FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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Flight.

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EDITORIAL COMMENT.

Aircraft Progress in 1914.

This being the last issue of FLIGHT bearing date of 1914, we give, according to our custom, a brief review of the outstanding events in the aircraft world during the past twelve months.

And what a memorable year it has been, considered from whatever point of view one can select. In the design and construction of aeroplanes, the performances achieved on them in the way of speed, altitude and duration flights, it will be found that very marked progress has been made; while, when we come to the practical use of aircraft, the purposes to which they have been put since the outbreak of the present ghastly war, has in some respects almost exceeded what in the pages of FLIGHT has been so consistently foretold would be accomplished.

One of the great events of the early part of the year was, of course, the Aero Show at Olympia in March. By far the most important Exhibition held in this country, it demonstrated in various ways the very great progress that had been made in aircraft design and construction, all directed towards increasing, not only the maximum speed of the machines, but, what was more important, their useful range of speed, their stability, reliability, and durability. Perhaps the main outstanding features of the Show were the increasing use of steel in place of wood in the building of aeroplanes, and in this connection the greater interest evinced by British steel manufacturers in aviation requirements being particularly worthy of mention; whilst the increasing attention that was being given to the development of seaplanes and the distinct influence of military requirements on aeroplane design were outstanding notes in the exhibits. Two other Aero Shows were to have been held during the year, one in Berlin from October 31st to November 10th, and one in Paris from November 21st to December 6th, but both these, as also many other interesting events, were automatically put on the shelf by the war.

* * *

Some 1914 Achievements.

Up to the time of the outbreak of hostilities, various competitions had, as usual, been organised, all tending, by the more arduous conditions imposed, to maintain keen rivalry between designers and constructors of aircraft in the different countries, and, thereby, materially assisting in the evolution of the heavier-than-air type of flying machine. Among the more important events of the year was the contest for the Jacques Schneider trophy, held in conjunction with the Monaco Aerial Rally in April. This resulted in a victory for Great Britain, Howard Pixton, on a Sopwith seaplane, being the only one out of eight competitors to complete the 150 nautical mile over-sea flight without trouble. At home, the Aerial Derby, over a 95-mile circuit round London, had to be postponed, owing to bad weather, from May 23rd to June 6th. The climatic conditions on the last-named date were not much better than on the original one, which may to some extent account for the fact that out of the eleven starters only three succeeded in arriving back at Hendon, the starting point. The event proved the first of a trio of notable victories for W. L. Brock, who, on a Morane-Saulnier monoplane, completed the distance in 1 hour 18 mins. 54 secs. Brock's second success was on June 20th, when, on the same machine, he carried off the prize offered in connection with the London–Manchester–London flight, his time for the 324 miles being 4 hours 42 mins. 26 secs. Altogether there were eight starters, and of these three completed the round journey. Brock succeeded in completing the "hat trick" by proving the victor, a few

weeks later, in the flight from London to Paris and back, his flying time for this notable achievement being 7 hours 3 mins.

In the land of the "Huns" several important competitions were held, but these were more of a national than an international character, organised, as we now clearly see, for the purpose of promoting the art, for utilisation later as a fighting force against the Allies. Perhaps the most important was the Prince Henry Circuit of 1,125 miles, held in May. Forty machines took part in the event, each carrying a pilot and a passenger, the fact, in the light of subsequent events, that fully one half of the machines belonged to the War Department being highly significant. Another foreign event worthy of mention in this section of our review was the Security Competition in France—in which, while the Grand Prize of £16,000 was not awarded, the Sperry Gyroscopic Co. carried off £2,000, and the Paul Schmitt biplane, in which the angle of incidence can be varied during flight, £1,200.

Coming to individual performances, the more important of the year include the journey up the Nile by Mr. F. K. McClean (now a Flight Lieutenant) and Mr. Alec Ogilvie on a Short waterplane; Pixton's flight from Brooklands to Farnborough on a Sopwith tractor in January at a speed of 110 miles per hour; F. P. Raynham's altitude flight of 14,420 ft. on an 80 h.p. Avro in February, beaten by Squadron-Commander E. F. Briggs' altitude record of 14,920 ft. in the following month on a Blériot; Linnekogel's flight in Germany in April on a Rumpler monoplane to a height of 20,800 ft.; Gilbert's record tour round France on a Morane-Saulnier monoplane in June, covering a distance of 1,875 miles in 39½ hours; Bohm's record duration flight on an Albatros biplane in Germany in July of 24 hours 12 mins.; Lieut. Gran's oversea trip from Cruden Bay, Aberdeenshire, to Klep, Norway, on a Blériot; and Oelrich's altitude record of no less than 25,780 ft. on a D.F.W. biplane.

From the point of view of weight-carrying, the feature of the year has been the work done in France by Garaix on the Paul Schmitt biplane, and, in Russia, by Sikorsky. Of the many successful flights with passengers made by Garaix, the most notable was one with nine persons on board the machine, in addition to himself, when he ascended with a load of 833 kilos. (nearly 16½ cwt.) to an altitude of 5,182 ft. A month or so later he achieved a noteworthy combination weight-carrying and duration flight, piloting himself and five passengers, and remaining in the air with a total load of nearly 12 cwt. for 1 hour 24 mins., covering a distance in that time of 94 miles. Sikorsky's none the less important achievements include a flight of 18 mins. with no less than fifteen passengers—the total load being close upon 24 cwt.—an altitude record of 6,560 ft., with ten passengers, and a duration flight, with six passengers, of 6 hours 33 mins.

Needless to say, the war has for the time being speedily put an end to all competitions. Early in the year, considerable discussion took place anent a projected aeroplane race round the world, while the *Daily Mail* offered a prize of £10,000 for a flight across the Atlantic. All such projects have, of course, been either cancelled or are in abeyance, while other events that have met with a similar fate include the annual Gordon-Bennett competition, which was to have been held in France in September, the Circuit of Great Britain, and the British Empire Michelin Cup No. 2 contest.

Notwithstanding the great advances made in aviation and mechanical flight generally, this has not been achieved without a heavy toll in the way of fatalities, it having been our sad duty during the year to record the death of a number of well-known and promising pilots. Although cut short in venturesome careers, these men, whose loss we deplore, have each done their share in the work of development in aviation, and those who have been left to mourn their loss may find some consolation in the fact that the aviators no longer with us will, in the time to come, be honoured as pioneer heroes in the great work of the conquest of the air. It is, however, gratifying to know that while accidents still occur—and entire freedom can hardly be expected in aviation any more than in any other section of daily life—their number is extremely small, and is becoming less and less in relation to the aggregate mileage flown. With the cause of each accident carefully investigated by the Accidents Investigation Committee of the Royal Aero Club, the expectation may reasonably be held that the percentage of accidents to miles flown will continue to be further and further reduced.

A number of important contributions to the literature associated with aircraft have during the year been made through the medium of the valuable papers read before the Aeronautical Society of Great Britain, amongst which may be mentioned "The Development of Military Aviation," by Lieut.-Col. F. H. Sykes; "Propellers," by Mr. F. H. Bramwell, B.Sc.; "The Lessons Accidents Have Taught," by Col. H. C. L. Holden; "Three Years' Experience of Flying," by Mr. B. C. Hucks; "The Value of Ballooning as a Training for Flying," by Mr. Griffith Brewer, and another on the same subject by Lieut. J. N. Fletcher; "The Rational Design of Aeroplanes," by Mr. Arch. R. Low; and "The Development of the Aeroplane," by Dr. Glazebrook. Reference, too, must not be omitted to the valuable paper read by Mr. F. W. Lanchester, at the Institution of Civil Engineers, on "The Flying Machine from an Engineering Standpoint"; the one by Major Brancker on "The Aeroplane in War"; and Dr. Orville Wright's contribution to the Franklin Institute, in America, on "The Stability of Aeroplanes."

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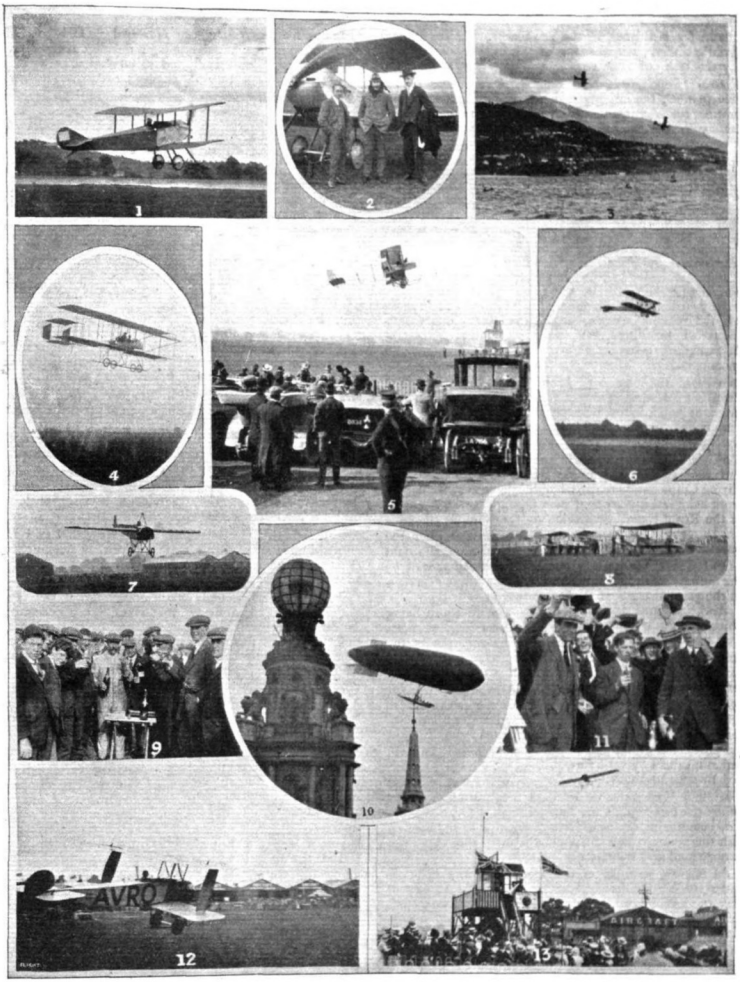
The Naval and Military Air Services.

Having regard to subsequent developments, no review of the aeronautical year would be complete without some reference to the lengthy discussions which took place in Parliament with regard to our Naval and Military Air Services. The Estimates for both these Services showed a marked increase over those for 1913–1914, and while they were agreed to, it was not without many questions being asked as to the condition and efficiency of our Fifth Arm. While those at the head of our Air Departments, both Naval and Military, are to be congratulated on the way they have carried out their work since the war began, it cannot, we think, be denied that the Parliamentary discussions had a valuable effect in spurring them on to greater efforts, and thus had some share in bringing about a state of efficiency which, as Field-Marshal Sir John French, in one of his greatly-appreciated despatches, was able to chronicle, has resulted in our flying officers being able to secure an individual ascendancy over those of the enemy.

Apart from the War, the two principal events of the year in connection with the Royal Naval Air Service was its complete reorganisation in accordance with the new regulations issued in June, and, in July, the important part it took in connection with the Naval Review at Spithead, where, for the first time, special provision was



SOME REMINISCENCES OF THE PAST SEASON.—1. C. H. Pixton making a flight on the Sopwith Scout at Brooklands. 2. The Schneider Cup trio: on the right, Mr. T. O. M. Sopwith, (centre) C. H. Pixton, (left) Victor Mahl; 3. C. H. Pixton leading in the race for the Schneider Cup at Monaco. 4. The Pashley Bros. at Shoreham. 5. P. Verrier on the "Shorthorn" M. Farman at Hendon. 6. H. Hawker well up on a Sopwith at Brooklands. 7. W. L. Brock winning the London-Paris-London Race. 8. The start for a race at Shoreham. 9. Hendon mechanics drink Brock's health after the Paris flight. 10. Army airship "Beta" over St. Martin's Church, as seen from FLIGHT Office window. 11. "Bravo, Brock!" after winning the Paris Race. 12. Raynham flying the Avro "Arrow" Scout at Hendon. 13. Garros finishing second in the London-Paris-London Race.

made for seaplanes in the anchorage. As for military aviation, the principal events of the year were the issue by the War Office of a specification of tests which aeroplanes of private design must pass to secure official acceptance; the important report of the Advisory Committee for Aeronautics with regard to the Factors of Safety in Aeroplanes; the Army Council's Aero Engine Competition, which commenced in May, and the result of which was announced in October; and the Air Manœuvres of the Royal Flying Corps at Netheravon in June.

The War and Aviation.

It is perhaps waste of space to remark that all the features of the aeronautical year above alluded to have sunk almost into insignificance since the outbreak of the European War. In every one of the armies concerned in the great struggle—the Allies' as well as those of the enemy aircraft—from the very commencement of hostilities has played a dominating part. It was, of course, realised that for scouting and reconnaissance work aeroplanes would be indispensable, but, as Sir John French, in his last despatch recorded, new uses for aircraft and their pilots are daily being found, and that the requirements, as they materialise, are being nobly responded to is indicated by the unstinted testimony as to their value and necessity that has been accorded them not only by Sir John French but also by General Joffre. The work of the Royal Flying Corps has, perhaps, from the unreported individual work achieved not secured such prominent notice as that of the Royal Naval Air Service, as, for example, the raids on Düsseldorf, Cologne, and Friedrichshafen, but the official statements that have been issued leave no doubt as to the great service that has been rendered as well by the military as by the naval branch of our aircraft services in the great struggle of Right over Might.

And, in thus giving a just tribute to those flying officers and men connected with the services, we must also find a corner for a word of commendation of the spirit of our "amateur" aviators, who so promptly placed their services at the disposal of their country, in response to the call of the Royal Aero Club. At the present time practically all the leading aviators are serving their King and Country in one form or another—some in active service at the front, others in assisting in the protection of our shores from hostile aerial invasion, and still others by acting as instructors. Both Hendon and Brooklands, which, in the early months of the year continued their valuable work in demonstrating to the public the progress of mechanical flight, have, since the war, become important centres of activity in connection with the maintenance of supplies of men and machines to our naval and military air services.

As regards airships, or dirigibles, Germany has continued to be the greatest supporter of this variety of aircraft. While we have always held the view that dirigibles have certain well-defined uses, it would appear as if the war has demonstrated them to be outclassed by the heavier-than-air type of aircraft. Certain it is, that so far, despite all the efforts of the enemy to instil into the mind of the British public a fear and dread of their Zeppelins, the practical capabilities of these much-vaunted airships have yet to be proved. That we are not sitting still to await the attack of these dirigibles may be accepted in advance, and it may be that if we are to be surprised by the Zeppelins, they on their part may find some even more startling surprises awaiting their coming than ever they can conceive. The Germans again have not been alone in their development of anti-aircraft guns, both France and this country being now well equipped in this direction, and ready to cope promptly with any attempt of invasion by the air.

H.M. The King.

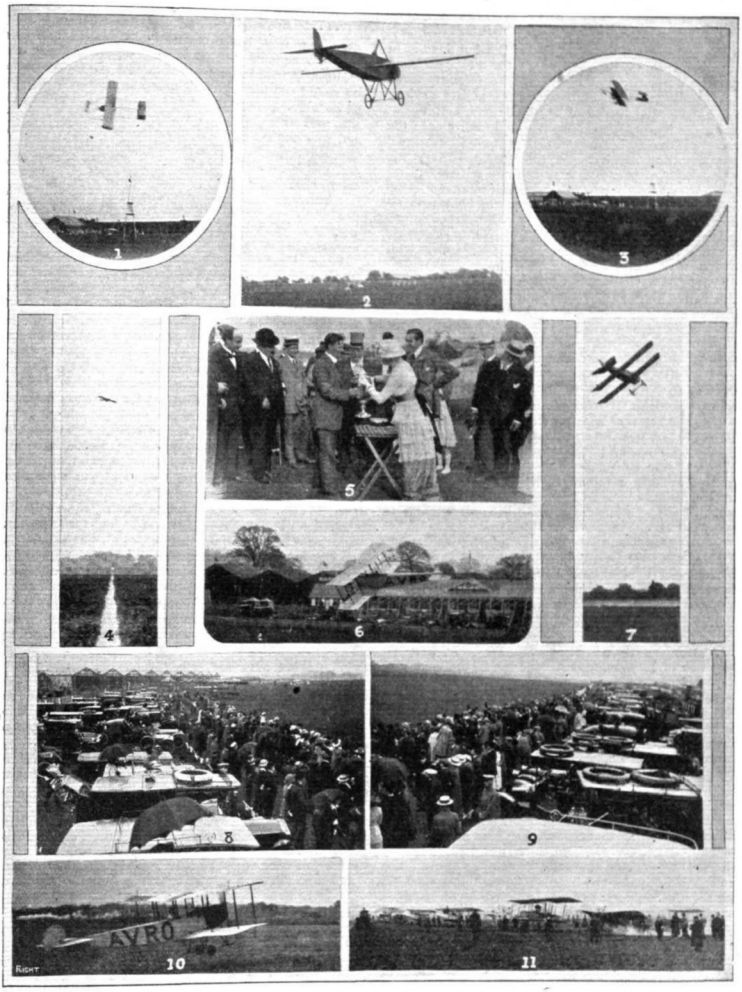
It is with pleasure that we are able to record that His Majesty the King has continued to evince the greatest interest in the aviation movement. During the year he has had ample opportunity of making himself acquainted with the progress made—in May, by an inspection of the Aircraft Factory at Farnborough, in July by the Naval Review at Spithead, and in the war by the visit to the headquarters in France of the R.F.C. during his memorable trip to the Front last month.

The Club.

Turning to the Royal Aero Club, we are glad to report that this body has continued to guide the destinies of the aviation movement in this country with success, and, in view of the high place aircraft has taken in the war, it has every probability of becoming an institution of even greater importance in the near future. Among its more noteworthy public work in 1914 has been the decision, in March, to institute a Benevolent Fund for the benefit of aviators, and, in the last month of the year, to organise and administer a National Air Services Fund, so that men may readily enter either the Royal Naval Air Service or the Royal Flying Corps with the full assurance that they will be cared for should they meet with injury in the carrying out of their duties, or that, in the event of their meeting death while on duty, their wives and dependents will to some extent be provided for. The Club has decided to make the generous contribution of £1,000, and thus form a worthy commemoration of the fact that the year closes with the issue of practically the thousandth Aviator's Certificate granted by the Club. It is in connection with these aviators' certificates that one of the most striking indications of progress is seen, the number having advanced from 706 at the end of December last year to 1,002—this being the number issued up to the 21st inst.—an increase of no less than 296 for the twelve months.

A Final Word.

We shall probably be excused on this occasion for briefly alluding to ourselves. FLIGHT, we are pleased to say, has not only maintained its leading position in the world of aviation, but has during the year made distinct progress, its circle of readers and sphere of influence having shown a steady and marked advance. We have continued not only to chronicle every important event in connection with all branches of aeronautics, but also to extend our policy of publishing complete descriptions, accompanied by detailed drawings and illustrations, of all types of new aircraft. In addition, since the war broke out, we have made a feature of collating every possible reference, at home and abroad, to the work that is being done by aircraft in connection with the great struggle—a feature which we have reason to know has been greatly appreciated. Needless to say, we shall not only continue all the features that have thus far contributed to the success of FLIGHT, but, as opportunity offers, shall introduce new ones that will render it even more popular with, and valuable to, all associated with the aircraft movement.



SOME MORE REMINISCENCES OF THE PAST SEASON.—1. J. Alcock racing on the Sunbeam-M. Farman at Shoreham. 2. F. Goodden on a Morane-Saulnier at Hendon. 3. Pashley Bros. racing at Shoreham. 4. W. L. Brock crosses the line, winning the Aerial Derby. 5. Brock receiving the cup for the London-Paris-London Race. 6. Gordon Bell has a trial flight on the Avro at Hendon. 7. S. V. Sippe testing the Bristol Scout at Brooklands. 8 and 9. The crowd at Hendon on Aerial Derby Day. 10. The Avro just getting off at Hendon. 11. Lining up for the start of the Aerial Derby.

A FLIGHT OF FANCY.

A CHRISTMAS STORY WITH A MORAL.

IN the very heart of the West End of London there is, to those who know where to seek it, a Turkish cigarette shop which to outward appearances is just a cigarette shop. It is open to any stranger to enter and purchase a supply of the comforting weed, and he will be served with great courtesy. Having been formally introduced, I have the privilege of passing behind the counter into—Orientalism! I lie on a divan, and Rita—we call her Rita—brings me my cup of Turkish coffee, thick and rich and sweet, with the usual cigarette, innocent as a spring morning. I sip my coffee, and Rita having removed my boots and replaced them by a pair of Turkey red slippers, kneels beside me with a lighted joss-stick, to light my cigarette.

"Rita, I'll have one of the special cigarettes to-night, please!"

"Ah! *Monsieur!* So? You are *très ennuyer!* (although Turkish she speaks French-English in her own peculiar and fascinating way). *Monsieur* is—what you call?—*fache?* is it not so? The war, it is *malheureux*, it make *Monsieur* what you call worry, and the leetle cigarette he shall bring the comfort! Is it not so?"

"Yes, Rita, I am worried! This war is upsetting business so. Everything is out of gear, and nothing seems to go right. I work just as hard and just as long as ever, and get very little for it. London is dark and miserable, and there is nothing doing. I shall be glad when it is all over and done with."

"Ah! And *Monsieur?* He does not fight the big battle so to finish it quickly, no?"

"No, Rita, there are plenty fighting without me. Besides I am a business man, and I have other things to attend to."

"So! *Monsieur* has no brothers fighting, perhaps?"

"No, Rita. How delightfully cool your hand is on my forehead to-night, and haven't you had this room altered? It looks much larger, and I have never noticed such rich curtains before or so many divans—talk to me, Rita, like you do sometimes."

"So? Do not worry! The war it is the worry, *mais oui!* But you shall see. Listen, *Monsieur*, it is the great roar of London, the cabs and the motor-buses and the cars, but see I make them die away, so, so, they become less, they come into one gentle sound, it is the aero engine that you hear purring. So, come with me in my aeroplane, and we shall see your brave countrymen that fight so that you shall not worry.

"Now we are off, and the great London she sink down, down, down. *Monsieur* is not cold? But it is dark below. The great London she is dark, but we fly away to the sea. So! hark! it is the sea! She is dark, and she hiss and tumble, and she makes *fou*, but your sailorman is there though you see him not. But we shall go down, we shall go close, we shall find him. Ah! so! He comes at what you call the speed. See the leetle black ship so he rush through the water till you see him not very much at all. We shall stand on his deck so you see him close. You are cold again, *Monsieur*, but see, I wrap you up warm. So, stand there behind the big gun turret in the shelter that you see your brave sailorman. The water shall not wet you, but him? he is very wet and very cold, and the salt water cut him in the face, but he care not, he look out, and he look out so that London shall have the lamps out a little but not worse, and the warm bed shall be there for us but him not. And the leetle black thing that is in the sea right ahead, which I see but him not, because it is not above the water—we must go in our aeroplane very high, because there is danger, and *Monsieur* he must not worry. And so, the flash and the thunder, and the leetle black ship that go so fast, he is no more! and the brave sailorman, he is no more, but he do *devoir*, what you call? duty! and another leetle black ship with other duty-men he come up and take the place, and so London shall still have the leetle light only, to bad, and the warm bed to good, and the sailorman's wife and the leetle children, what shall they do that Father comes home not?

"But you help, *Monsieur!* You put one leetle shilling in the box, and you say '*Devoir*,' duty, I have done him! But, *Monsieur*, this duty, is it then that the brave sailorman and the shilling is *combien aussi* the same value?

"And so we fly up, up, up and away far. The searchlight, it is Calais. And still we fly over the dark country, and see, ahead there, the flashes that lighten the night. It is the guns that try to get to Calais and so to England, but the brave English soldierman he say no! and the Frenchman and the Belgian he stand by his brother and he say no! and so they fight in the trenches. So! we go down, we go close and we look at him, the brave soldierman that fight like did the sailorman who is now asleep.

"You are cold again, *Monsieur*, for the snow falls and the earth is wet, so I wrap you up warm, and you are better, but the soldierman he just stand in the water to his knees and he so cold to death, because he have not the good food like you have, and he fight, and he pleased that he kill, kill, kill, because it warm his gun so that his hands make not so cold. And although it is so cold and so dark, the order come, 'Forward' to the attack. And he go not far before the big shell it find him and he drop in the mud, and he make the puddle into blood and water, and none shall come to him till the morning when it is too late; *il est mort!* And so he follow the sailorman so that London shall have the leetle light but no worse, and for you is the warm bed and for him the mud-puddle to die in. But the leetle shilling that you put in the box, it is the duty like so he has done? is it not so?

"And the buzz that you hear high in the sky, it is the aeroplane that you know so well in England. See the curved wings, it is the German, and he come to see where shall his guns fire to kill most. But see the other machines that go up to the attack, the fight in high air, *Monsieur*.

"So we go right up *aussi*, for we will see the fight, and they will see us not at all, because we cannot be seen. And so he go up, up, up, for he has seen where your guns they hide, but the other machines they will not let him take back the news. See them, one on each side of him. He dive down again, but they dive, and he twist and turn, but they twist and turn. *Mais oui*, but it is—what you call?—great! Now they shoot at each other, and from the earth they shoot at them all, the big guns. Ah! One is hit, it is the English! See his machine so it he cannot control, and he go down, down, down, and the leetle heap that you see not below, because it is so far, is where the brave airman go to join the sailorman and the soldierman. It is the duty, is it not so? But the other, he what you call 'square things up' for his friend down below, so, there is no German machine to return with the news of where your guns hide, and then he return safely, and the leetle shilling that you put in the box, it is the same *combien aussi?* the same value as all? *mais oui?*

"So! You have seen enough? but you have seen nothing! Yet you are so cold, we will return to London of the leetle light, but the warm bed and the good food, and you shall do your duty with the leetle shilling, it is so very cheap! And so we go up and away, and Calais and the sea and the land they pass under us, and there is London and——

"Ah! *Monsieur!* You have had the nice sleep, yes? And the dreams, were they not glorious?"

"Rita, our soldiers are fighting for England and me, and I do nothing!"

"*Mais oui!* he has much to fight for, and you fight not, but you worry. There are plenty fighting, did you not say so? *Monsieur.* He fight for himself and for you, but he know you look after his wife and his children if he come not back to them again. Is it not so? And him you send out warm things and cigarettes, is it not so?"

"Rita, I have drawn much money from the bank to-day to spend on Christmas-boxes for those who do very little for me. I had forgotten. I will spend it all to-morrow on comforts for our brave men that are fighting. Yes! you soothed me to sleep, and I dreamed, and I saw. Those are very marvellous cigarettes of yours, Rita, they make a man of one. *Au revoir.*" "THE DREAMER."

THE FLYING SERVICES FUND.

ON Monday at the Special General meeting of the Royal Aero Club, called together to decide upon the Club's contribution to the Flying Services Fund, it was decided to donate the £1,000, as suggested by the majority of the Club Committee, so that the Fund starts off with a splendid total. The objects, properly set forth, should be deserving of the support of the general public, with such generosity as to show in no uncertain degree the measure of appreciation in which the great services accomplished in this war by the "Fifth Arm" are held.

After the meeting, it was rumoured that some members of the Finance Committee, in view of the decision of the Club, had decided to resign. We should greatly regret to think that there is anything in this rumour, because no suggestion has been made that the arduous work of the Finance Committee is not thoroughly appreciated by every member of the Club. The members' decision really is, that the Club, while accepting the information of the Finance Committee that it cannot afford to give the £1,000, does not take this as a reason for not contributing, but rather as a reason why it should contribute. In subscribing an amount in which in ordinary times it could not afford, it sets an example to others to loosen their purse strings in an exceptional manner, and far from belittling the members of the Finance Committee, it applauds them for the strenuous way in which they have defended the assets of the Club and looks with confidence to them in the future to maintain the best interests of the Club. If, therefore, any member of the Finance Committee resigned because the body of members present at the general meeting exercised the discretion they were invited to exercise, it would indeed be regrettable, having in mind the valuable work they have exercised on the Club's behalf. It would also be still more regrettable, because in resigning from the Finance Committee, new members would have to be found to carry out the finance duties, and for such important functions it would be a *sine qua non* that they should be members of the main Committee also, the difficulty, therefore, arising in regard to finding room for them on the Executive Committee.

The admirable work in connection with the finances of the Club, as carried out by the Finance Committee in the past years, cannot be over-estimated, and to them must be credited the sound financial policy which has obtained. For this reason, it is to be hoped they will not feel they have been in any way rebuffed by the decision of the members, who, in voting as they did, duly accepted the responsibility placed upon them and for which they had been called together. We firmly believe that with thorough organisation and consistent publicity in the general Press, very great credit should accrue to the Royal Aero Club, and that in the time to come the Fund will be found to have inaugurated a career of extended success upon which it should never have reason to look back.

THE BRITISH AIR SERVICES.

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

THE following was announced by the Admiralty on the 17th:—

John T. Bankes-Price entered as Probationary Flight Sub-Lieut. and appointed to "Pembroke III," for R.N. Air Service. Dec. 16th.

The following were announced by the Admiralty on the 21st:—

The undermentioned have been entered as Probationary Sub-Lieutenants, with seniority as stated: G. A. Reid, Nov. 19th; F. T. Digby, Nov. 30th; P. Leigh, Nov. 30th; A. G. Shepherd, Dec. 3rd; B. D. Kilner, Dec. 3rd; and R. S. Sorley, Dec. 4th; and all appointed to "Pembroke III," for R.N. Air Service. Dec. 19th.

Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 16th inst.:—

Special Reserve. Supplementary to Regular Corps.—The undermentioned Second Lieutenants (on probation) to be confirmed in their rank: Leonard Parker and Edward F. Norris.

The following appeared in a supplement to the *London Gazette* issued on the 17th inst.:—

To be Flying Officers: Nov. 17th, 1914: Lieut. James L. Jackson, 3rd Batt. Connaught Rangers. Sec. Lieut. the Hon. William F. F. Sempill (Master of Sempill), Special Reserve.

The following appeared in the *London Gazette* of the 18th inst.:—

Lieut. Robert Loraine, Special Reserve, to be a Flying Officer. Dated Sept. 3rd, 1914.

Special Reserve. Supplementary to Regular Corps.—Second Lieut. Robert Loraine to be Lieutenant. Dated Nov. 11th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 19th inst.:—

Capt. Arthur B. Burdett, the York and Lancaster Regt., a Flight Commander, to be an Adjutant. Dated Dec. 5th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 21st inst.:—

The undermentioned appointments are made:

Wing Commander—Brevet-Major Henry R. M. Brooke-Popham, the Oxfordshire and Buckinghamshire Light Infantry, from a Deputy Assistant Quartermaster-General, and to be temporary Lieutenant-Colonel. Dated Nov. 20th, 1914.

Lieut. C. S. Barnett, Reserve of Officers, to be an Adjutant (graded as Flight Commander), and to be temporary Captain. Dated Dec. 6th, 1914. Lieut. Napier J. Gill, Royal Artillery, a Flying Officer, to be an Adjutant (graded as Flight Commander), and to be temporary Captain. Dated Dec. 6th, 1914.

Flying Officers.—The date of appointment of Lieut. Frank B. Binney, Royal Artillery, as a Flying Officer is Aug. 5th, 1914, and not as stated in the *Gazette* of Oct. 27th, 1914. Dated Dec. 4th, 1914: Lieut. H. J. Collins, 3rd Batt. Hampshire Regt.; Second Lieut. L. Parker, Special Reserve; and Second Lieut. E. F. Norris, Special Reserve.

Special Reserve. Supplementary to Regular Corps.—The undermentioned Second Lieutenants (on probation) are confirmed in their rank: Hereward de Havilland and A. G. Weir.

RADIO-TELEGRAPHIC APPARATUS FOR AIRCRAFT.

By W. REGINALD DAINTY, M.S.I.E., A.Am.I.E.E.

THE elementary principles upon which wireless telegraphy depends for its successful operation were explained in FLIGHT for November 13th last, where particulars, with detail sketches of a Marconi set as applied to a Morane-Saulnier monoplane, are also given. Wireless telegraphy has one great advantage over other forms of communication between aircraft and the ground and between aircraft and

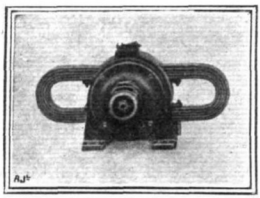


Fig. 1.—Bethenod magneto-alternator.

other aircraft that have been evolved, in that it is possible to maintain communication over much longer distances, say, up to about 200 kilometres during the day, and to a still greater distance during the night. The apparatus that has to be carried in order to accomplish this is very compact, and of comparatively light weight, as a set having a range of 100 kilometres during the day weighs only about 35 kilos., while a 200 kilometre set weighs but 48 kilos.

These figures relate to wireless sets which are in general use in the French Army and Navy. The smaller set has been specially designed for use on aircraft having only a small range of action. The aerial consists of a bronze cable of about 1 mm. diameter, ballasted at its extremity by means of a weight in the form of a spindle, which ensures that the cable will unroll and provides sufficient

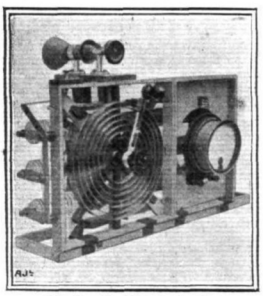


Fig. 2.—Oscillating circuit.

tension. This aerial is allowed to trail in the air, and owing to the speed of the aeroplane assumes a nearly horizontal position, thus offering quite a negligible resistance to the air during flight.

Normally the aerial cable is wound upon a light spool made with insulated sides and handle. This spool is fitted with a circular commutator upon which presses a brush arranged in such a manner that the aerial cable may be wound or unwound without interrupting the operation of the apparatus; while it also allows the operator to rapidly tune the different circuits, and particularly to change the sending wave length easily. A cutter, provided with an insulated handle, is fitted to the spool to enable the cable to be instantly cut in an emergency, should there be any sudden danger due to the trailing cable; and the spool, commutator, brush and cutter are mounted upon a very rigid tubular frame which may be instantly fitted to any of the various types of aircraft.

As on airships, the "earth" connection on aeroplanes is replaced by an electrical capacity, which consists of all the metallic parts of the machine connected together electrically; and it may be mentioned that it is particularly necessary to carefully join, by means of very small connections, those metallic parts which are insulated from each other, or of which the contact is not good in an electrical sense.

The aerial is indirectly excited by means of a musical

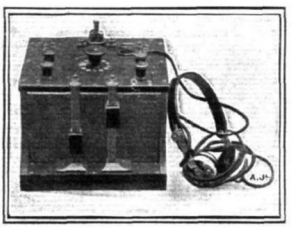


Fig. 3.—Receiver.

note transmitter, which comprises a generator, transformer, oscillating circuit, and manipulating key.

The generator, which is driven from the aeroplane motor either by a friction drive, or by gearing, a clutch or its equivalent being provided for disengaging the alternator, consists of a special Bethenod magneto-alternator (see Fig. 1), having an output of 350 watts, low tension, and giving a spark frequency of 800 sparks per second, which produces a very musical sound at the receiving station. A particular feature of this alternator is that it does not have any current collecting rings or commutator, and as a result the machine embodies an extremely strong and simple construction.

The generator for the larger set (see Fig. 4) consists of a special Bethenod resonance alternator having a normal output of 750 watts, 1,500 cycles, at a speed of 4,500 revolutions per minute; but which is capable of carrying a continuous overload of over 20 per cent. This generator weighs 19 kilos., and is of the same type as those used in land stations, portable military stations, and ship stations, all over the world. It is driven from the aeroplane motor in the same way as the 100 kilometre set, and the musical note obtained may be varied from a very low note to a very high whistling note.

The oscillating circuits (see Fig. 2) of both sets are arranged so as to give a wave length of 400 metres, and consist of a condenser, having a capacity of $\frac{1}{1000}$th micro-farad, and a spark gap, which in the smaller set is of the point and plate type; while in the larger set (see Fig. 2), the electrodes are in the form of a tube and a plate, which is fitted with a special ventilating arrangement. A high frequency ammeter is also connected in the circuit.

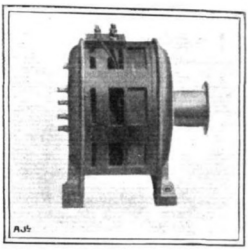


Fig. 4.—Bethenod resonance-alternator.

The aerial for the larger set is similar in general design to that used with the smaller station, as is also the variometer, which allows the wave length to be instantly varied in a continuous manner without interrupting the operation of the transmitter; and transmitting is effected on the low tension primary circuit, by means of a light sending key, in both sets.

These two types of wireless apparatus are designed primarily for aeroplanes, but may, with certain modifications, be used under similar conditions upon seaplanes. A station suitable for a seaplane must, however, be able to work not only whilst the machine is in the air, but also when the machine is floating upon the surface of the water; and it is therefore necessary to have an independent source of supply of energy so that communication may be maintained when the aeroplane motor is stationary.

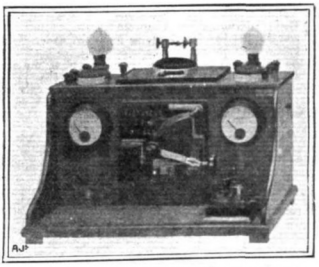


Fig. 5.—Wireless set for use with accumulators.

The radio-telegraphic material is the same as that described with the previous stations, so it will only be necessary to consider the special features necessary for seaplanes. When the machine is in the air, the aerial consists of a cable that is unrolled beneath the aircraft; but when the craft is floating upon the water, the end of this cable is attached to a special type of box kite. The box kite is of very small dimensions when closed, but when it is opened it has a surface area of 3 sq. metres, which is amply sufficient even during the most feeble wind. The kite, the total weight of which with its accessories is $3\frac{1}{2}$ kilos., may be opened very quickly, and all that is necessary is to fasten it to the end of the aerial cable, and to allow the reel to unwind. The aerial thus obtained is quite sufficient to obtain under normal conditions a much longer range than is possible during flight.

In order to maintain operation when the seaplane engine is not working, a light water-cooled single cylinder motor, developing 1 B.H.P., and weighing 9 kilos., is provided with the 100 kilometre set, while the motor for the 200 kilometre set weighs 18 kilos., has two cylinders and develops 3 B.H.P. In both sets the motor drives the alternator by means of a belt.

The receiving sets weigh 3·75 kilos., and are fitted with both crystal and electrolytic detectors, and very

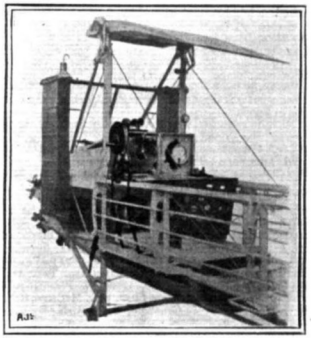


Fig. 6.—A 200-kilom. wireless set mounted on an aeroplane.

sensitive loud-speaking double headgear telephones to enable the operator to receive signals when the motor is running. The 'phones are also combined with the aviators' helmets in order to facilitate reception.

Where it is undesirable to instal an auxiliary motor it is possible to have an equipment consisting of a musical vibrator (see Fig. 5) with its condenser, an induction coil, spark gap with point and plate electrodes, sending key, &c. The energy in this case is furnished by a battery of accumulators of light weight, which supply current for the set for a period of 10 hours continuously, and the total weight of the set would be 32 kilos. The output of this apparatus is 50 watts, and it is possible to transmit up to a distance of 80 kilometres during the daytime.

The accumulators are generally charged on the ground, but if the aircraft is fitted with a lighting set this may be also used to charge the accumulators, or the accumulators installed for a searchlight may, of course, also be used for the wireless set.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND.

Organised and Administered by the Royal Aero Club for the Benefit of the Royal Naval Air Service and the Royal Flying Corps.

SOME time ago Mr. André Michelin, Chairman of the Michelin Tyre Co., approached the Royal Aero Club, with regard to a suggestion he had made to the Admiralty and War Office, that a general fund be established,

"the proceeds of which would be distributed at the end of the war to all British aviators (or their dependents) having accomplished deeds of daring."

Mr. Michelin offered to open the fund with a contribution of £1,000, and asked The Club to undertake the organisation and administration of the Fund.

The Lords Commissioners of the Admiralty and the Army Council, while appreciating Mr. Michelin's generosity, did not think it advisable to establish such a fund, but the following suggestions were made :—

(1) By the Lords Commissioners of the Admiralty—

A General Fund for the benefit of the Royal Naval Air Service to supplement the provision for officers, and especially men, of the Air Service who are permanently prevented by wounds or injuries, received on duty, from contributing to their own support ; and for the wives and dependents of those killed in action.

(2) By the Army Council—

A General Fund for the benefit of the Royal Flying Corps to be devoted to the provision of pensions for military aviators permanently incapacitated, and for the families of such as are killed ; but it is suggested that the rank and file should be the first to benefit.

Mr. Michelin concurred with these suggestions and confirmed his offer to subscribe £1,000.

The Lords Commissioners of the Admiralty and the Army Council approved of the Fund being administered by the Royal Aero Club, and The Club then agreed to organise and administer the Fund.

SPECIAL GENERAL MEETING.

Professor A. K. Huntington presided at the Special General Meeting held on Monday last, the 21st inst.

The question as to the advisability of the Club subscribing the sum of £1,000 to the Flying Services Fund was discussed, and amongst the speakers were the following members :—Professor A. K. Huntington, Mr. Ernest C. Bucknall (Hon. Treasurer), Mr. Griffith Brewer, Mr. Martin Dale, Lieut. N. Pemberton Billing, R.N.V.R., Mr. John Cates, Flight Lieut. F. K. McClean, R.N.A.S., Mr. C. G. Grey, Mr. C. G. Grunhold, Capt. R. K. Bagnall-Wild, R.E., and Mr. C. F. Pollock.

Mr. Griffith Brewer moved :—

"That the Club contribute £1,000 to the Flying Services Fund."

This was seconded by Flight Lieut. F. K. McClean, R.N.A.S., and carried, the voting being 20 in favour and 11 against.

Forty Members attended the Meeting.

SPECIAL COMMITTEE MEETING.

A Special Meeting of the Committee was held on Monday, the 21st inst., when there were present : Prof. A. K. Huntington, in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Flight Lieut. F. K. McClean, R.N.A.S., Mr. Alec Ogilvie, Mr. C. F. Pollock, and the Assistant Secretary.

Election of Members.—The following New Members were elected :—

Flight Lieut. John Marten Rush Cripps, R.N.A.S.
Ernest Edward Hooper.
Flight Lieut. Hugh Alexander Littleton, R.N.A.S.

Aviators' Certificates.—The granting of the following Aviators' Certificates was confirmed :—

984 2nd Lieut. Clifford Alban Hooper, R.F.C. (Maurice Farman Biplane, Central Flying School, Upavon). Nov. 18th, 1914.

985 Lieut. Charles Stuart Burnett (Highland L.I.) (Maurice Farman Biplane, Central Flying School, Upavon). Nov. 24th, 1914.

986 Frank Sowter Barnwell (Maurice Farman Biplane, Military School, Brooklands). Dec. 9th, 1914.

987 Flight Sub-Lieut. Guy William Price, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 9th, 1914.

988 Flight Sub-Lieut. Bernard Osbourne Ffield, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 10th, 1914.

989 John Claude Horsey Barfield (L. and P. Biplane, London and Provincial School, Hendon). Dec. 12th, 1914.

990 Charles Percival Wilson (Maurice Farman Biplane, Military School, Brooklands). Dec. 14th, 1914.

The following Aviators' Certificates were granted :—

991 Flight Sub-Lieut. Thomas Spencer, R.N.A.S. (Maurice Farman Biplane, Netheravon Flying School, Netheravon). Oct. 27th, 1914.

992 Flight Sub-Lieut. Edward John Cooper, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 14th, 1914.

993 Flight Sub-Lieut. Percy Ethelwyn Hunt Wakeley, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 14th, 1914.

994 2nd Lieut. Malcolm David Methven (Maurice Farman Biplane, Netheravon Flying School, Netheravon). Dec. 14th, 1914.

995 2nd Lieut. Henry Bayly Reginald Grey-Edwards, R.F.A. (Maurice Farman Biplane, Military School, Brooklands). Dec. 14th, 1914.

996 George Gilbert Algernon Williams (Maurice Farman Biplane, Netheravon Flying School, Netheravon). Dec. 15th, 1914.

997 Stanley Graham Gilmour (Maurice Farman Biplane, Netheravon Flying School, Netheravon). Dec. 15th, 1914.

998 Lieut. James Cecil Thornton, R.F.A. (Maurice Farman Biplane, Netheravon Flying School, Netheravon). Dec. 15th, 1914.

999 Flight Lieut. Robert Hilton Jones, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). Dec. 17th, 1914.

1000 Flight Sub-Lieut. Roger Martin Field, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 18th, 1914.

1001 Flight Sub-Lieut. Kenneth Falshaw Watson, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Dec. 19th, 1914.

1002 Maurice Leigh Gardner (Wright Biplane, Beatty School, Hendon). Dec. 20th, 1914.

Re-election of Members.—It was unanimously resolved :—

"That the Members elected between the 1st November, 1913, and the 31st October, 1914, be re-elected under Rule 39, except those who are alien enemies."

Flying Services Fund.—It was reported that at the Special General Meeting held that afternoon the motion "That the Club contribute £1,000 to the Flying Services Fund" was carried, the voting being 20 in favour and 11 against.

It was decided that the Fund should be known as "The Flying Services Fund."

Further consideration of the matter was deferred until the next meeting of the Committee on Wednesday, the 30th inst.

Aero Club of America.—The following letter from the Aero Club of America was received :—

"December 8th, 1914.

"The President, Royal Aero Club, 166, Piccadilly, London, W.

"SIR,—The following resolution, expressiug our sympathy for the affiliated clubs of the Fédération Aéronautique Internationale, was unanimously adopted at the annual meeting of the Aero Club of America, held on November 9th, 1914 :—

"**Whereas** : in the great European conflict the ranks of our sister clubs of the Fédération Aéronautique Internationale have been thinned as the result of the daring of their members who have given patriotic service to their countries at the cost of their own lives ; and

"**Whereas** : the Aero Club of America, in common with all aeronautical bodies throughout the world, lament this loss to the science of aeronautics, and their relation as fellow club members ; be it therefore

Resolved : that we inscribe upon our records this expression of our sorrow, and tender our condolences to the Aero Clubs of

Austria, Belgium, France, Germany, Great Britain and Russia, in the losses which have come to their membership—and offer this tribute to the genius, the daring and fidelity of such brave men of the air, whose names have become enrolled upon the Honour List of achievement; and be it further

"**Resolved**: that a copy of these resolutions be forwarded over the signatures of the officers of the Club to each of our sister-clubs of the Fédération Aéronautique Internationale in token of our fellowship.

"With renewed assurances of our distinguished consideration, we beg to remain,

"Yours fraternally,
"AERO CLUB OF AMERICA.
(Signed) "HOWARD HUNTINGTON, Secretary.
(Signed) "ALAN R. HAWLEY, President."

The following letter from five American Aviators was received:—

"The undersigned American aviators are sending you this little contribution (£7 16s.) and ask that with it you will buy cigarettes and forward them, with the best Christmas wishes of the American aviators to the officers of the Royal Flying Corps who are now on service at the front.

(Signed) "SAMUEL S. PIERCE, STEVE. MACGORDON, JOHN D. COOPER, THOMAS L. BALDWIN, and WALTER BROCK."

It was decided to divide this kind contribution between the Funds for the Royal Naval Air Service and the Royal Flying Corps being administered by Mrs. Sueter and Lady Henderson respectively.

Aviators' Certificates.

Members will note with gratification that the Club has now issued over one thousand Aviators' Certificates, the number now reached being 1,002.

Christmas Holidays.

The Club will be closed from Thursday evening, the 24th inst., to Monday morning, the 28th inst.

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

DROPPING MILITARY MESSAGES FROM AEROPLANES.

ALTHOUGH a considerable variety of ways and means have been devised for the purpose of enabling an aviator to communicate with friendly troops when on reconnaissance flights, no great measure of success can as yet be attributed to any of these methods. The wireless telegraph, whilst not only feasible but entirely possible, is necessarily of proportionately small range as regards the transmission portion of it, while the reception of messages is, to a large extent, handicapped by the noise of the engine. Various systems of optical telegraphy have been proposed and experimented with, but can hardly be said to have conclusively proved their practicability.

In addition to the difficulties of finding means for transmitting messages from an aeroplane with any degree of certainty that they will be picked up, it will often in actual warfare be found advisable to supplement messages with sketch maps showing the position of the enemy's troops, guns, &c. This can be accomplished, it is true, by the simple expedient of returning to the base and alighting for the purpose of delivering the message and map, but it may frequently be found desirable to save valuable time by dropping the message without alighting.

As a small written message or map would obviously be very apt to be blown away by the wind, it becomes necessary to enclose it in some form of receptacle which will ensure that it falls at the desired place, and at the same time protect it against damage on striking the ground. A weighted leather pouch is often employed, but a more elaborate apparatus is illustrated in the accompanying sketches. This is the invention of the French aviator Paul Fugairon, who has tested it near Brest, and obtained good results. It consists, as shown in the illustration (Fig. 1), of a hollow cylinder pointed towards the lower end and fitted at the top with a lantern-shaped cap. Into the lower, pointed end of the cylinder has been poured a certain amount of lead through a passage in which passes the needle, T. The top of this needle is suitably connected to a small crank lever, which, in turn, engages with the collar, E, on the firing pin, B. The coil spring, R, retains the firing pin, B, in its position, and the two brackets, S, serve as guides. Fitting over the top of the cylinder is a cap, L, the top of which is formed somewhat like a lantern with four open windows, C. Inside the cap and held by four clamps are the materials for a Bengal fire, which is ignited by the explosion of a cap of mercury fulminate situated in the outer end of the bent tube, U. When the needle, T, strikes the ground it is forced upwards against the action of the spring, thereby pulling down the firing pin, B, by means of the crank lever resting on the collar, E. When the crank lever has moved down sufficiently it releases the firing pin, B, which, driven upwards smartly by the spring, R, strikes and ignites the cap of mercury fulminate, from which the fire is transmitted to the materials for the Bengal fire through the bent tube, U. The resulting bright Bengal fire is easily visible not only at night but in the day time as well, and will burn sufficiently long to enable a soldier on the look out to locate its position.

Several points in the arrangement of this device are open to criticism, as, for instance, the danger to friendly troops from the high speed at which it descends. This, however, could be remedied by attaching to the cylinder some form of a parachute which would retard the fall sufficiently to render the dropping cylinder harmless, and yet allow of the impact being hard enough to operate the needle T.

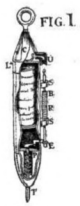


FIG. 1.

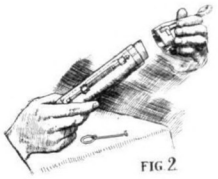


FIG 2


FIG 3


FIG 4.

By means of the device shown in the above set of sketches messages can be dropped from an aeroplane and are easily found, as Bengal fire is ignited the moment the device strikes the ground.

EDDIES.

IT appears that the problem which has for some time been confronting a number of flying schools up at Hendon of finding new flying grounds, has now been suddenly solved in a way that is no less satisfactory than unexpected. When paying a brief visit to the aerodrome the other day, I was everywhere greeted with the information, in most cases accompanied by radiant smiles, that the various schools had been given to understand that after all no objection would be taken to their remaining in their old quarters should they so desire. This change in plans, which has been hailed with general satisfaction, is, I gather, the outcome of a decision of the Naval authorities to erect a large shed of their own at Hendon for the accommodation of a number of the Naval machines now in use or expected to arrive. Renewed activity now reigns at most of the schools that were under threat of expulsion, and although in one or two cases arrangements had been practically completed for new grounds, the firms concerned were no less satisfied with the opportunity of being able to stay, especially as they are hoping to receive suitable compensation for any expense to which they have been put over the matter.

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At the London and Provincial Aviation Co.'s school several extensions is the direct reply to the permission to stay on. In addition to the first machine with which this school started some time ago, a second one, although ready for some time, had not been put through her paces, owing to the adverse weather conditions. It has now been tried out, and found to be, if anything, even better than No. 1.

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Work on two more machines of similar type will now be commenced; one to be used for "ticketing" will have a 45 h.p. Anzani engine, while a 60 h.p. Anzani will be installed on the other. Dual control will also be fitted to the more powerful machine, so that the pupil in the earlier stages of his tuition can get accustomed to being in the air and follow the movements of the instructor, thus acquiring an excellent idea of how the machine is controlled, both while in the air and during the operation of alighting, before venturing out solo on the lower-powered machines. With such a graduated course of instruction, the popularity that this school has already acquired should be considerably increased.

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Of the other firms whose fate has been hanging in the balance, the Ruffy school is already in full swing, several of the pupils having commenced their course of tuition, under the instruction of the James brothers. The 60 h.p. Gnome-engined Caudron biplane of this school is, as was pointed out in these columns some time ago, fitted with dual controls, and the pupils are taken up to a sufficiently safe altitude (about 1,000 ft. or so), and are then allowed to take control for a short while in order to get the "feel" of the machine. When they have, in this manner, become accustomed to the controls, they are sent out on the 45 h.p. Anzani-engined biplane built by the James brothers, on which they complete their course of training. Another biplane is nearing completion, and will, when finished, be used for the brevet tests. This machine will have a 50 h.p. Gnome engine.

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At the Hall school several new machines will be put into commission shortly, among others a two-seater biplane that will have dual controls. This firm has been repairing "Lizzie," after her little spill recently, and she is now almost ready to take the air again, and looks as well as ever. While awaiting her return from "hospital," "Lizzie's" owner is getting a little preliminary experience on the dual-control two-seater Caudron biplane of the Ruffy school, so as to get used to the handling before taking "Lizzie" out again.

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The Beatty contingent is awaiting the arrival of the 60 h.p. Wright engine, which is *en route* from America,

The 150 h.p. Sunbeam-engined Avro seaplane which was to have taken part in the "Circuit of Britain" race.

but has been delayed in transit. In the meantime work is progressing on the new Beatty engine, which is now practically complete and will in all probability have been tested by the time these lines are in circulation. The new engine is of very clean design as regards its outward appearance, having none of the numerous "gadgets" sticking out everywhere that mar the appearance of many engines. Its weight is considerably less than was generally anticipated, being in fact only 206 lbs., or approximately 4 lbs. per horse power, which is rather good for a water-cooled engine. The performance of this new product of the Beatty establishment will be watched with interest.

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The new Grahame-White biplane, to which reference was made in "Eddies" some time ago, has been doing a great amount of flying lately, taking up on several occasions two passengers as well as the pilot. Recently, as an experiment, three passengers in addition to the pilot were carried, two of them being seated on the lower plane, one on each side of the *nacelle*, thus offering a considerable amount of head resistance and reducing somewhat the speed of the machine. In spite of these unfavourable conditions, the 'bus lifted the extra load for several circuits of the aerodrome, a performance of which its designer, Mr. "Bill" Law, has every reason to be proud, considering that the Le Rhone engine fitted is only of 60 h.p. Evidently the Naval authorities were impressed by the lifting qualities of the new biplane, for I understand that it has now been taken over by them for the use of Naval pupils requiring extra practice. Two school machines of the front elevator type are being built at the Grahame-White works, and as these are the same as the one taken over by the Admiralty, with the exception that they have a front elevator and no extensions to the upper plane, it is intended to convert one of them into a rear-elevator type machine by taking the front elevator off, fitting extensions to the top plane, and placing the engine and pilot's seat in a *nacelle* similar to that of the Le Rhone-engined biplane. A 70 h.p. Gnome will be fitted instead of the 50 h.p., for which the machine was originally intended, but all the component parts are of such dimensions that they should be amply strong for the extra power. The chassis is uncommonly substantial, and would appear to be capable of withstanding the severest bumps it may be expected to contend with.

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News has been received of several of the old Hendon favourites, of whom a considerable number have gone to the front. R. H. Carr, the one-time famous pilot of "Lizzie," has written home to friends from France in order to wish them the compliments of the season and let them know that he is well and happy. L. A. Strange is said to have been particularly active in bringing down German aeroplanes, and has, I am told, sent home as a trophy the altimeter from one of the German machines that he had brought down. Less fortunate have been two other well-known Hendon pilots—A. E. Barrs and R. J. Lillywhite, both of whom are said to have had bad smashes in France, Barrs being reported as having broken one leg and sustained other serious injuries, whilst Lillywhite is said to have had both legs broken. It is to be sincerely hoped that the injuries of these two popular aviators may prove less serious than is reported, and all my readers will join me in wishing them a speedy recovery.

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To the host of FLIGHT readers at home and abroad I beg to extend very best wishes for as happy a Christmas as is possible under existing conditions, and a brighter New Year than has been associated with the latter part of the Old. At the same time, I take the opportunity of thanking my readers for their valuable co-operation in sending me items of news from all corners of the world, and hope that they will largely increase their budget in the coming year.

"ÆOLUS."

FROM THE BRITISH FLYING GROUNDS.

Bowness-on-Windermere.

Northern Aircraft Co.—Bad weather at the early part of last week confined the work to the hangars. Students were given their usual illustrated technical lectures, and they made themselves familiar with the practical side at the works.

On Friday, Pilot-Instructor Bland made two attempts, despite a heavy wind, to give lessons, but was forced to desist, in fact one of the aeroplanes was blown over and only saved from a complete capsize by Mr. R. O. Lashmar and Mr. Bland climbing out on the windward wing. Indefatigable "Sarah," the motor boat, in hastening to the rescue, buck-jumped a submerged rock, and there was an anxious search for empty petrol tins. Fortunately they were not required, and the aeroplane was towed in safely.

Saturday was a perfect flying day. Chief Instructor W. Rowland Ding was working like a navvy from morning till dark. Mr. R. O. Lashmar and Mr. Geoffrey L. Railton were given long lessons morning and afternoon with full and partial control. Mr. G. D. Cluniess-Ross, a prospective pupil, was given his baptism of the air. Darkness alone put an end to a most successful day.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday last week, Probationary Flight Sub-Lieuts. Barnes, Breese, Cooper, Livock, Wakeley, Watson and Mr. Greenwood solo circuits, eights, &c. Probationary Flight Sub-Lieuts. Dalison, Mills, Walmesley, straights with Instructors Manton, Russell, Shepherd and Winter. Probationary Flight Sub-Lieuts. Driscoll solo straights. Afterwards Probationary Flight Sub-Lieuts. Cooper and Wakeley going in for and gaining pilot's certificate in first-class style.

Tuesday, Probationary Flight Sub-Lieuts. Barnes, Ffield, Livock, Watson, and Young circuits, eights, &c. Driscoll half circuits alone. Probationary Flight Sub-Lieuts. Mills and Walmesley straights with Instructors Russell and Shepherd.

Thursday, Probationary Flight Sub-Lieuts. Barnes, Ffield, Livock, and Young circuits, eights, &c. Dalison and Driscoll straights, and half circuits alone. Mills solo straights. Probationary Flight Sub-Lieut. Walmesley straights with Instructor Manton.

Friday, Probationary Flight Sub-Lieuts. Ffield and Watson solo circuits, eights, &c., Sub-Lieut. Ffield afterwards going in for and gaining his certificate.

Saturday, Probationary Flight Sub-Lieuts. Watson and Breese solo circuits, &c., afterwards going in for and securing *brevet*, making five tickets in all this week.

Beatty School.—Pupils out last week on "dual"-controlled machines, with Mr. E. Baumann on 50 h.p.

Gnome biplane and Mr. W. Roche-Kelly on 40 h.p. Wright biplane.

Monday, Messrs. Virgilio (6), M. L. Gardner (6), C. Leeston-Smith (6), Anstey Chave (4), Cornish (5), G. Merton (7), G. Beard (9), Roche (7), B. de Meza (6), and Ormsby (6).

Tuesday, Messrs. M. L. Gardner (10), Anstey Chave (10), G. Merton (10), G. Beard (40), Donald (16), Perrot (16), Miller (15), and Ormsby (15).

Wednesday, owing to bad weather no training possible.

Thursday, Messrs. Virgilio (9), Leeston-Smith (10), Cornish (8), Roche (15), Miller (15), and G. Perrot (10).

Friday, Messrs. Anstey Chave (10), Cornish (10), Donald (10), and Lieut. Bannatyne (6).

Saturday, Messrs. Virgilio (10), M. L. Gardner (15), Newberry (10), G. Merton (10).

Sunday, Messrs. Virgilio (10), M. L. Gardner (10), C. Leeston-Smith (10), Cornish (10), Merton (6).

On Sunday Mr. M. L. Gardner flew for his certificate, which he obtained after making a series of very good flights; afterwards, Mr. G. Virgilio went up for his first two tests, which he passed in very good style, and afterwards went up for his height test, during which he attained 1,100 ft., making fine *vol plané* from that height.

Hall School.—Monday last week, W. J. M. Connochie six straights; Waterson eight straights; test flight by J. Rose, lasting ten minutes at 300 ft.

Tuesday, windy; Lloyd Williams six good straight flights. Wednesday, Thursday, Friday and Saturday, gale and rain. Sunday, in spite of fog, Instructor Rose took out No. 3 tractor and made several circuits. Afterwards mist cleared sufficiently for pupil practice. W. J. M. Connochie doing eight straights and Lloyd Williams four short flights. Instructor of the week: J. Rose.

London and Provincial Aviation Co.—Weather generally unfavourable last week. Instructors: Messrs. Warren and Smiles. Monday, school out in the morning. Messrs. Laidler, Moore and Abel straights. Laidler pancaking from ten feet smashed the machine.

School out again on Wednesday. Messrs. Moore and Abel straights. England Derwin and Laidler rolling.

Friday, school out in morning. Messrs. Moore and Abel straights. Laidler and England Derwin rolling. Machines in use: L. and P. biplanes.

Ruffy School.—Instructors during last week: Herbert James and Howard James. Pupils receiving instruction: Messrs. Aoyang, Graham, Donald, Marriott, Lacrouts. Machines: 60 h.p. Gnome-Caudron, dual control, and 45 h.p. Anzani, single-seater. One 50 h.p. machine is being erected at works, and will be ready in a few days.

AIRCRAFT AND THE WAR.

A *Daily Mail* correspondent at Venice reported on the 12th:—

"The Austrians, having learnt that a quantity of provisions and ammunition for the Serbs was due to arrive at Antivari, endeavoured to disturb the operations by an aeroplane raid. This entirely failed. The aeroplanes made off towards Mount Lovcen, where the Montenegrins were able to bring down one of the raiding aeroplanes."

The *Vossische Zeitung* on the 12th received the following from its Bale correspondent:—

"Almost daily French aviators are sighted flying in groups of two or three over the Sundgau district around Mulhouse in Alsace coming from the direction of Belfort. They are always flying so high that pursuit is unsuccessful."

A Reuter message from Petrograd on the 13th said:—

"During the fighting in the Vistula region there was an exciting incident when two Russian aeroplanes gave chase to a German machine. The German had been encircling a portion of the Russian positions, and two captains of the Novogeorgievsk aviation detachment started after him. They succeeded in intercepting his return to the German lines, and the German mounted higher and higher, hoping to shake off his pursuers. The Russians followed one on each side. Suddenly the German dropped, but the Russians were after him. He mounted again to so great a height that the machine was covered with frost, the propeller was working irregularly, and the airman was half frozen. Realising the impossibility of escape the German made a volplane, still with the Russians in attendance, and landed in the Russian lines, where he was captured."

In a despatch to the *Daily Mail* from Western Flanders on the 14th, Mr. W. Beach Thomas said:—

"Farther north, and a long way within the German lines, many daring expeditions have been made by airmen, and one of them has seen a German submarine, of which the engines were being tested in a bay of one of the Bruges canals, where there is just room for the vessel to turn.

"The activity of the airmen on both sides has been remarkable lately. The increase in general skill is remarkable, but especially in this point — that they are just beginning to learn to shoot tolerably straight. The great pace and great height of the aeroplane must always make the calculation of the due allowance immensely difficult. The bomb is launched at what I may call a muzzle velocity of anything from sixty to thirty miles an hour. How far forward will it travel in a still air from 3,000 ft. when dropped at a fixed rate of forward motion? This is the sort of question—dear to mathematicians—that airmen begin to answer instinctively. Some men have already earned great reputation as the Lord Ripons of this new marksmanship. Many of the latest bombs have only missed their mark by about thirty yards, which in these things is a narrow margin, and there have been some bull's eyes. However, there are many failures. One of the bombs near Hazebrouck, for example, both missed its mark and failed to explode, but became an object of terror to the gardener in whose patch it lay. The military authorities on request applied an electric wire, now devised for such purpose, and gave an exhibition explosion. A few airmen tried to combine several sorts of fighting, and have come down to earth behind the enemy's lines for various nefarious purposes. Recently a French sentinel was wounded and seized by two German airmen who had so descended. But, luckily, it was the moment of changing guard, and the relief came at the critical moment, just as the sentinel was nearly throttled by his captors. His life was saved and both airmen shot as they tried to escape."

In a message to the *Daily Mail* from West Flanders last week, Mr. W. Beach Thomas said:—

"The aeroplanes, in spite of the fear of bombs, are a daily entertainment to the people, and some of the Germans begin to appreciate their own value as entertainers. At any rate, one may be allowed to infer it from one of the 'Taubists' who the other day dropped a shower of his own photographs over the British lines. They were eagerly seized as 'souvenirs,' a blessed word that is now in everybody's mouth. The dropping of literature of various sorts has recently become a regular practice with German airmen."

The Swiss correspondent of the *Morning Post* reported the following from Berne on December 15th:—

"A great deal of cannonading has been heard again on the Swiss shore of Lake Constance, proceeding from Friedrichshafen, where the searchlights were also very busy. It is supposed that another aeroplane attack on the Zeppelin sheds has taken place, but nothing certain can be ascertained."

A special correspondent of the *Daily Chronicle*, writing from Northern France on December 15th, said:—

"L'Abbé Lemire, of Hazebrouck, has recently adopted a novel method for giving news to the citzens of Lille. He has sent an aeroplane over the town with a stock of newspapers, mainly 'Le Cri des Flandres.' These contain French and Allied news and a very useful list of people who have left Lille to take temporary refuge at Hazebrouck. In this way he has enabled many families to know how their friends and acquaintances are faring."

In *L'Auto* of the 15th inst., the following details were given of an incident which occurred on October 7th between Metz and Verdun:—

"The aviator Gaubert, with Captain Blaise as passenger, on sighting a hostile aeroplane, at once made for it. Gaubert hovered

about eighty feet over the German machine, while Captain Barise fired eight shots from his rifle, the German passenger replying with revolver shots, without any effect. The French pilots were unable to see if their bullets had taken effect, but the German newspapers have published a note to the effect that Lieut. Finger, wounded in the course of a flight on October 7th between Metz and Verdun, at a height of 2,300 ft., died of his wounds on October 9th, while his passenger was wounded and the aeroplane was smashed in alighting."

Regarding the bombardment of Sillery, a *Times* correspondent wrote from Epernay on December 15th :—

"French airmen were at once ordered to discover the new position of these guns, but every time they drew near the guns kept silence and the airmen were peppered with mitrailleuses. The Germans, it may be said here, have become extremely appreciative of the efficiency of the French airmen, and take endless pains to baffle them. Not only their trenches, but their depôts, magazines, and batteries are all concealed with the utmost care, and according to the authority of a German soldier, airmen continually fly over their own lines to see if anything important is visible to the enemy. If it is the whole emplacement is reconstituted; fresh branches and tree trunks are brought up until everything is absolutely hidden. It was no fault, therefore, of the French airmen that they failed to discover the guns."

In a message to the *Daily Mail* from Dunkirk on the 17th, Mr. Basil Clarke said :—

"A German Albatros aeroplane flew over Dunkirk to-day and dropped a letter addressed to "Aviateurs Français," written by a French airman who was taken prisoner recently by the Germans."

The following incidents were reported from Dunkirk by a *Times* representative on Dec. 17th :—

"Two German aeroplanes flew over Dunkirk yesterday, the first for some time. They did not drop bombs. On the contrary, their business was of a very conciliatory nature. One of them dropped in the suburbs a little bag containing a message from a German general asking the French military authorities to make inquiries for the body of his son, who was killed recently in the fighting near Soissons. The other Taube also dropped a message giving news of a French airman who was captured in the German lines, and wishing all French airmen a happy Christmas."

In connection with the recent attacks by French aviators on Freiburg, the following details were received in Paris on the 17th inst. :—

"On December 4th airmen from Belfort dropped six bombs on Freiburg-im-Breisgau with good effect. The airmen had made a great detour over the Black Forest to reach Freiburg in order to throw the Germans off the scent. On December 9th the squadron, notwithstanding a furious cannonade, dropped eighteen bombs on Freiburg from height of about 3,000 ft. In this raid the leader of the squadron had a wing of his machine damaged by a shell splinter. Several bullets grazed the petrol tank and smashed some stays, but the machine did not lose its stability. After the last cannonade, near Altkirch, we made an eventful return to Belfort."

Regarding this incident, the *Matin* correspondent at Berne wrote on Sunday :—

"I am in a position to give details of the raid of French aviators on Freiburg recently mentioned in French *communiqués*. The aviators took the greatest pains to avoid doing any damage to the civilian population, or to the famous Gothic cathedral. In the course of their principal raid they followed the line of the railway from Brisach to Freiburg, and destroyed a great portion of it with their bombs. They also did enormous damage to the hangars of the Aviation Society."

In a message to the *Daily Telegraph* from Northern France on Friday, Mr. A. Beaumont said :—

"A Belgian aviator who enlisted only a few weeks ago, and who is but 20 years of age, has distinguished himself by a daring flight over Ostend, Bruges, and several other places, where he dropped bombs on the German troops and caused a panic in their midst. Near Ostend he observed a convoy of supply, which was slowly moving along. He flew over it very low and dropped two bombs, which struck three of the motor lorries and destroyed them. Near Bruges he dropped several bombs on a detachment of cavalry which was concealed behind a farm, and dispersed it. The daring air pilot has been already raised to the rank of lieutenant. After his last exploit his machine was riddled by bullets, and he landed just inside the Belgian lines in the flooded district, and he and his machine were rescued by Belgian soldiers."

In the German wireless news sent out from Berlin on the 18th inst. there was the following :—

"An American war correspondent who has had exceptional opportunities of observing the Austrian forces in the field, reports that the conditions which he found were extremely favourable. The men are animated. Aeroplanes are doing good work, but the pilots state it is difficult to attain great heights on account of the rare mountain air. They are able to get in close touch with the garrison at Przemysl."

A correspondent of the *Observer*, writing from Warsaw under date of December 8th, said :—

"Apart from remote cannonading, Warsaw has other signs of war. There is a shop in a street off the Marzalkowska which has been destroyed by an airship bomb. Two days ago an airship coming from the side of Prushkow, the extreme point of Hindenburg's October advance, showed itself from a snow-cloud. There was a flash very high up and a report which must have come from a prematurely exploding bomb. No harm was done. The airship immediately slid back into the snow-cloud. The porter of the Bristol had better (or worse) luck. He saw the explosion of the Marzalkowska side-street bomb."

According to a message published in the *Varsavski Kurier*, Warsaw was bombarded on the 9th inst. by a Zeppelin airship, which threw eighteen bombs into the city, with the result that two houses were demolished, ninety of the citizens killed, and fifty wounded. On the following day six bombs were thrown into Warsaw from German aeroplanes.

An *Evening News* correspondent wired from Paris on Saturday :—

"Paris is now resuming an almost normal appearance with the approach of the New Year. Realising the possibility of fresh aeroplane attacks, and not disregarding the possibility of Zeppelin raids, the authorities have instituted a night air patrol. The whirring of aeroplanes can now be heard during the still hours over Paris, and a floating star marks the passage of this night watcher."

It was reported on Saturday that a biplane, piloted by Major Destouches caught fire while flying over Paris, having come from the direction of Issy, and fell on the slaughterhouses at Vaugirard. Both the pilot and the passenger, the well-known aviator Rugene, were burned to death.

The following message was received from Reuter's correspondent at Capetown on Saturday :—

"Telegraphing from Chaukaib, German South-West Africa, yesterday, Reuter's special correspondent reports that a German Taube flew over the camp on the morning after the fight on December 16th. The visit was more or less expected, and everybody was on the *qui vive*. The airman flew at a very high altitude, probably because he was thus obscured by a dense mist. Consequently, he was not sighted until he was directly overhead, where there was a break in the mist. Then he came down to some 5,000 ft., whence he launched two shells. The first burst without doing any harm, but the second fell near a knot of men, nine of whom were wounded by splinters, some of which also pierced an ambulance operating tent where a red flag was flying. The majority of the wounded in the Chaukaib affair reported to-day are artillerymen of the Defence Force. One has since died."

Writing on Sunday to the *Daily Express* from the Belgian frontier, Mr. Percival Phillips said :—

"A report received on the frontier from Westcappelle, a Belgian village near Zeebrugge, states that an airman of the Allies, flying over that territory on Thursday, threw a bomb on a German military train which was arriving at the station at Zeebrugge from Bruges with reinforcements of marines. A portion of the train was wrecked, forty of the marines being killed and 100 wounded."

Regarding the effect of the British raid on the Zeppelin works at Friedrichschafen, the correspondent of the *Matin* at Berne wrote on Sunday :—

"The Germans still cherish an artless belief in the possibility of a successful Zeppelin raid on London if advantage is taken of foggy weather. In spite of the reticence of the Prussian drilled staff and all the German démentis, it can be stated that the material damage done is of a serious character, and that a dirigible which was to

begin its trials on the very day after the raid was badly damaged. Since the raid not a single airship has come out of the sheds, and the minutest and most careful precautions have been taken against a fresh attack, of which serious fears seem to be entertained. At night the whole of the German side of the lake is in absolute darkness, while at frequent intervals star shells light up the skies. Orders have also been given to the inhabitants to stay at home in the event of an alarm. I hear, on good authority, that the Zeppelins which are under construction at Friedrichshafen, and are turned out at the rate of one a month, are all of the same type. They have a speed of fifty miles an hour, and are able to lift a weight of five tons. Many attempts have been made to discover a practical system of armouring these Zeppelins, but so far with complete lack of success. It has even been found necessary to do away with the aeroplane cannon on the higher platform for fear of fire."

A correspondent of the *Tyd* at Sluis on Monday reported :—

"The aeroplanes of the Allies are to be seen at all times of the day between the Yser and the Dutch frontier, and during the night they examine the whole region with searchlights. Last Saturday a British airman dropped a bomb on the barracks at Bruges.

"A telegram from Brussels *via* Berlin states that a hostile airman yesterday flew over the suburb of Etterbeek and tried to throw bombs, but was driven off by the fire of the German soldiers."

In a message to the *Daily Mail* from Dunkirk on Monday, Mr. Basil Clarke said :—

"It is stated here that Brussels has been visited by the Allies' airmen, who dropped bombs on a Zeppelin shed and set it on fire. The first night air raid has been made by Allied airmen from Dunkirk, who have flown at a low altitude over the German positions on the coast. The airmen dropped twelve bombs and were able to do considerable damage because of their nearness to their marks. The aeroplanes returned safely to Dunkirk guided by light signals."

Mr. W. Beach Thomas, also writing to the *Daily Mail* on Sunday from North of France, said :—

"Two bombs were dropped from a waterplane of the Albatros pattern upon Calais this afternoon. The rare beauty of the weather and Sunday afternoon were too great a temptation to be resisted. We saw the latest varient of the old saying 'It is a fine day ; let us go and kill something.' Three aeroplanes flew also over the Hazebrouck neighbourhood, from where they were chased by the Allied airmen. At Calais I happened to be in an almost ideal position for seeing the manœuvre. The machine, travelling fast at about 2,000 ft., came from the north-west over the sea, making a direct line for a signalling station situated on the dunes about a mile west of the town. Here the first bomb was dropped, falling into the sea and exploding as it struck. This relieved any doubts about the nationality of the airman, and as it flew over the Casino hospital a lively fusillade of rifle fire was directed against it. An unusual number of people were collected along the beach, and the excitement was great. Even the women were more interested than afraid. The second bomb was let go as the biplane topped the Casino, but it fell as harmlessly as the first, burying itself in the middle of the harbour. A few splashes of water on the sides of the Pas-de-Calais, a French boat lying by the landing-stage, were the ultimate mischief. The aeroplane, rising rather higher after the bombs were dropped, disappeared in the direction of Dunkirk, from where it was chased."

A Central News correspondent reported the following from Petrograd on Sunday :—

"In Eastern Prussia a daring air raid was effected by a Russian officer over Stallupoenen. The station was reduced to ruins, and a considerable part of the railway line was destroyed by the aviator's bombs.

"An Austrian aeroplane with a machine gun from Cracow attacked the Russian positions from the rear, but the bombs and bullets caused no damage. Printed appeals to Russians from 243,000 'comrades' were thrown down, promising good fare, tobacco and rum.

"On a second expedition the Russian artillery brought down the aeroplane and killed the aviator. The aeroplane lies between the Russian and Austrian trenches."

Writing to the *Daily Telegraph* on Sunday, Mr. Granville Fortescue said :—

"Here we have the true 'War in the Air.' Aeroplane reconnaissances have become so constant that hardly an hour of daylight passes without either menacing or protecting motor birds circling above the city. Whenever the loud humming of a Taube rings through the welkin, the Warsavians scuttle to cover like chickens under a hawk's shadow. So often have the assassins of the air hovered over this town, dropping death on those below, that the sight of an oncoming flying machine sets every heart trembling. In Jerusalem Street, at the very doors of the American Consulate, four innocent citizens were killed. The Consul saw the mangled bodies huddled beside the kerb. He showed me the shattered pane of glass where the bomb bullet pierced the Consulate window. Lately Russian aeroplanes have arrived, and these have been scouting in the blue, searching for the enemy.

"As yet, there has been no encounter. I find it difficult to distinguish the Russian aeroplanes from the French. In outline they are the same, and having the same red, white, and blue bull's-eyes painted on the planes, from the ground they look much alike. The Russian aviators feel that they have not had their chance yet, but soon they hope to set up a record that will rival that of their English allies.

"The question of indiscriminate bomb-dropping is a serious one, with a non-combatant popu'ation living in the war zone. Poland, which is a country almost as thickly settled as France, has been a terrible sufferer. When Warsaw was first attacked the German bomb-droppers aimed at the railway stations, which might be considered to be of military value, and thus to be fair targets. But soon missiles were scattered over thickly-settled sections of the city, in wanton disregard of the non-fighting population, or of the women and children. In Poland no one considers himself safe from the German infernal machines."

The *Morning Post* Petrograd correspondent on Monday sent the following account of a visit to a Russian aeroplane factory :—

"It is now some time ago that I was accorded the exceptional privilege in war time, even for an ally, of visiting one of the Russian great aeroplane factories. Several have been established to keep up the large supply required by the various armies in the field. The one I visited can turn out five aeroplanes per day, or thirty a week. Imagine a London railway terminus, considerably reduced in size and with a broad gallery running all round half-way to the roof. That is the fitting department. The whole floor area is crowded with completed aeroplanes in the rough, some awaiting their engines and others certain other pieces of mechanism used in active war in the air. Around this central hall and communicating with it are a series of buildings for the preparation of the various parts, for everything, including the engines, is entirely constructed on the spot. Construction has been standardised, and many are the ingenious contrivances for simplifying the various processes of manufacture.

"Except perhaps the building of a ship, which, is a slow process to grasp, I can imagine nothing more engrossing than the rapid assembling of these modern hawks by a few skilled workmen. When completed they are lowered down from the gallery to the floor of the great hall. Thence they proceed to the flying grounds for the testing of the engines, and they have to be passed by an inspector, a skilled aviator, before being despatched to the army. As boxed for the railway the entire aeroplane is got into a solid packing case which might contain, say, a couple of grand pianos, but rather longer. Thus packed, they fear nothing in transit, and are easily and rapidly got to work when they arrive at their destination."

The following illustration of the work of aircraft at the front was given to a *Daily Telegraph* representative by Corporal G. Welsby, of the Royal Horse Guards, who has returned home wounded :—

"'The Indians are fine,' said Corporal Welsby, 'but there's one funny thing about them—they can't let an aeroplane pass without firing at it. It doesn't matter whether it's German, French, or British, you can't keep their rifles down when they hear it. One day I was with some Gurkhas in charge of a transport wagon when a British aeroplane passed over. Up went all their rifles at once, and they began blazing away at it for all they were worth. Try as hard as I could, I cou'dn't make the little chaps stop until it was out of range, but fortunately none of them hit it.'

"Corporal Welsby had the satisfaction of witnessing a most thrilling air duel. A Taube was making a scouting flight over the the British lines, but to avoid disclosing their position the men were not allowed to fire. Just as the Taube passed overhead two British machines rose to meet it, and the most exciting duel took place right above the trenches. The German turned to escape, but was too late, and the three machines, darting round, above and below each other like huge birds, were engaged for several minutes, until a lucky shot from one of the British machines brought the German fluttering down."

Models

Edited by V. E. JOHNSON, M.A.

Models Driven by Compressed Air.

A 10-oz Model.

(*Continued from page* 1220.)

FIGURE 1 is an illustration of a model biplane fitted with the reservoir described in last week's issue, and an ordinary double acting cylindrical-shaped slide-valve loco. engine, the complete weight of the entire model being slightly over 10 ozs.

The span of the upper plane is 33 ins. and the lower 31 ins. The planes are staggered to rather more than one-third their chord, which is 5 ins. The elevator is small, only 9 ins. by 2·5 ins.; both planes and elevator have rounded ends and upturned tips. The centre of gravity is slightly behind the leading edge of the top main plane, but I must add that the model has not yet been tested in free flight, so some readjustment may be necessary in this respect. The main planes have a *very* slight negative angle when the *fuselage* or reservoir is horizontal. The propeller on the machine in the photograph is a 10-in. diam. Normale, and is the only one so far tested; sufficient thrust (from 2½ to 3 ozs.) is given by it to fly the model. As the photograph shows, there are eight struts to the main planes. Four of these are arranged two and two in pairs in the centre between which the container passes, gripping it slightly.

The container is not, however, held fast by this gripping, as was the case in the Bragg-Smith model, but "slung" in the following manner, by four pieces of very thin steel wire; since both leading and trailing edges are similarly dealt with, we need only consider the former. One piece of wire is fastened to the top main plane, where the left-hand front strut joins it; this passes down *underneath* the container and up again to the place where the right-hand front strut joins the upper main plane, where it is fixed. Another similar piece passes *over* the container and is joined to the bottom of the same struts, where they are fixed to the lower plane. The rear edge is similarly dealt with. The planes and their chassis are prevented from "rotating" by two steel wire stays carried from the rear edge of the top plane to the bottom of the engine fixing. The planes, &c., are prevented from shifting longitudinally on the container by means of the fastening of a couple of the "sling" wires to the wire with which the container is bound. By the above means, we obtain a quite rigid fixture without nipping our "tender" reservoir.

One fact worthy of notice is that the very light container, elevator and front chassis, combined with the biplane, engine, &c., and propeller in the rear have the effect of bringing the c.g. well back; the rear edge of the lower plane is only about an inch from the bottom of the engine cylinder. The distance between the leading edge of the top main plane and the rear edge of the elevator is 15·5 ins. The main planes are of the smallest diameter—magnalium tubing with steel ribs. The struts are magnalium tubing. The elevator is of thin steel wire. The planes and elevator are all covered with Bragg-Smith proofed silk. The chassis is of steel wire. The two rear wheels are two of Messrs. Bonn's aluminium disc wheels, 1·5 in. in diameter. The front wheel is one of Messrs. Evans' 3-ply wood wheels, 1¼ in. in diameter.

The machine is not yet quite finished, as both the elevator and front chassis are only fixed on temporarily.

The weakest and most inefficient part of the machine is undoubtedly the engine. As already stated, it was originally a loco. motor; it weighed 3 oz. 4 grms.; by judicious filing and cutting off of superfluous parts, together with the substitution of a much lighter connecting rod (made from a piece of umbrella ribbing) for the heavy one shown in Fig. 2, the weight was finally reduced to 1·75 oz., or just about *one-half*. At high pressure, however, it undoubtedly wastes at least 50 per cent. of the air; in spite of this, so near as I can calculate without actual trial, a hand-launched flight should give about a 20 secs. duration, with an initial reservoir pressure of not more than 110 lbs. A more efficient motor would easily raise this to half a minute.

The loading works out at about 4·5 ozs. per sq. ft., a very light loading; but the idea was to make use of the same planes on a heavier model fitted with a larger container. For instance, if the total weight were a pound, the loading would be about 7 ozs., a very good and useful loading. What we want for better results is a larger container and more efficient engine. There should be no difficulty in making a similar container of three times the *capacity* to weigh not more than 8 ozs. Since our planes and rear chassis weigh only slightly over 3 ozs., we have still nearly 5 ozs. left for the motor, propeller, elevator, and front chassis, which should be ample. Of course, three times the capacity would not give us three times the duration, because our motor must be more powerful, *i.e.*, it must use more air per any specified time, but it is, I think, a fair inference to assume that it should double our duration, and that with such a machine, charged to some 110 to 120 lbs., certainly not more than 150, a duration of a minute could be obtained. We could either have a container about 3 ft. long by 2·5 ins. in diam. or keep the length the same and make the diameter 3 ins.

Considerable interest appears to have been aroused by what we have written on compressed-air motors, and quite a number of letters have reached me, some of which are printed below. Now the writer wishes to make it quite clear what he has in his mind. Readers of FLIGHT must not draw the erroneous conclusion that he considers such motors as the *best* for model aeroplanes. They certainly take a back seat when either petrol or flash boiler steam plants are concerned, but they are much easier of construction, and they are much better suited for the ordinary juvenile amateur than the other two types, which require not only to be made by an expert but worked by one as well; moreover, they are much cheaper (a very important item), and they are (as opposed to rubber) *an engined model*.

The only part outside the scope of an ordinary amateur is the

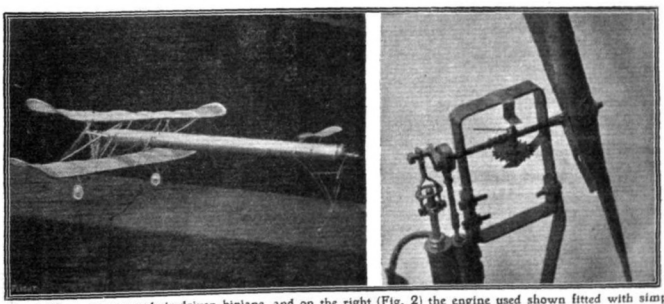

Fig. 1.—A 10 oz. compressed-air driven biplane, and on the right (Fig. 2) the engine used shown fitted with simple speedometer for experimental purposes.

" motor," but these can be bought quite cheaply. So far as I have experimented, I prefer the 3-cylinder type arranged symmetrically round a circle.

Such a motor, however simple in appearance, is not so easy of construction as it looks, the difficulty in all cases is to combine ease of running with non-wastage of steam at high pressures.

Further details and illustrations of the 10-oz. model will be given when some further experiments have been made.

(To be continued.)

Heating Compressed Air Motors—Turbine Motors.

" I see you are suggesting," writes Mr. G. H. Kilshaw, " heating compressed air for model aero work, and in your suggestions for this you say that it is difficult to keep any flame other than a blow-lamp alight while in flight. I may say that a recent member of my club, A. G. Pugh, used on several occasions for illuminating purposes on a 1-1-0-P2 model a piece of cotton wadding soaked in methylated spirits, and although this was fixed between both propellers it always remained alight while flying, spurting rearwards in a thin blue flame.

" I thought this might suggest an extremely 'light' method (in more senses than one) of heating.

" As you by now know by my many 'moanings' in FLIGHT columns, I am keen on stability free flight tests with a properly designed model, and a decent small motor would be a very great help.

" I recently tried an acetylene motor working on the catherine wheel principle, as per sketch.

" A being the crank-case, and B, B1 and B2 pipes, to the ends of which a light is applied, as the gas is fed to them through the crank-case, A.

" The feeding pipes were, however, always getting choked with carbide, and the engine could only be got to do a few revolutions before stopping up, but this could undoubtedly have been overcome had leisure at the time permitted me.

" However, I should like to know your opinion of below.

" Could acetylene gas be got to give enough power to drive the engine you describe December 11th?

" Would heating this before it enters engine be dangerous, and would the power be increased?

" If so, the exhaust from the engine could be led to do this."

Referring to Mr. Kilshaw's communication, we do not think any satisfactory results can be obtained on the catherine wheel or reaction turbine principle. A De Laval or better still Rateau type of turbine is another matter, but the almost insuperable difficulty is the smallness of the model; for instance, a De Laval turbine of 4 ins. diam. to run at the best theoretical speed should make (I quote from memory) some 78,000 r.p.m., so a *slight* gearing down would be necessary; I propose, however, to deal with this type in an early issue. We should certainly leave acetylene alone; it is nasty, not to say dangerous stuff at best, and when compressed highly explosive; some years ago, if we remember correctly, a Russian professor and his assistant were both killed when trying experiments on compressing acetylene.

Referring to the wadding pad, the heat would be insufficient, moreover. The best way to employ methylated spirits is in the form of a vapour lamp, with a powerful jet which I constructed on this principle. I could keep up a 60-lb. pressure in a pot boiler 12 ins. long and 1⅛ in. diam. when driving a 2-in. three-bladed marine propeller, indoors, but outside on the water about 45 lbs. was the best result; I do not say this is a fair test, or that the arrangement was of the best, but such was the result. A better plan is to use methylated spirit in the boiler instead of water, and discharge the exhaust vapour to burn underneath the boiler; such a method has been employed to fly a model successfully, and was described in one of the earliest, if not the very first, copies of FLIGHT. An engine on this principle was exhibited at Olympia at the last Royal Aero Show but one.

The Paddington Club and Research Work.

Mr. O. Hamilton, jun., writing in connection with the above, says:—" I hope my latest ink-splashing ventures have not debarred me from adding a little to Mr. Evans' suggestion on the above topic, and I can speak from experience when I say that the research work that will be carried out by the Paddington friends will be properly done; if I may take the carefully calculated tables of propeller pitches they have prepared for distribution amongst their members, the results will at least be systematically tabulated.

" As regards the work to be considered as a basis of investigation, I think Mr. Evans has fairly well enumerated a season's experiments, and I think the majority of the serious minded aero-modellists will say go forward and prosper.

" The results obtained to be of value to the movement must be compiled in such a way as to circulate amongst the various clubs and individual aeromodellists. It is quite possible that the circulation would be large enough to prepare a printed manuscript, but it might be possible to prepare copies of loose leaflets dealing with the various subsections of the experimental work done, these being available to clubs, &c., on payment of a nominal figure to the funds of the Paddington Club, then the movement will be on a footing with other branches of model work, and possibly more advanced in its scientific knowledge.

" The subject will, I know, stand a great deal of argument, &c., but I think we must all congratulate Mr. Evans and his fellow clubmen on their ambitious programme for 1915."

Reply to Query.

Reply to O. Hamilton.—If we remember correctly, such was employed.

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AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).—JAN. 4TH, 1915, annual general meeting, 8 p.m., at Broomheads, Leopold Street (room over sweet shop). All members please attend, and all books out of library should be returned that evening.

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"Dope" Dangers.

An inquest was held at Marylebone on Saturday concerning the death of Gilbert Moody, 36, french polisher, of Queen's Park, Paddington, who had been employed at the Aircraft Factory, Hendon. According to the evidence deceased for several weeks had complained of illness, and eventually was medically treated for jaundice. Later, he was removed to the Middlesex Hospital, where he died on the 15th inst. It was stated that deceased had been engaged in applying dope to the wings of aeroplanes, and had frequently complained of the smell from the dope.

Dr. Bernard Spilsbury, pathologist, of St. Mary's Hospital, who made a post-mortem examination, stated that death was due to syncope from an acute and mysterious disease of the liver.

Dr. Wilcox, of the Home Office, said he had made investigations, and had carried out experiments upon white rats with quantities of the dope. The effects of the dope had made the rats drowsy, and on being killed the animals were found to be showing signs of quite extensive liver disease. The dope contained tetrychlor-ether, methylated spirit, benzine and other ingredients. The cause of Moody's death was syncope from disease of the liver, due to the action of the tetrychlor-ether. This was the first case of that description reported.

On behalf of the factory it was stated that the necessary precautions for the protection of employees would immediately be taken.

The jury returned a verdict in accordance with the medical evidence.

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