenever I could.

Baghdad to Bundar Abbas was rather a nightmare. I was getting into terrific heat, and no matter how high I went (ceiling at 10,000 feet) my oil pressure would fall, but it did not go below 35, so I just flew as high as I could, throttled down the engine, and hoped for the best. Besides this, my engine was missing, and I did not at all like the sound when I ran on to the right-hand magneto only. My revolutions dropped, but not very seriously, and I guessed one plug must be misbehaving. I hastily switched on to the other magneto so that I should not hear the unpleasant sound so plainly. There was nowhere to land, anyhow.

At Bundar Abbas I was not expected; the aerodrome was not marked in any way, nor was there any indication of the wind. Presuming there was a sea breeze I landed towards the Gulf in the only available large space, which proved to be the aerodrome. I landed fast, as usual, and rather heavily, also as usual, in the terrific heat I was now flying in, and to my horror, the left wing drooped and trailed the ground. This time it was the bolt securing the top of the new strut which had sheared, and I could not see any hope of help in such a God-forsaken place as Bundar Abbas. I was taken into the British Consulate situated almost on the aerodrome, where I succumbed to a blinding headache, and was utterly incapable of seeing to

my machine. The Consul was very kind, and assured me he had an excellent man who looked after his car, and who would do everything he could for my plane. I was not so sure, but felt far too ill to take any active steps just at that moment. I was given tea, and made to lie down, the Consul's wife and daughter doing their utmost to cure my headache. By dinner time they were successful, and the headache marvellously vanished, but much precious time had been lost, and I had done nothing to my machine. Dinner was a long meal because the lights went out in the middle (the man in charge of the power house had run out of petrol, and so had taken a holiday, and gone out to see my machine). Dinner over, it was dark ; but a beautiful moon was rising which after a time gave enough light to enable me to see to my engine, helped by a torch for " inside " jobs.

Feeling very anxious indeed, as it was getting so late (it was by then about 10.30) I insisted on going at once to the aerodrome (I will tell of the car drive over bumps in my book). Here, to my intense surprise, I found my machine standing up properly, and on testing the strut and bolt I found a new bolt had been fitted, and the result all that could be desired. I could not imagine how anything so marvellous had been carried out in this place at Bundar Abbas. I was then introduced to the wonder worker, who went by the name of " David," and he confided to me that when Air Force planes had been using the aerodrome he had always hung around to help, and to learn all he could. He also said he had found the bolt amongst some spare parts which had been left behind. I was too thankful to be curious, and I blessed him for his interest in aero engines.

Two Englishmen had come on the scene from somewhere, but they evidently had not ever in their lives shown any interest in aero engines. Balanced precariously on petrol tins, as no steps were available, I tugged at the cowling, as I was anxious to discover the mystery of the " missing " plug. It was not all missing, but the middle of it was. The electrode had blown clean out. Oh well, no harm was done fortunately, and from then on I vowed to add tightening of electrodes to the list of my daily tasks.

David worked hard under my instructions, and whilst he balanced on the petrol tins, I stood on the sand, and directed him whilst he took out the plugs. I impressed on him the importance of putting back the C. & A. washer on each plug, and when the job was done I myself tightened the electrodes, and plugs. The rest of the work went on smoothly, if slowly, because of the lack of light, and the sand blowing over my tools, and large and small insects creeping in and out amongst them. I carried out the complete daily schedule, and by midnight had

got as far as putting in the new oil, having drained out the old. " Where's my XXL., David ? " Consternation, reigned. After a long search some Castrol R. was produced, and I was told that was all there was, and no one had any idea as to how many years it had lain there on the aerodrome. We opened it, but I did not like the feel of it. I had no experience of Castrol R., and had never seen any, as all my engine work had been done at the Club where XXL. and Vacuum BB. were the only oils used. There seemed no alternative but to risk this, so I decided to pour in two gallons, run up the engine, and note the oil pressure. However, when I saw what looked like weak tea running into my engine I had definite misgivings, and ordered a halt. After much questioning, and a journey back to the Consulate to get the Consul's views as to the whereabouts of my own supplies, it was decided to find out whether the oil was in the Custom's shed. We got into the car and bumped across to the Custom's Officer's bungalow where we hauled him out of bed (or rather the Consul did) and he gave us the key so that we could examine the place ourselves. This was about 1 a.m. I returned to " Jason " whilst two of the others went to look for oil. In about an hour's time they triumphantly returned with two gallons of XXL. I drained out the weak tea, and with great relief saw the thick green peasoup with which I was so familiar disappearing into the sump. By 2.30 a.m. I had finished all I intended to do (the air was wonderful, and I did not feel a bit tired), and went off to bed. I was up at 4, as I had left the petrol cap on the front tank to be fastened in the morning.

I will explain here that there were several small things which caused me more worry and irritation than the whole of the work on the engine. One of these was the fastening of the cap on the front petrol tank. From the beginning of my flight the cap would not screw on more than one thread and a half. At Constantinople, when I was not looking, I think someone must have hammered the cap in, because at my next stop the thread was entirely gone. It was hopeless to do anything at all, because it was a terribly long job to take out the tank, and I had not time to stop and do this. After having done five or six hours work on the engine, after a ten or eleven hours flying day, I had to stand, sometimes as long as an hour, securing this beastly cap on that wretched front petrol tank. It was essential that the cap should be secure as the petrol was pumped by air pressure into the gravity tank, and I knew that a strain would be put on the cap in consequence. Another worry was the filling of petrol from tins. A friend of mine had got a filter for me at the last moment. It was an enormous thing, with a very small hole in the centre. It could not possibly have been for petrol. I do not know for what it was really meant. I had

to manage with it, because it was the only one that I had. I always insisted on having with me two chamois leathers, as I was told that I must not run the risk of getting water or dirt into my petrol, and it was better to filter petrol through two chamois leathers than to force-land somewhere because of a stoppage in the jet.

Then there was the question of the engine step on the machine. On the machine there is a step to get up to the engine. You put your foot in the step, and then you can reach the engine quite easily. This step had been filled in at some time or other, because anything like a step causes air eddies. I had not even noticed its absence until I wanted to use the step. I was an absolute idiot, because, if I had only thought about it, I could have got a sharp knife and have cut the step out, but it never occurred to me.

Then there was the air vent in the front petrol tank, which was a small pipe leading into the front cockpit. I had no gauge for the front or rear tanks, and the only way to tell they were full was to put a finger inside, as it was not possible to see the petrol level. Often the tanks overflowed, and even when the front tank was not full, the vent overflowed as it was some distance below the top of the tank. The result was that the whole of my kit in the front cockpit became saturated with petrol, and when I retired at night I had to do so in petrol-soaked pyjamas, and lay out the rest of my things to dry and air. This meant getting up early to re-pack.

Then there was the trouble given me by the top engine cowling. A pin is pulled out which disengages the two parts of the top cowling, which then fall apart enabling one to get at the valve gear. This had to be done every day in order to check the tappets, oil and grease valve gear, and change right side plugs. The pin would never come out, and it would never go back without being hammered, which made it more difficult to pull out next time, and so on. I fell off a petrol tin many a time pulling this pin with a pair of pliers with all my might.

Last, but not least, was having to take my spare propeller off the side every time I wanted to unfasten the bottom left side piece of cowling in order to get to the left-hand magnetos and engine controls.

Bundar Abbas to Karachi was a very worrying flight, partly because my engine was again missing on the right-hand magneto, and I could not imagine what was wrong, as I had been so extra careful the night before. On landing at Karachi the trouble was soon discovered. On the outside of the right-hand cowling I saw a round black bulge, and inside I saw a black patch surrounded by a pretty rainbow halo. I did not stop to admire this, but turned my attention to the plug opposite. I found

two washers on it, and again was thankful for my lucky escape, as the plug had been shorting across to the cowling during a journey of about 800 miles. Fortunately it was on the opposite side to the carburettor, or there might have been danger of fire ; but, as I say, I was lucky. I must have overdone the emphasis to David about the washer, and the explanation which seemed the most likely was that in taking out this plug the washer had remained stuck to the cylinder. I was handing up new plugs with washer, and telling David to be quite sure he put on the washer before screwing in the plug. Therefore the old washer and the new washer must have remained on that plug.

At Karachi I was taken over by Imperial Airways ; told to be a wise girl, and rest a day whilst my engine was overhauled. I wanted to be wise, but had no intention of losing a day, and after a good deal of persuasion it was arranged that my machine should be done overnight. How mighty thankful and relieved I was. They examined my carburettor, and adjusted it for tropical flying as I explained the engine was running too rich. (I must explain here that I had a Zenith carburettor which could be adjusted only by changing the jet. I had no jets with me, as I had been told I ought not to need to change it). Early in the morning, whilst still dark, I ran up the engine in the hangar and was delighted to see the beautiful Bunsen blue flame which flashed out of each of the four stubs. The advantage of having stub exhaust is that you can see straight away if anything is wrong with the petrol mixture. They went through my tools, renewed those missing, cleaned all my plugs, and wrapped them in petrol rags. My next stop was to have been Allahabad, but I had head winds, and had not sufficient petrol, or daylight, to reach that aerodrome. I therefore forced-landed at Jhansi, on the parade ground, as the aerodrome was not marked on my map, and I could not locate it. Anyway, the parade ground seemed to be the most suitable place that I could possibly land on. I landed with my wheels just touching the bushes on one side, and I ran across the parade ground. There was nothing at all to pull me up. There was no wind, and there was nothing to stop me, as I had no brakes. I therefore simply ran across the parade ground. There happened to be a post on the opposite side, and I ran into the post, damaging my wing. There were a number of natives there who could have stopped the machine by holding on, but, naturally, they did not know anything about aeroplanes. My wing was slightly damaged. I was really heart-broken about it, because I could not see any hope of having it repaired there. Anyway, it was not quite so bad as it looked, and I found that I could mend it by strengthening the leading edge, and covering it with fabric, and doping it. I was told by the officers there that in the village there was a

mystery man. I thought that this sounded very good, and I had in mind another miracle worker like David at Bundar Abbas. In the end, a bearded man came out, and I asked him who he was. He explained that he was known as the Village Mystery Man. He set to, and in a short space of time he had most marvellously mended this leading edge, and strengthened it, and it was stronger than it was before. I found out later that " Mystery Man " is simply the village name for a carpenter. They also fetched out the village tailor to repair the wing, and to sew it up he used all my fabric, and all my dope, and cotton. I had none left, and I very badly needed them on a future occasion.

The officers of the 3rd and 8th Punjab Regiment helped me to carry out my daily overhaul. Enough petrol was fetched in cars from the aerodrome ten miles away to enable me to reach Allahabad. Nothing very interesting happened over the engine work (the interesting bit at Jhansi may possibly be told in my book) ; the heat was terrific, but I landed in the best place possible—the Colonel's front yard practically—and servants came constantly to and fro with long cool drinks. As time wore on my kind friends made me lie down on a camp bed near the machine, and direct operations. This was the nicest way that I had ever overhauled my engines : I liked it ! Eventually I was ordered off to bed with their promise to awaken me extra early in the morning to fill up with petrol. This was against my usual rule, but I was tired out, and gave in. Next morning I found they had finished everything for me, and most efficiently too.

From Jhansi I flew the odd 200 miles to Allahabad, where I re-fuelled. The engine had been spluttering slightly, and I knew the plugs must be all right, so I cleaned the magneto points (this sounds simple, but off the propeller had to come ; the sun was blazing hot, and there was not a particle of shade), but it seemed to rectify the trouble.

Calcutta was reached with no incident, and my engine was there taken over by the Dum-Dum Flying Club, who did my work for me, whilst I spent my time trying to borrow clean clothes.

Rangoon was my destination next day, and a long tale of woe follows my forced landing at Insein. Everyone knows "Jason" ran into the ditch, and everyone wonders why I chose to land there instead of the racecourse. All I will say here is that I should not have been such a perfect idiot (or I hope not) as to have tried to come down on a football pitch if I had known that it was not the racecourse. It happened to be the compound and playing field of the Insein Engineering Institute, and I was at any rate relieved to know I was near an engineering

school, and not a dancing academy. " Jason " ran smoothly and quietly past the goal posts head on for the ditch surrounding the compound, but there was not the slightest chance to take off again because of the high trees and buildings. I crashed into a wire fence, held up by posts which guarded a deep ditch. The wire pulled him up, and he went over into the ditch on his nose, one of the posts crashing through the left lower wing, ripping the left tyre open, shearing the bottom bolt on the under carriage radius rod, and bending the oleo leg cowling into a very distorted shape. It would be too long a story to describe everything that was done to repair the damage, but I will briefly tell you the most interesting things.

The head of the Institute was exceedingly kind, and placed his works, staff, and pupils entirely at my disposal. It was examination time, so his kindness did all the more credit to him. None of them knew the first thing about aeroplanes ! It poured with rain the whole time. The machine was in the ditch, and it had to be moved across the compound. The ditch had to be bridged to get the machine across, and then the machine had to be manœuvred through trees right up to the Engineering Institute building. We took off the wing the next morning. Then came the task of repairing it. Two compression ribs were found to be broken, and several former ribs in the leading edge. They were all under the footboard, and there is a special stress on them there. We worked all the next day and night, and the following morning. I was very much helped by the Forestry Inspector there, who came along with some of his men, and took out the ribs, and pieced and glued them together. He chose timber from his warehouse which was as near as possible like my own ribs, and cut out new ones exactly to shape. These people did not know the first thing about aeroplanes, and yet they made all these important compression ribs, and the former ribs, which are not so important, to match exactly those which were broken. They worked all night fitting the wings. The insects which I saw at Insein are the worst that I ever came across during the whole of my flight. They had to have several servants during the whole night through waving them off. The next morning they put on the wing, and they got several Burmese women from Rangoon, and the surrounding villages, to do the stitching. This was a long job. The stitching has to be done very carefully over and under, and it takes a long time to do it. I had no fabric. Several yards were needed, and somebody came forward with a brilliant suggestion that during the War a lot of aeroplane fabric had been dumped in Rangoon, and as there had been no other use for it it had been sold cheaply, and all the thrifty wives had bought it to make shirts for their husbands, as they had been told it would never

wear out! As many shirts as possible were collected and cut up into strips, and used for mending the wings. I had no dope left, and that is absolutely important for tightening up the fabric. A chemist was sent for from Rangoon, and he took my empty tin and made some more dope to match the smell. Over the dope there should have been a varnish of aluminium nitrate. There was none of this, and so we had to do without it. The dope had to be put on, according to the strict instructions of the makers, in a temperature of not more than 70° F., and a humidity of not more than 75 per cent. was allowed. It did not seem much use worrying about things like that. The temperature, I expect, was well over 100° F. It poured in torrents the whole time, and I do not know what percentage of humidity that represents.

In between times I carried out my daily schedule on the engine, fitting on the spare propeller, which was very light, and not nearly as good as the one which was broken. I tested it for truth, because it was just possible that when the propeller shaft had been bent it might have thrown the whole engine out of alignment, which would have been perfectly hopeless. I tested the propeller, and I found that it satisfied all requirements.

The pupils made a new bolt, and straightened out the bent cowling, whilst a Dunlop Rubber representative took away my outer cover to vulcanise it, as I only carried a spare inner tube, and an outer tube was not available. It speaks well for the care in carrying out this job that the same tyre still holds good, and also for my new strut made at Hinaidi, as it still held firm, in spite of being in the thick of the damaged part. I left in the oil so that we could run up the engine before taking the plane away, as the Engineering Institute was the best place for it as long as anything was wrong.

It was the following morning before we had the wing on and ready for test; the engine started easily, and I anxiously listened for any change in its note. I ran it up, and was relieved to find no vibration, and that everything seemed O.K. The oil pressure was only 30 lb. per sq. in., but I knew the old oil must be getting very thin after its long journey from Calcutta, so this did not worry me. The spare light propeller (a doped one) ran up to 1,900 revolutions per minute on the ground, and I was sorry my excellent heavy one was ruined.

I will not spend time on the difficulties of finding a vehicle to tow the plane to Rangoon, or getting out of the Institute grounds, and of its twelve mile journey at a speed of about three miles per hour; a native policeman going in front on a bicycle, and importantly clearing all traffic off the road for "Jason's" approach. Every fifteen minutes or so a halt was called for the tyres to cool down, because I was afraid of the long stress on the

vulcanised cover, and if it had given way I was stranded until new tyres or wheels could be sent.

In due course our destination was reached, but it was sunset by then, and too dark to fill up that night. Early the next morning we filled up, I took the plane up with a light load for a test, and was all ready to take to my parachute if anything happened, but nothing did, and in due course I brought the machine down, packed in my kit, and after a long delay, due to wind squalls across the aerodrome, I took off in a blinding rain storm across the wind. The racecourse is only 100 yards wide, and about 750 yards long. Therefore one has to take off the long way of the aerodrome, no matter in which direction the wind is blowing. I do not know how I would have got away from Insein if it had not been for the excellent help given by the Institute and the forestry men; they were absolutely marvellous.

In the air, at full throttle, my engine ran at 2,200 revolutions per minute, but my speed was greater. I throttled down to 1,900 revolutions per minute, and cruised at 90 miles per hour. This was a better performance than my old propeller gave, but I was grateful to my old friend because I knew it had saved my engine a lot on the journey so far. I was not happy with the light propeller, but it was much better than no propeller at all. The light propeller would not carry the weight so well, and my take-offs were much longer, often proving dangerous, because I needed so much more space. At the aerodrome in Atamboea I nearly did what Hill has done, crashed into a fence. I only just got over it in time before reaching the boundary of the aerodrome.

Nothing eventful happened to the engine between Rangoon and Bangkok, and the other events are another story. At Bangkok I landed on Don Muang Aerodrome, over a mile square, and at the wrong end, so that I had to taxi at walking pace for nearly a mile behind a man with red and green flags. When the green flag was up I could continue to crawl, but at the red flag I must stop. My heart was aching for my poor engine working so hard in such terrific heat, but nothing could be done, and we must have been twenty minutes reaching the hangar. This was exceptionally bad for the engine. I soon developed a splitting headache again, so was persuaded to lie down a short time whilst the Siamese Air Force mechanic got on with some work on my machine. It was already dark, and there were no lighting arrangements in the hangar, the only torch was my own small one, and I was mighty thankful that this had not been souvenired. I had to give my instructions in English to the Shell representative, who repeated them in French to a Siamese, who translated them to the mechanics. As neither of the interpreters could translate technical words I was pretty helpless,

and should have preferred to have cleared everyone out and got on with the job myself, but my head was too bad to enable me to cope with things at the moment, so I went to the barracks, having left instructions (or so I thought) to examine the plugs, clean all old ones, and drain the oil, by which time I expected to be back. When I did return I saw two new empty two gallon XXL. tins on the ground, and at once I asked where my supplies of oil were. "Inside the engine," I was assured. "But how much was inside?" I insisted. "All that had been sent for me." This was four gallons, and I knew the sump held only two gallons; I was very puzzled. I asked whether the old oil had been drained out. No, it had not. I asked if there was any more XXL.? No. Any other similar oil? No. Only Castrol R., and I did not fancy that after my Bundar Abbas experience. There was nothing for it but to have all the four gallons, plus old oil, drained out, filtered, and two gallons poured back. I left them at this job whilst I went to have some dinner. On my return I found them struggling with the oil filter housing, in spite of my having shown them the drain plug. It was explained that they could not unscrew the drain plug, so had decided to take out the whole housing. This is not an easy job on a Gypsy engine, as anyone here who has done it will know. I cannot describe to you the muddle and mess; the awkwardness of working by the aid of one small torch, and the insects and my headache. There were about six mechanics helping me, and they worked hard, and joked and laughed the whole time. I have never seen such good-humoured and happy people as the Siamese, but they are small, and do not seem to have much physical strength. They could not do any of the things which up to then I had called for a man to do for me because I could not do them myself. At long last, however, I went to bed (that was not exactly delightful, but that is another story).

At dawn the following morning I was off almost before it was light. I was always relieved and happy to get into the air, as my hardest work was certainly on the ground, and this morning, as usual, I headed towards the sunrise with pleasure. I had barely taken off, however, before the top cowling flew open so down I had to come with full load, the first time I had had to do such a thing, and I was a bit worried. I was devoutly thankful for the large aerodrome, but the landing, after all, proved quite easy. The cowling was well and securely fastened, and I took off once more. I had hoped to reach Singapore, but had already lost some time, and the bad weather I had to fly through that day made it necessary for me to make a half way halt at Singora. I seemed to be expected, although I had certainly had no intention of stopping there if all had gone well. The aerodrome is not worthy of such a name, but it was great

good fortune that I landed near the sea, as the remainder was soft sand through which I could not taxi the machine. It took about 20 men eventually to carry it through the sand on to the road, where I decided it safest to take off next day.

The Singora halt is a fairly long and amusing story, but I will only relate briefly the incidents connected with my engine. I arrived at Singora fairly early in the afternoon, but I knew it was useless to try to reach Singapore before dark. For once, therefore, I was able to carry out my overhaul in daylight, but even then I had to wait till the sun had gone down a bit, because there was no shade on the aerodrome, and it was impossible to work in the mid-day heat. Fine sand was blowing all the time I was working, and the Siamese brought picnic parties out, and ice cream stalls, squatting themselves round the roped-in ring made by the efficient police. All these small people laughed at everything, and I even had to laugh myself at things which were not really amusing. I covered up the air vent hole in the petrol tank, the carburettor, and the air intake to prevent sand blowing in, and then set to work to fill up with petrol. There was one native who spoke English who had been sent down by the Siamese Government to help me, but there was no one who knew the first thing about an aero engine, and they had little strength. Quite a time was spent on undoing the front cowling which had been so securely fastened at Bangkok, unscrewing the plugs, oil drain plug, and relief valve. One man was fetched out of the crowd who was supposed to be extra strong, and every time I wanted anything doing I called out: "Where is the strong man?" After a time the crowd recognised these words, and when they saw me looking round for some one to help they called out for me "Strong man," amid peals of laughter!

It was a difficult matter filling up with petrol, because of the sand blowing about, and I insisted on tying my one chamois leather over both ends of the petrol filter, and the task of filling proved a very long one. The natives took off their shoes, and climbed on the wings and it took about four of them to hold up the heavy four gallon tin. One of them had a brain wave, and said there was a ladder which would make things easier, and went off to fetch it, and when I next looked round I saw them struggling to lean a huge ladder against the top wing, quite capable by its own weight of caving in the leading edge. The ladder had to be abandoned. The rest of the daily overhaul went off all right, but it was not pleasant working there in the hot sun with sand covering up the tools, and the sun scorching them as fast as I laid them out on the ground.

The next morning I had an exciting take-off along the road, which was lined on both sides with crowds of natives. My life

and theirs depended on my keeping perfectly straight, and this was made much more difficult by the petrol which squirted in my eyes as the machine took up flying position. I must explain that at Karachi I was so tired of petrol-soaked kit that I had asked for a rubber tube to be attached to the air-vent pipe in the front petrol tank, and to have the petrol overflow led outside the cockpit. This was done, with the result that on the take-off I received a full burst of petrol in my eyes, because I take off looking over the left side. After that I used to take off looking to the right, but at Singora I had to look rapidly from one side to the other, and could not avoid the squirting petrol. I was devoutly thankful when I was safely in the air.

At Singapore the Royal Air Force took command of my machine, and as I was worried about the roughly repaired wing I asked if they would kindly look at it for me. Examination showed a large split in the rear spar. Fortunately they had a spare Moth wing handy. I left everything to them with a mind quite at ease, and was myself taken into Singapore for dinner. It was a great relief to know everything was being done for me very efficiently.

The next morning as I was strapping myself in the cockpit I noticed the air speed indicator looked peculiar. It was luminous, and graduated in " Knots." It was explained to me that my own indicator, graduated in " miles per hour," had been tested, and found incorrect, and they had therefore lent me one of theirs. All their machines being sea planes, their reckoning was in knots. I did not much like this new idea because it looked too much like hard work translating knots into miles per hour, and vice versa. However, I remembered my shut indicator, which is a rough and ready but accurate speedometer invented by Captain D.H. (The direct pressure of the air as the plane moves through it presses back a pointer working on a spring against a piece of metal marked in miles per hour) so I did not worry much over the knots problem in the cockpit.

I left Singapore at dawn, and hoped to reach Sourabaya but had no luck. Rainstorms made going difficult, immediately on leaving Singapore, and to make up for lost time I decided on what was to be a short cut across the Java sea instead of following the coast line of the Islands of the Dutch East Indies. That short cut nearly proved my undoing, as everybody knows. The terrific downpour of rain making visibility nil, forced me to seek the coast as quickly as possible, instead of keeping on my compass course across the open sea. There was neither sufficient petrol nor daylight to reach Samarang, never mind Sourabaya, and I forced-landed at Tjomal, a sugar factory, within five miles of an excellent emergency landing ground further inland, of whose existence I had not the slightest idea, as I had been

unable to obtain a copy of the book in which a list of these landing grounds is given. I will not describe the landing, or the even more dangerous take off the next day, as these have no bearing on my subject. The kindly Dutch people at the factory gave me some motor spirit which I carefully filtered through two layers of chamois (I was always extremely careful about filtering petrol as I had heard so many stories of forced landings due to a grain of dirt or drop of water choking up the jet ; this was my downfall in Australia, but of that anon).

I re-fuelled at Semarang, and was there advised to follow the Dutch Air Mail to Sourabaya to show me the proper aerodrome as it was difficult to find, and there were two. I agreed, and about an hour later took off after the Air Mail, a three engined Fokker, whose pilot had promised to go as slowly as possible. At full throttle I could barely keep him in sight, and I did not dare lose him as he was not following my compass course, and treacherous volcanoes were, I knew, buried in the clouds unpleasantly near. I had to fly full throttle, 2,200 revolutions per minute she gave, and a speed of 100 miles per hour the whole of the way, and on throttling down to land at Sourabaya the engine spluttered, and the propeller stopped dead immediately on landing. My propeller had been worrying me lately as it had had to bear the stress of the hundreds of miles of monsoon rains I had flown through, and it was looking much the worse for wear. At Semarang therefore, where I had been examining the propeller, someone volunteered to ring up a gentleman who owned a Moth, and ask him if he had a spare airscrew to lend me. He consented to take off his own propeller, and sent it to Sourabaya for me, and, as far as I can make out, he has never sent me the bill ! I should like to meet him, and thank him. I had great difficulty in explaining about this propeller to the mechanic who was given charge of my machine, as he only spoke Dutch, and my translators knew no technical words. With some misgivings I left the overhauling in his hands, but was assured he was very clever, and knew how to deal with a Gypsy Moth. This ultimately proved correct.

Later in the evening I came down to see how things were going on, and found practically nothing had been done. He said he would work all night, and I was taken away by my hostess, and put to bed. Before dawn the next day I was at the aerodrome. On running up the engine I found the revolutions dropped considerably on the rear switch. The mechanic assured me he had cleaned the plugs and examined the magnetos, and he was sure it was all right. I was not, and when I ran it up again it spluttered badly on the right-hand magneto. The mechanic promised to look into the matter whilst I was taken into Sourabaya for some breakfast. I had already

wasted too much time to reach Atamboea, and the midway halt was Binia, so there was not so much hurry. When I returned later on I found, to my dismay, the right-hand magneto lying on the bench in the hangar with bits of flexible coupling still sticking to the teeth of the driving gear wheel on the engine. The Simms' flexible coupling joining the magneto to the gears had evidently swollen, as it often does in the tropics, and it gets covered with oil (although I had foreseen this, and taken great trouble to clean it often), and the teeth had sheared. I had no spare coupling with me, and no such thing was to be found in Sourabaya. We phoned the man with the Moth, but he had no spare, and could not take his own magneto to bits, which, of course, I could hardly expect. He had already been much too kind to me in the matter of the propeller. At length an ordinary motor coupling was obtained, and we made this do. I did not know whether the mechanic knew the timing of a Gypsy engine, and all my efforts to have this process explained to him through my interpreter proved futile, as he knew no Dutch technical words, and did not even understand what I said. I suppose it is difficult to translate: "Propeller at 35 degrees before T.D.C., magneto at No. 1 segment, points just breaking, magneto fully advanced." I much wanted to stay and see it done, but was not allowed, and I realised it was hopeless to try to get off that day. I returned later when the work was finished to try out the engine, and found her quite O.K., the new propeller, I decided, being responsible for the slight drop in revolutions.

I was off at dawn the next morning heading for Atamboea. It is too long a story to tell of my forced landing, but suffice it to say I landed safely, if only just, and had to leave my machine where it was for that night.

The next morning preparations had to be made for me to get the machine to Atamboea. We got all the natives out of their huts, and bribed the headman to cut down the large heaps which were on the earth. I think that they were ant-hills. He got all the natives out with knives and swords, and they cut down these, and made me a run through. I had only a little petrol in the machine, and there was no petrol to be had anywhere. Where I had brought it down in a field was miles away from the road. As everybody knows, I had been cared for by the Pastor at this little village, and he happened to have one or two tins of motor spirit there. He sent these on donkeys, and they were about three hours arriving at where I was. When they did arrive we spent about an hour trying to get the petrol through my two filters. It simply would not go through them, and at the end of about one hour I think that about an egg cup full of petrol had run through, so that I had to give that up.

I dared not waste petrol running up the engine. I tried to explain to the natives—as I had not much room for a take off—that they must hold my machine back whilst I ran the engine up, and then when I gave the signal they must let go of the machine, and let me go straight off. There was a very amusing native there with large white eyeballs. He really was quite a comic character. He instructed the men to hold on to each wing, but every time that I opened the throttle out a little, in terrific fright they simply fled in both directions, and I had to jump out of the cockpit and bring them back again. Nobody understood a word of what I said, and I did not understand them. I had to make movements showing how, when I pushed the throttle open it would make a noise, and the propeller would go round, but they must still stick to their posts. I tried about four times before they would do it, and even then, when I opened full throttle they ran, so I continued my take off. I was just at about the last gasp of petrol, and I had to get to the aerodrome. It had had a bush fire on it, and I had not been able to locate it the day before. It was a mass of black, and the white cross on the centre of the aerodrome was covered over with black. I had been within seven or eight miles of the aerodrome, and not known it, because it looked like a black patch of hillside.

It was then too late to think of rushing through the work so as to leave that day for Port Darwin, so I decided to utilise the time overhauling my engine as thoroughly as I could, so that nothing should go wrong over the sea that could humanly be avoided. It worried me terrifically at Atamboea, because I had a long sea crossing, and the only petrol that there was at this aerodrome at Atamboea, which was nothing more than just a field, was in enormous casks. They had been there for so long that they were covered all over with red rust. As the petrol poured over the casks it naturally collected all the rust. This would have gone into my engine, so that I had to filter it out of the casks into smaller tins, and then out of tins through two chamois leathers into my engine. I was still very worried as to whether any pieces of rust had got through.

The thing that worried me most was that my oil supplies had not come through. I had a spare gallon with me, and there was less than half a gallon of dirty oil left in the sump after my long flight from Sourabaya (nearly 1,000 miles). There was nothing to do but add the fresh gallon to the dirty oil, and hope for the best. I anxiously watched my oil pressure gauge the whole way over the Timor Sea. I was worrying terrifically about whether I should have enough oil. Again fortunately I had.

I did every single thing I could think of on the engine. I put in a new set of plugs I had kept specially for this stage of

the journey, tightened up every single nut and bolt on the engine and machine, carefully examined all petrol and oil pipes and connections for the slightest hint of leakage, and did all the other jobs which I have already detailed as coming under a daily overhaul. I worked long after dark by the light of a big fire built for me on the aerodrome. I even looked at my books to see that I had remembered everything. I was determined that I was not going to have any forced landing over the sea owing to my having left out any small thing. Through the whole of the night they had to keep the natives out to watch for bush fires, which were all round, and which were steadily approaching the aerodrome. Fortunately they did not get as far as my machine.

The next morning I set off on the last stage to Port Darwin. My engine ran beautifully, but half way across it spluttered occasionally. It sounded like a slightly choked jet, and I wondered whether, in spite of all my precautions, some dirt or water had got into the petrol. Every time the engine spluttered I opened out quickly to full throttle to try to blow the foreign matter out, and then quickly throttled down again. Black smoke escaped from the stub exhaust, but the engine never stopped. This happened several times, and I was not sorry to sight land.

At Port Darwin the care of my engine and, indeed, all other matters were taken out of my hands, and from then onwards throughout the whole of my journey through Australia I was not even allowed to think for myself.

Flight-Lieutenant Owen, who had been sent to Darwin by the Shell Company to meet me, saw to my engine, and after that it was seen to, or supposed to have been, by my escorting pilot. I believe that " Jason's " daily overhaul (or my idea of a proper one) was carried out at Atamboea.

There are only two matters of engine interest during my flight from Port Darwin to Brisbane. (1) The reason for losing sight of my escort on the way to Charleville, and (2) the cause of my crash at Brisbane.

At Longreach mechanics stayed up all night to give my plane a quick top overhaul (this primarily meant taking off the cylinders to decarbonise the pistons, piston ring, cylinder heads and barrels, in addition to the general work of careful examination and daily overhaul).

It is a well recognised fact that straightaway after a top overhaul an engine should not be run full out for any longer than necessary (that is, for the few minutes ground test), and that even if run full out in the air the resulting speed is not so great as when the engine gets worn in.

The next day nothing particular happened, and then the day after that my engine still would not do any more than about 85 miles per hour. My escort, knowing that before I had been able to do about 100 miles an hour, evidently thought, for some reason, that he would like to get along quickly. My engine simply would not go beyond 85 miles per hour, and so my escort faded away in the distance. I simply could not catch him up, and in the end I completely lost sight of him. I had no idea where I was. I had tried to set my compass course on his machine, but the maps are not made the same way in Australia. The orientation keeps changing, and all the strip maps were just about as much use as a piece of blank paper, because there are no features on them. I continued on until I saw the railway. On my map Charleville was marked at the end of this railway. I came to this railway, and I naturally thought that I should have to follow it to the right. The railway was wrong on the map, and if I had gone to the left I was within about ten miles. I turned to the right and went about forty miles off my course. I landed where the railway petered out, filled up with motor spirit, and had to come all the way back, landing after dark.

My crash at Brisbane was definitely proved to be due to carburation trouble. On examination the slow running jet was found to be choked, which explains how it was that, on the main jet, my engine ran well, but when I throttled down till the engine was running on the slow running jet, it spluttered and stopped.

As I explained to reporters in Australia (who seemed to regard my version as the one least likely to be correct !) I was forced high up on the approach to Brisbane by the tableland to the north and north-west of that city. I therefore throttled half down all the way to the aerodrome, still being about 1,500 feet up when I was almost on its borders. I had arranged with my escort that he was to go straight in and land, and I would do a circuit before landing. He came down in the middle of the aerodrome, and I kept to the outside. When over the crowds I was at 1,000 feet. I realised that I must throttle down then and make a circuit, and come in to land. I therefore throttled down. The engine went on to the slow running jet, which was choked, and the propeller stopped. I therefore had to lose height very quickly. I came down at as steep a side slip as I could. My wheels touched the ground a few feet off the boundary fence at the far side. The result was inevitable. It was hopeless to try to turn round at that speed, because I should have overturned, and there were other machines landing beside me. There was no alternative but to go on to the fence. The result was that I turned a somersault, and everything was over very quickly.

There ended " Jason's " quest, so far as I was concerned.

He was flown to Melbourne for me, and was there packed up and put on board the "Naldera."

On examination in England on his return he was found to have a cracked sump, so he is now somewhere lying in the dust. I do not know where, but I am going in search of him soon, because he deserves a better fate. He has flown altogether a distance of, approximately, 50,000 miles, which is not bad for an engine. (Applause.)

I attribute my safe arrival in Australia to the excellence of the Gypsy engine, and to the careful training and wise advice of my engineer tutors at Stag Lane.

Ladies and Gentlemen, that is the end of my address. It has been rather long, but I did not realise that I was going to speak at a function of this nature.

I thank you very much for your kind attention, and for the great compliment which you have paid me in asking me to come here, and to speak before you. I wish the Society of Engineers the very best of luck, and I thank you one and all. (Applause.)

Dr. H. S. Hele-Shaw, LL.D., D.Sc., F.R.S., Hon.F.S.E., then presented the Certificate of Honorary Fellowship of the Society of Engineers to Miss Amy Johnson and in proposing a vote of thanks to her for her talk said he felt sure that they did not really understand how well Miss Johnson deserved the Certificate, and the Fellowship of the Society of Engineers, until they had heard her marvellous address. He could scarcely find words to express his admiration of the great engineering feat of Miss Amy Johnson. He noticed that in the wonderful engraving on the Certificate which had just been presented there was not an aeroplane. They must see in future that they had one on the Certificate.

He said how glad they were that Miss Johnson had honoured them to-night. When he first saw a picture of Miss Johnson, he said: "Here is another in the long line of first women; here is the first woman aeronautical engineer." He knew all the rough, dirty, hard and strenuous work entailed in acquiring the art of a mechanic, and when he heard that Miss Johnson had quietly and unobtrusively started on her great feat he felt that she had been preparing herself in the only safe and proper way.

After what they had heard from Miss Johnson that night they realised that she knew far more about engineering than a good many men in the profession, and that she had used her information, as far as possible, to minimise the great dangers which she encountered. Her brother engineers were proud of her. They offered her hearty congratulations on her remarkable achievement which had now placed her amongst the Olympians. Although the Golden Fleece which Jason went to seek in Miss Johnson's case was glory, they were delighted and proud to think that it had turned out to be a very substantial Golden Fleece.

Notwithstanding Miss Johnson's well deserved fame she had survived it without losing those qualities which they all hoped for in a heroine. They could trace the Viking ancestry which came across the great North Sea in small boats and conquered the English in their own country. He had been sitting next to Miss Johnson's father, and he said to him: "You are of Danish origin." Mr. Johnson said: "I am a Yorkshireman, and my wife was born in Hull too." There was a combination: A Danish Viking ancestry and a Yorkshireman. Could they be surprised now at the marvellous feat of endurance? They had been listening to the wonderful account of the grappling with difficulties, and he did not believe that any ordinary stock could possibly have produced such courage and such tenacity of purpose in the face of all those difficulties.

He was the senior past President of the Institution of Mechanical Engineers, and with all the experience of 50 years of membership he had never heard a more careful and perfect discussion of engineering difficulties, and how they were overcome, than they had heard that night.

He proposed a vote of thanks to Miss Johnson for giving them what was really a classic in engineering. (Applause.)

Viscountess Rhondda, in seconding the vote of thanks said that speaking as a layman she had found every word in Miss Johnson's address entrancing.

When she thought of Miss Johnson she always thought of a sunny morning one day early in the Summer when news came through that Miss Johnson had been lost. The newspaper was taking a very gloomy view, and it seemed to take the whole brightness out of the morning. Here was someone of whom one had never heard a week before, and yet their imaginations were gripped. As she was going to a Colliery Board Meeting she saw a poster, which said: "Amy safe," and when she read the paper it was a tremendous relief. When she got to the meeting she passed the paper round and it was the cheeriest meeting that they had ever had thanks to Miss Johnson. They could not be grateful enough for what Miss Johnson had done in linking up the Empire, and making people realise that this flying in the air was really coming.

Professor C. Vernon Boys, F.R.S., Hon.F.S.E., in supporting the vote of thanks, said that all the Honorary Fellows of the Society of Engineers were men of high distinction, and people who had done things. In the addition to that body of their

sister Fellow they had more than an ornament: they had another Fellow who had done things. The Honorary Fellows of the Society might be likened to a band of pure gold, and their sister Fellow to a jewel clasp. Their body was enriched by the addition. But what sort of jewel. One's first thoughts turned to the ruby, sapphire, diamond, but the flash, the sparkle, or the glitter of such crystalline transparent stones hardly fitted the steadfast purpose with which Miss Johnson pursued her great flight. Then there is the opal, but again no. The inherent beauty of the opal depends upon a multitude of inherent flaws and what could less represent the machine; and that stone of ill omen must not be mentioned as fitting for we all realize that in her great flight our Johnnie with all her misfortunes nevertheless was caressed by the Goddess of fortune. But there is a gem prized above all which by its steady lustre, its mystic sheen is more fitting, a gem sought after by the cultured European, and which captivates the imagination of the impassive oriental as our Johnnie did, nurtured by Neptune and delivered up in all its perfection to the light of day—the pearl, the pearl of great price, the pearl of the ocean. Pearl of the Ocean, Johnnie, that is what you are to us.

He had listened carefully to every word that Miss Johnson had said. She had shown herself to be a highly skilled engineer, and a skilled speaker. It had been an admirable address. What had struck him about it was the foresight, the resource, and most of all her amazing perseverance and industry. If long ago Icarus had possessed the foresight of Miss Johnson he would not have flown so near the Sun, and the heat of the Sun would not have melted the wax with which his wings were attached; but if, being young he must needs do a bit of a stunt, and so must soar high in the heavens, he would then, had he possessed the resource of Miss Amy Johnson, have coated the wax with a thick layer of fluffy asbestos, so that the Sun should not melt it. Icarus fell into the Aegean Sea, and that part of the sea is called the Icarian Sea to this day. Icarus won fame by failure. Miss Amy Johnson won fame by success, but, happily no ocean bears her name. After a success such as our Johnnie's it is not surprising that Honorary Fellowship of this Society is not the only distinction which she has won. There is another which she alone of all in this room now enjoys. She has become a member of another body more miscellaneous in character. It begins well. At the head there is her own Archbishop and he is ably supported by the Dean of St. Paul's. I have said that this company is miscellaneous, I might say more aptly, they are a mixed lot, very mixed. They tail off to a rag tag and bobtail and the manners of these are atrocious, their habits detestable. Our Johnnie may be glad of the fatherly

protection of her own Archbishop and of the wise counsel of the learned and witty Dean. They ogle, they leer, they even kiss. They hate, they detest, they asperse. They are barely human, some are not at all human. For are not Ebor and Inge, Emu and Tit, Lion and Lynx and now our Amy with her anagrams May and Yam all firmly established as cross words. And let me tell you that Amy did not seek this distinction, it was thrust upon her. The fact is she was kidnapped by a press gang or to be more accurate she was captured by The Press gang.

Well, well, I can only conclude by expressing the delight and enthusiasm with which I have listened, as we all have, to Miss Amy Johnson.

Miss Amy Johnson : Ladies and Gentlemen, I thank you very much for your very kind appreciation of my coming here this evening to say a word to you. (Applause.)