

Flight, October 14, 1911.

FLIGHT

First Aero Weekly in the World.

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

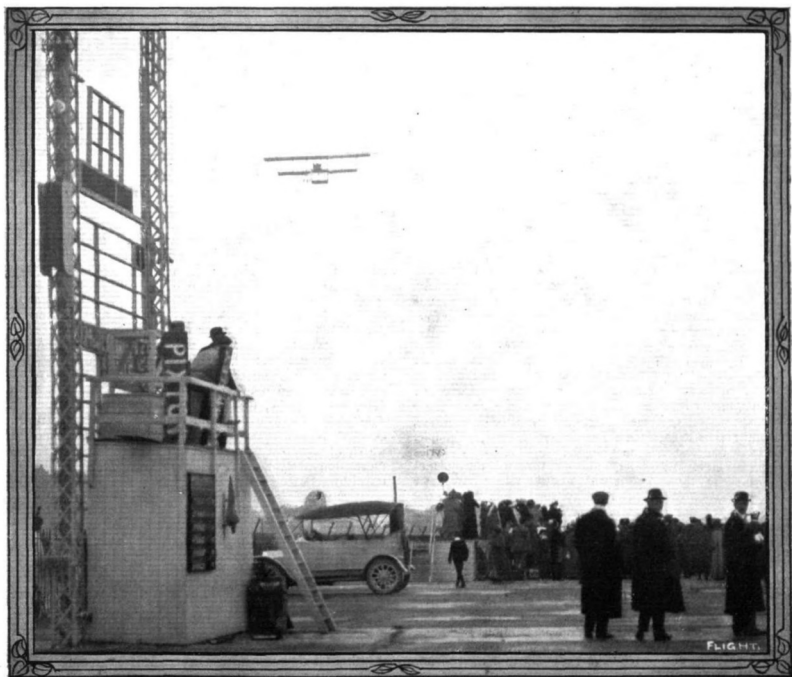
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WINNING THE MANVILLE PRIZE.—Mr. Pixton on the Bristol monoplane at Brooklands on Wednesday of last week, when he was competing finally for the Manville Aviation Prize. Mr. Pixton is seen on the Bristol passing over the paddock at Brooklands.

EDITORIAL COMMENT.

How We Encourage the Native Industry.

We are not enamoured of the rôle of consistent critic of the powers that be, nor are we of that school which assumes, or makes a pretence of the assumption, that whatever is done by a Government department, must of necessity be wrong. At the same time, we have never hesitated to call attention to what we consider the shortcomings of our authorities in their attitude towards aviation, and if we have been called upon more often to blame than to praise, our opinions have been advanced in all sincerity. We are prompted to these remarks for the reason that we have found it needful so often to criticise, that we are at last beginning to feel that some of our readers may think that it is part of our policy to pick holes in anything the aerial advisers of the Government may see fit to recommend. That is not so, however, and we sincerely wish we could find some trend of policy, some settled conviction, upon which to hang a word of praise, or to congratulate someone upon something. But the farther we go the more inept seems to be the handling of our aerial policy.

We have got to the length of admitting that it is necessary for this country to be brought up in line with the Continental powers, who are straining every nerve to secure the domination of the air. Even the most case-hardened veteran of the stock-and-pipeline school realises that some day aerial supremacy may decide the fate of the world, and none can say how soon that day may come. We have got even further than that. We have begun to give halting effect to the policy which most obviously results from this realisation, and are slowly gathering together the nucleus of an air fleet, but so far as actual accomplishment, and even the plans for the future that are in sight at the moment, it is but a nucleus, and a weak one at that, to which we have attained. That our possible rivals are going far ahead of us does not seem to worry the ostriches who run our affairs—their heads are safe buried in the sand—they see nothing, and, ergo, there is nothing to see.

We have said that we have got a little way on the road towards the creation of an aerial navy. The army has a few assorted aeroplanes, the property of the State, and has a few more belonging to enthusiastic officer-aviators, and Mr. Barber's two Valkyries at its disposal. There are also two broken-winged dirigibles lying about somewhere, and one small experimental gas-bag, or it may be a couple. Then, the Navy has the "Mayfly," the other two Valkyries presented by Mr. Barber, and two or three other aeroplanes owned by officers. But we are going to purchase more aeroplanes for the Army, and by way of encouraging the growth of the British industry we are going to get them all from—France!

The Army authorities will have it that the aeroplane which is ideal for military use has not arrived, and, all inexperienced as we are, we agree that this is so. Then the aeroplane must logically be in an experimental stage of existence, and the machines we are buying for the use of our fighting services are for purely experimental use. That being so, and it being above all things important that, if we are to hold our own, we should have the same encouragement to strive for perfection and thus create and foster a native industry, why should the Army go outside Great Britain for the machines it wants? We fully recognise the fact that the authorities would be wanting

in their duty if they did not get the best obtainable for their money, but they are certainly wrong in assuming that they must necessarily cross the Channel to get the best. There are some French machines which we frankly admit are in advance of anything we are producing here, but on the other hand there are types on the War Office list for purchase which our own manufacturers can easily equal, if not beat. It would seem that the British aeroplane is quite good enough for the armies of Russia or Spain, but for some inscrutable reason falls short in merit when it comes under the criticism of our own authorities. Doubtless, if the matter were put to the latter the reply would be that the British manufacturer is so hopelessly unenterprising that it is impossible to do anything with him. We do not admit that this is anywhere near the truth, but if he were there is much excuse for him. Look at the encouragement given by the French Government to the pioneers of flight, and contrast it with the neglect and discouragement with which our own industry meets at the hands of those in authority here. There can be very little incentive to even the keenest when he sees that his own people ignore his efforts, be they never so meritorious, and that orders for which the British industry is anxious and is quite capable of filling go to others who cannot even claim that they are farther advanced. It is a sorry spectacle, and one that could be seen in no other country but our own.

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A Nice Legal Point.

What the *Leeds Mercury* calls "an amusing reminder of the recent aviation flight round Britain," came out the other day in connection with the proceedings of the Yorkshire Farmers' Union. A member of the Union claimed compensation from M. Montalent for damage done to a crop of barley by the descent of his aeroplane during the race. The Secretary reported that the claim had been disputed on the ground that the damage was not done by either the aviator or his machine, but by the public who had invaded the field intent upon sight-seeing. It was argued by several members that whether this was the case or not, no damage would have been done if the aviator had not alighted in this particular barley field, and that he, therefore, should be liable to pay. The point is a nice one, and we do not propose to express any opinion upon it, one way or the other, and we should not have referred to it at all except as an illustration of what may be expected before long, when travel by aeroplane becomes more general. The case in point serves as one of the first indications we have had in substantial form of the need which will soon be felt for some codified law of the air, which will take cognisance of such points as these. Unless a case of the sort can be amicably settled between the parties, it seems that there is an opening for almost endless litigation, with all its attendant expense, and with the possibility of an ultimate decision that would be satisfactory to nobody.

When we speak of a codified law of the air, we mean, naturally, the law as applied to the status of aerial craft and their *civil* relations with, and responsibilities towards, the State and the individual. The application of the criminal law to offences in connection with aerial craft is another matter, and one upon which our opinions are already well known to our readers.

FLIGHT PIONEERS.



MR. W. B. R. MOORHOUSE.

Who has recently been making such excellent cross-country flights on his Gnome-Blériot from Portholme Aerodrome, Huntingdon, to Northampton and the district, and on Friday from Huntingdon to Brooklands.

A Study of Bird Flight

By Dr E.H.Hankin, MA, DSc.
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CHAPTER XXIII.—Descending of Vultures at Ballia Ravine. THAT a bird should flex its wings and glide downwards with speed increasing under the influence of gravity is what one might expect to happen, and I have already quoted examples of such an occurrence.

That a bird flexing its wings to a lesser degree should glide downwards at an angle of about 10° or 15° with the horizon, with speed continually decreasing, in spite of the action of gravity, is not what one would expect to happen. I therefore thought that it would be worth while to devote attention to this phenomenon, for which I had exceptionally good opportunities during my stay in Naiini Tal. It will be seen that the attempt to explain this decrease of speed will involve an advance in our knowledge of gliding flight.

Vultures returning to roost on the trees in Ballia Ravine could be seen circling near the top of the end of Sher-ka Danda mountain, and then gradually circling downwards in a large spiral. When they commenced this descent, they placed their wings in a slightly flexed position, and glided downwards in circles of decreasing diameter and at a diminishing speed. The vertical distance through which they circled before reaching their roosting place was between 350 and 400 metres. They usually took from 60 to 80 seconds to make this descent.

On a day on which vultures had been flex-gliding at 18 to 24 metres per second, I noticed one circling downwards at 12 metres per second. When it had reached a lower level, I estimated its speed again, and found it to be 8 metres per second (June 21st, 1910). Another vulture, when circling down but still near the top of Sher-ka Danda, was found to be travelling at 12 metres per second. On different occasions I found the following values for the speeds of vultures circling downwards near the end of their descent : 9, 6, 6, 6, 8, and 8 metres per second.

Usually, but not always, when circling downwards, the feet were hanging down. As the bird neared the perch, first its legs and then the legs and feet were allowed to hang down below the level of the wings. The alulae were either not extended at all, or if they were extended this only happened a short time before perching. In the case of a Lammergeyer (on June 21st, 1910), I have, on one occasion, seen both alulae extended and rotated upwards during the whole of several successive circles during descent. Occasionally, besides the feet, the legs were also partly hung down while the vulture was at some distance from the perch.

Vultures thus descending with loss of speed steered by dip movements. A double dip was also once observed.

A vulture descending with legs hanging down was once seen to be struck by a puff of wind. It responded by momentarily increasing the flexure of both wings.

Of the different adjustments that may be supposed to act as brakes in decreasing speed, it will be obvious from the above brief description that extension of the alulae or hanging down of the legs or feet must be of subordinate importance, and need not here be further considered. A peculiar kind of flapping that occurs just before perching will be described in a later chapter under the name of "stop flapping." It will be shown that this acts as a brake.

My observations soon showed me that during descent with loss of speed the camber was maintained at its maximum instead of being decreased as it is in ordinary flex-gliding flight. I propose first to attempt to prove the correctness of this observation, and then, after explaining the mechanism for altering camber, to bring forward reasons for believing that in descent with loss of speed there is an adjustment that tends to put out of action the lifting and tractive power of the cambered wing. There can be little doubt that in this adjustment it is the brake that is of importance in decreasing speed.

First, by way of proving the correctness of my observation of maintenance of camber in descent, I may refer to my description of the descent of vultures at Fateygar-Sikri (Chapter IX). I stated that towards the end of their descent the vultures exhibited a swaying from side to side which I gave the name of "parachuting." The track of a bird when parachuting is shown, as seen from in front, in the accompanying Fig. 26. At each angle of the zigzag, the bird makes a "dropping turn." Somewhat suddenly its cant in one direction is changed to a cant in the opposite direction. While making this change the bird continues to face almost or quite in the same direction. There may, in some cases, however, be a slight rotation round the dorso-ventral axis during the turn.

As, during these dropping turns, the centre of gravity is far below the centre of effort of the wings, I was under the impression that the bird was oscillating from side to side like a pendulum, and that any tendency to oscillate in a fore and aft direction was quenched in some way that tended to cause the bird to lose height and speed.

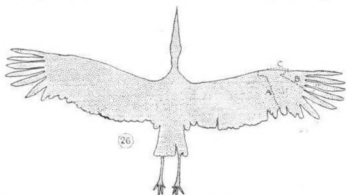


Fig. 26.—Adjutant circling. The dotted line, A, indicates junction of secondary and metacarpal quills. The line, B, indicates junction of metacarpal and phalangeal quills. C is outline of alula.

My observations at Ballia Ravine, however, showed me that this movement was not automatic (in the sense of being due to a pendulum-like oscillation), but that it was voluntary and due to an adjustment that I was fortunately able to discover. After watching a number of vultures descending one after the other and each making a dropping turn at about the same position, at first I saw that there was some displacement or movement of the secondaries of the wing that became lower at the moment of the dropping turn. Then, as I became more practised in making the observation, I formed the impression that, at the moment of turn, there was a temporary increase of flexing of the inside wing. Lastly, I was able to see with certainty that this sudden and temporary extra flexing occurred, and that it was accompanied by a momentary relaxation of the

secondaries. That is to say, a dropping turn is an example of a bird becoming canted by decrease in supporting area of the wing that thereupon becomes lower in position.

The import of this observation of the slackening of the secondaries during the dropping turn, is that it proves the correctness of my observation that the secondaries were not relaxed while a dropping turn was not taking place. That is to say, during descent with loss of speed secondaries were kept tight.

Owing to the fact that at Ballia Ravine I was on the same level as the birds under observation, I was able on a few other occasions to observe relaxation of the secondaries. The details of these very difficult observations are as follows:—

June 17th, 1910. At 2.34.—A vulture circling, in air blowing up the valley, was seen to relax the secondaries of the outside wing on the leeward side of the circle.

9.43.—A vulture, to avoid another, was seen to dive by double dip and momentary relation of the secondaries.

June 21st, 1910. At 2.35.—A vulture turning showed slight relaxation of secondaries of outside wing.

June 25th, 1910. At 12.35.—A vulture turning in thin cloud near seen to slacken secondaries of outside wing.

June 26th, 1910. At 11.36.—Two vultures ease-gliding, and then commencing to descend. I formed the impression that the tightening of the inside wing secondaries occurred while turning.

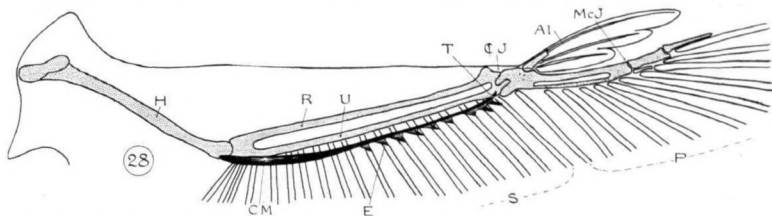


Fig. 28.—Dissection of wing of an adjutant showing "camber muscle." H humerus, R radius, U ulna, C.J. carpal joint, Al alula, McJ metacarpal joint, P basis of primary quills (eleven in number in this specimen instead of the more usual number, ten), S bases of secondary quills, CM camber muscle, T insertion of tendon of camber muscle into lower end of ulna. Tendonous extensions (E) of this tendon are inserted into the outer eight or nine secondary quills.

After the turn (which was a turn in the horizontal plane), the secondaries of both wings were tightened. (That is to say, the wings were adjusted for descent by increase of camber to maximum.)

Two vultures descending showed a double dip, accompanied by increased flexing of wings. In each case, at the time of increased flexing, a relaxation of secondaries was seen.

What I have described in the above diary extracts as "relaxation of secondaries" was a moving upwards of the posterior margin of the inner or cambered part of the wing. The movement cannot in any case have been as much as an inch in birds of 7 or 8 ft. span. These observations, therefore, were difficult to make, and at the time entirely unexpected. It will be seen that they refer to two kinds of relaxation: one, quite momentary, coincident with a momentary but visible increase of flexing, the other lasting perhaps for several seconds, in which no increase of flexing was observed. That in this latter case a slight increase of flexing must have occurred, will be shown in the sequel. It will also be shown that, in each case, the relaxation of the secondaries was equivalent in a decrease of camber, and was a disposition for increase of speed.

We have now to consider more closely the nature of the wing-flexing shown by the descending vulture. When taking their time of descent with a stop-watch, I soon learnt to distinguish at a glance between a descending and a flex-gliding bird. There was some difference in the appearance of the flexed wing in the two cases, but not a difference that I could grasp sufficiently to express in words.

It will facilitate description if I mention two theories that I formed to account for the appearance of the descending bird.

Firstly, it occurred to me that possibly in fast flex-gliding the flexure is more at the elbow joint, while in descending possibly the flexure was more at the carpal joint. It was conceivable that the ligaments of the wing should be so arranged that one kind of flexing would affect camber and the other have no effect on camber.

Secondly, the idea occurred to me that the maintenance of camber in the descending vulture might be due to direct muscular action. I had some recollection of a muscle that I had found in the wing of a vulture that appeared to be capable of producing this adjustment.

After my return to Agra I put these theories to the test by dissection of an adjutant bird of nine feet span, and later on of a vulture of seven feet span.

Firstly, with regard to the idea that change of camber may be due to muscular action, as I expected I found a muscle that originates on the lower end of the humerus. Its tendon does not run straight, but follows a somewhat curved course with its convexity backwards. This tendon is inserted into the lower end of the ulna. As shown in Fig. 28, extensions from this tendon go to the membrane that binds together the bases of the outer secondary quills. The result of this arrangement is that, on pulling the muscle, its main tendon becomes straightened. There is, therefore, a pull on the extensions.

The outer secondaries are thereby drawn downwards and also inwards towards the body of the bird. This displacement of the secondaries is in effect an increase of camber, but the action is slight. It cannot therefore be denied that the action of this muscle may have to do with the maintenance of camber. But its possible action does not seem proportionate to the effect actually observed,

and it appears more probable that the chief function of this muscle is of a less important nature, such as arranging the feathers on furling the wing.

Secondly, I investigated the relation between change of camber and change of flexing. On holding the wing loose in the hand and

extending and flexing the different joints, no certain effect on camber can be observed. But a different result accrues when the wing is held firmly by clamps attached to the radius and ulna. It is advisable to clamp the wing horizontally and upside down so that the weight of the quill feathers to some extent imitates the effect on them of the pressure of the air when in use. On fully extending a wing so clamped, the camber is seen to be at its maximum. Flexing at the elbow joint is found to have only a slight effect in describing the camber. On flexing at the carpal joint the camber decreases

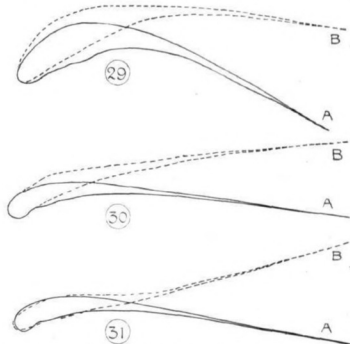


Fig. 29.—Sections of wing of an adjutant at elbow-joint, at A with wing extended, at B with wing flexed. For taking these sections the wing was held upside down. The quill feathers assumed the position given to them by their own weight only.

Fig. 30.—Sections of wing of an adjutant taken at junction of middle and inner thirds of the wing. For taking the sections the wing was held upside down. A weight of 10 grammes was attached to each quill feather to imitate the effect of air pressure, at A with wing extended, at B with wing flexed.

Fig. 31.—Sections of wing of adjutant taken at junction of middle and inner thirds of the wing, at A with wing extended and a weight of 10 grammes attached to each quill feather, at B with wing flexed and a 30-gramme weight attached.

greatly, the decrease being, within limits, in proportion to the amount of flexing. In certain cases in flex-gliding the alula becomes visible in such a way as to prove definitely that the flexing is carpal. That is to say, in flex-gliding the flexing of the wings is an adjustment that, so to speak, automatically diminishes camber. The more the wings are flexed the greater is the decrease of camber, and the greater is the speed. I shall have to describe these changes in greater detail when I bring forward evidence, in a later chapter, as to the direction from which the energy of soarability is operative.

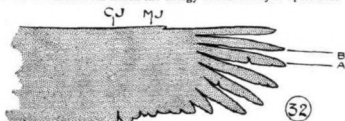


Fig. 32.—Outline of outer part of wing of adjutant when circling with effort to gain height. A, line on prolongation of which is centre of effort of cambered part of the wing; B, line on promulgation of which is centre of lifting effort of phalangeal quills; CJ, carpal joint; MJ, metacarpal joint.

On the other hand I discovered that if flexing is carried out at the metacarpal joint, no effect on camber is produced. This metacarpal flexing retires the wing-tip, as seen in the descending bird, but leaves the wings at their maximum camber.

There can, I think, be no doubt that the peculiar appearance of the descending bird is due to the flexing being metacarpal and not carpal. I propose the term "metacarpal descent" for the mode of descent now under consideration.

In Fig. 29, I show two sections of the wing of the adjutant bird. In each case A represents the section with the wing fully extended, and B the section taken with the secondaries relaxed by flexing at the carpal-joint. For taking these sections the wing was held upside down. The feathers were consequently merely extended by their own weight.

But in actual flight the feathers must be pressed by a force much greater than their own weight. I attempted to imitate this force by attaching a weight of 10 grammes to each secondary while the wing was held upside down as before. This weight was chosen arbitrarily, but I found that a slight increase or decrease of the weight would have but little effect on the section obtained. The results on the camber are shown in Figs. 30 and 31. It will be seen that with the wing flexed the camber is greatly diminished.

With the aid of the facts now described, it is possible to make a suggestion as to the nature of the adjustment by which the tractive and lifting effort of the cambered wing is put out of action in metacarpal descent.

In Fig. 32 I have drawn the outline of the outer part of the wing of an adjutant as seen when it is circling in not fully soarable air. The line, A, is the line, on a prolongation of which is the centre of effort of the cambered part of the wing. B, represents the line on which is the centre of lifting effort of the phalangeal quills. Thus between A and B there is a couple tending to tilt up the wing or to maintain its angle of incidence.

In Fig. 33 I have represented the outline when the bird is in metacarpal descent. The wing tip is shown retired by flexing at the metacarpal joint. The centre of effort of the cambered part of the wing is on the line A. The centre of effort of the wing tip is on the line B. But as this line, by the retirement, has been displaced backwards, instead of a couple tending to maintain the tilt of the

wing, there is a couple tending to decrease its tilt. That is to say the new position of the wing tip results in a tendency to diminish the angle of incidence of the cambered part of the wing.

I think we may regard it as a fact that when the bird changes from ease-gliding or circling to metacarpal descent, it has changed from a mode of flight in which it takes energy from the air to a mode of flight in which it no longer takes energy from the air. The only known change in the disposition of the wings is the retirement of the wing tips. If the wing no longer takes energy from the air it is

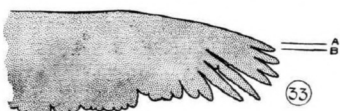


Fig. 33.—Outline of outer part of a wing of an adjutant when in metacarpal descent. A, line on prolongation of which is centre of effort of cambered part of the wing; B, line on prolongation of which is centre of lifting effort of phalangeal quills.

difficult to imagine that its angle of incidence is the same as before. As may be observed, the angle of incidence is certainly not increased. It is, therefore, probable that retirement of the wing tip either facilitates, or more probably causes, a decrease or abolition of the angle of incidence.

When descending in a strong wind, another mode of descent may be adopted. Flexing of the wings is increased to a greater extent than that usual in fast flex-gliding. The bird accordingly drops through the air feet foremost with the flexed wings extended horizontally. The alula is usually advanced. This mode of descending may be termed "carpal descent." At the end of a metacarpal descent, when speed has sufficiently diminished, there is often a change to carpal descent by further flexure of the wings. I shall describe cases of carpal descent in detail on a later occasion. In carpal, as in metacarpal descent, the angle of incidence appears to be abolished.

The smaller birds frequently descend by a method of a totally different nature, namely, by increasing the angle of incidence without change of course. On a later occasion I shall describe the nature of the adjustment by means of which this change of disposition of the wings is produced.

In carpal descent flexing is chiefly at the carpal and elbow-joints. In diving flexing also occurs at the shoulder-joint, with the result that the greater part of the area of the wings is brought behind the level of the centre of gravity, as shown in the accompanying Fig. 34.

I may close this chapter by considering a point in nomenclature. In speaking of rotation of a wing or of a wing-tip in the preceding chapters, I have implied that the rotation was in such a direction as to lower the anterior margin. As such rotation results in the wing or the wing-tip becoming depressed, it might be described as "rotation downwards." Similarly, in speaking of rotation of the body of the bird round the transverse axis, it will be convenient to describe as "rotation downwards," rotation that depresses the beak and raises the tail. Rotation in the opposite direction, whether of the body round its transverse axis, or of the wings, may be described as "rotation upwards." I shall have occasion to mention cases of rotation upwards when I come to describe my observations on flapping flight.

(To be continued.)

THE MANVILLE PRIZE.

ON Wednesday of last week, the final day of the competition for the Manville prize for the best aggregate flight on an all-British machine with a passenger, attempts were made by Mr. Cody at Aldershot and Mr. Pixton at Brooklands to improve their records. The result was a win for Mr. Pixton, who was already leading, on the Bristol biplane. During the eight specified days on which flying for this prize had been permissible, Pixton had placed an aggregate of 187 mins. to his credit, while Mr. Cody was second with 156 mins. The latter intended to start early on the morning of the 4th inst. to try and improve his position, but a northerly gale put flying out of the question. It was not until ten minutes to five

in the afternoon that Mr. Cody was able to get under way, and then he was flying until 5.30, at which hour the competition finally closed. Mr. Cody's record was thus 196 mins. At Brooklands, however, Mr. Pixton was in the air for 129 mins., and so he was an easy winner of the £500 Manville prize with a lead of 120 mins. It will be remembered that Mr. Pixton learnt to fly on the Avro biplane, and it was on this machine that the first portion of his aggregate flights for the Manville and Brooklands competition was carried out. The latter and major part, however, of his flying has been accomplished on a Bristol biplane, on which he has not hesitated to go up when the wind has made the conditions distinctly unpleasant.

FIRE AND THE AEROPLANE.

Of late months so great a percentage of aviation fatalities have been directly attributable to the escape and ignition of petrol on aeroplanes that it is surely high time for designers to devote their careful attention to eliminating as far as possible this source of danger. Those who are directly connected with the mathematical side of the question, with the quest for greater efficiency, greater speed, and greater stability are, in the excitement of the quest, prone to disregard the subject from the standpoint of the aviator's safety.

Every accident that has occurred in the aviation world has, in a manner, been valuable in pointing out certain weaknesses—either peculiar to the pilot or to the machine.

The former's shortcomings can only be deplored, as all the writing in the world would not serve to effect any difference, but in the latter case we opine that every single accident should be carefully analysed, the remedy decided upon, and every effort be expended to render such a recurrence an absolute impossibility. Yet, considering the magnitude of this danger of fire, what steps have been taken to eliminate it since Louis Blériot, at the first Rheims meeting, fell to earth from a height of 60 feet—a mass of flames?

One would have thought that this accident would have forewarned constructors to devote careful consideration to the absolute insulation of the petrol reservoirs and supply pipes.

In some cases flexible rubber couplings were inserted in the petrol pipes to prevent the vibration from deteriorating the quality of the soldered joints; in others, *cloisons* or partitions were fitted in the tanks in an effort to strengthen them and, at the same time, to prevent undue washing of the fuel from end to end. Neither of these efforts were serious enough to help materially in diminishing risks from fire.

Let us for a moment analyse those fatalities that occurred between May 18th and September 12th of this year. In all 38 mortal accidents have been recorded during this period. Of these, nine have been ascribable to fires. For the remainder of these accidents the following list gives the various causes and the number of deaths in each case that they are responsible for:—

Inexperience ..	9	Equilibrium destroyed	
Engine failure ..	3	through severe wind gusts	7
Drowned ..	2	Trick flights	1
Structural ruptures	2	Cause unknown	5

It will thus be seen that fires account for as many deaths as inexperienced, and considerably more than each of the other causes enumerated.

The appended list will serve to still further analyse the causes of these disasters, and it is significant to note that, with one exception, all the fires here recorded have occurred on engine-in-front machines that employ the fuselage as a feature of the design.

Date.	Names.	Type of machine.
May 18 ..	Pierre Marie Bournique	.. Monoplane
	Lieut. Dupuis (passenger)	
May 28 ..	Cirri	.. Monoplane
June 8 ..	Marra	.. Biplane*
June 18 ..	Lieut. Princeteau	.. Monoplane
	Landron	.. Monoplane
Sept. 2 ..	Lieut. de Grailly	.. Monoplane
	Marron	.. Biplane†
Sept. 4 ..	Lefrestier	.. Monoplane
	* Engine behind.	† Engine before.

Further, in each case the burning of the machine and pilot has been directly caused by the bursting of the petrol tank and the escape and consequent ignition of the spirit through coming in contact with the hot engine. In one of the instances mentioned there is cause for doubt—that of the case of Marron, who met with a mortal accident on a Savary biplane. According to some reports the tanks burst, but the spirit did not become ignited until one of those who ran to his assistance lit a match. Marron was flying in the dark when the accident occurred. In addition, this bears out, in a remarkable way, the assumption that the fires have been caused by contact of the petrol with hot *air cooled* engines rather than by water-cooled ones or rather than by sparks leaking from the electrical ignition system, for to the best knowledge of the writer this single exception on record where the tanks have burst and not become ignited was connected with a biplane equipped with a water-cooled engine. Some are of the opinion that the hot engine would be insufficient to ignite petrol.

In contradiction to this statement it must be remembered that the incandescent particles of carbon that are invariably present in internal combustion motors are quite sufficient to bring about the ignition of the spirit. As a proof of this the writer has, on more than one occasion, noticed that, in priming a hot Gnome engine, the injected petrol has become ignited. Little fear need be entertained from fire resulting from a stray spark, for machines nowadays are, with scarcely a single exception, fitted with magneto ignition, and this organ would in a case of a smash have ceased to generate current by the time the tanks had burst and the petrol had escaped.

How then can these fatalities be avoided? For in every instance mentioned the unfortunate pilots would have been living to-day if it had not been for the escaping of the fuel. The chief source of trouble is the rupturing of the tank itself. A broken supply pipe would not be so serious a matter, for the fire resulting would scarcely be of sufficient magnitude to prevent the pilot from making good his escape.

To the material from which the tanks are made—sheet brass, for the most part—and to the way in which this unsuitable metal is unsuitably soldered in the manufacture of the tank, must be attributed the chief trouble. If these tanks were replaced by ones made of 1 or 2 mm. mild steel, the cylindrical centre portion drawn after the manner of weldless tubing, with the dished ends stamped or pressed from the sheet and securely welded in position, a recurrence of tank rupture would hardly be in the bounds of possibility. Again, the method of mounting the tank and the position it occupies with regard to the rest of the machine is a matter of the utmost importance. The reservoir should naturally be arranged at the centre of gravity (or pressure) of the machine, or at least at a point on the vertical line passing through this centre. It would be preferable to strap it in position by means of very wide steel clips fastened strongly to the top two longitudinal members of the main body. Mounted in this position the chances of the tank becoming mangled in the smash are remote in the extreme, while the width of the clips would avoid any tendency of the tank to buckle or slit at the points of support. The practice of arranging an auxiliary tank of large capacity below the front part of the fuselage is one that should be severely condemned, for in case of chassis failure the reservoir could never be expected to survive actual and violent contact with the ground. A tank fitted in this way was responsible for the fatal accident to Lieut. Princeteau at the start of the European circuit.

As for the supply pipes from tank to engine, the use of armoured petrol-proof rubber tubing, much after the style of that used to connect gas rings, might be recommended.

Of those cases of the machine catching fire in the air little need be said, for the causes are more simple. Blériot's accident at the first Rheims meeting when the engine of his old low-centre-of-gravity No. 12 monoplane caught fire must be ascribed to the breaking of a petrol pipe directly above the engine. This could be remedied by replacing the rigid supply tubes by the flexible kind mentioned above and by conducting it to the carburettor without passing it above the engine.

Another cause, perhaps the most likely one of fires occurring in flight, is the back-fire owing to the improper closing of the inlet valve. A mishap of this kind recently occurred to Hamel while flying from Hendon to Windsor. He was using a rotary motor. A counterweight of one of his inlet valves broke, with the result that the automatic valve remained open owing to centrifugal action. The charge in the crank case fired and petrol became ignited at the "injector" jet. Had he not been fairly near terra firma at the time it is quite likely that the heat of the flame would have melted off the connecting nipple, and the burning of the increased flow of fuel would have been serious. As it was, he had the presence of mind to turn off his petrol and *vol plane* to earth, and so risk was avoided. The remedy in this case would simply mean the fitting of one or a series of gauges in the induction pipe.

The use of solid petrol, a commodity which is yet in the experimental stage, should absolutely prevent the recurrence of fatalities due to fires on aeroplanes.

But apart from this, and still using fuel in the liquid state, it is really by no means a difficult proposition to tackle, and if due consideration were afforded to the prevention of such disasters, they might be absolutely banished, much to the relief of the aviator who possesses a natural objection to the prospect of being helplessly grilled.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 10th inst., when there were present—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. H. C. L. Holden, C.B., R.A., F.R.S., Prof. A. K. Huntington, Mr. Mervyn O'Gorman, Mr. C. F. Pollock, Mr. A. Mortimer Singer, and Harold E. Perrin, Secretary.

New Members.—The following new Members were elected:—
Lieut. Kenneth Mason, R.E., and Lieut. Charles Benjamin Wilson.

Aviator's Certificate.—The following aviator's certificate was granted:—

145. Lieut. E. J. Strover (Bristol, Salisbury).

The Manville £500 Prize.

The competition for the prize of £500 offered by Mr. E. Manville closed on Wednesday, October 4th. The certificates of the flights recorded in the competition were examined by the Committee, and the prize was unanimously awarded to Mr. C. H. Pixton.

The recorded flights of Mr. Pixton at Brooklands were as follows:—

May 6th, 1911	...	31 mins.	...	Avro biplane.
May 20th, 1911	...	49 "	...	Avro biplane.
June 24th, 1911	...	31 "	...	Bristol biplane.
July 15th, 1911	...	1 hr. 16 "	...	Bristol biplane.
October 4th, 1911	...	2 hrs. 9 "	...	Bristol biplane.

Total ... 5 hrs. 16 mins.

The following are the specifications relating to the machines used by Mr. Pixton:—

Avro biplane.—Motor, 30-h.p. Green; carburettor, Trier and Martin; magneto, British Bosch; sparking-plugs, Lodge and Gnat; propeller, Avro.

Bristol biplane.—Motor, 60-h.p. E.N.V.; carburettor, White and Pope; magneto, British Bosch; sparking-plugs, Lodge and Gnat; propeller, Bristol.

Mr. S. F. Cody made three flights in this competition, making a total aggregate of 3 hrs. 16 mins., using the Cody biplane fitted with a 60-h.p. Green, Zenith carburettor, British Bosch magneto, Pyramid sparking-plugs and Cody propeller.

British Empire Michelin Cup (No.2).

This competition closes at sunset, 5.8 p.m., on the 15th inst. The following competitors have entered:—

F. P. Raynham (Avro), R. C. Kemp (Flanders monoplane), S. F. Cody (Cody biplane), C. L. Pashley (Humber monoplane), H. J. D. Astley (Birding monoplane), D. Graham Gilmour (Bristol monoplane), H. C. Pixton (Bristol biplane), and J. L. Longstaffe (Howard-Wright biplane).

The course is a cross-country circuit of 125 miles, and competitors may select any of the following circuits. The respective official observers' names are in brackets:—

Hendon (Harold E. Perrin), Bedford (H. L. Foster), Huntingdon (E. Jolly), Cambridge (C. A. Branstone and V. M. Studd).

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Women's Aerial League (227, Strand, W.C.).

The autumn season of the Women's Aerial League was inaugurated on Tuesday last by an "At Home" at the Inns of Court Hotel, at which an address was given by Mrs. Maurice Hewlett. After relating her earlier experience as a flyer, and the difficulties she had to overcome, Mrs. Hewlett urged her audience to do all in their power to arouse public opinion so that the cause of aviation might go forward in this land. She also said that British manufacturers ought to take up licences from French firms for building the best machines, as the trade is being injured by the copying of successful machines without licence.

With a view to giving to Boy Scouts a specially simplified aeronautical training, useful for scouting purposes, the

Amesbury (G. B. Cockburn), Swindon (J. C. Crowley), Henley (J. A. W. Katty), Alton (A. J. Martin).

Brooklands (G. F. Joseph and W. E. de Whittaker), Shoreham (W. Pettett), Winchester (Gordon J. Petter).

Lafin's Plain (Lieut. A. G. Fox, R.E.), Andover (Henry G. Gale), Reading (Alfred E. Newton), Hemdon (Harold E. Perrin), Brooklands (G. F. Joseph).

The circuit must be completed between the hours of sunrise and sunset.

October 14th ... Sunrise, 6.22 a.m. ... Sunset, 5.10 p.m.

" 15th " ... 6.24 " ... 5.8 "

Flights on Sundays.

The following notice has been issued to all aviators:—

"The Home Office has written to the Royal Aero Club with regard to the interruption caused to Divine Service by flights on Sundays, and the Committee therefore appeals to all aviators to refrain from making any flights over or near churches on that day."

F.A.I. Conference.

The annual conference will be held at Rome, commencing November 1st, 1911, and the following delegates will represent the Royal Aero Club:—Mr. R. W. Wallace, K.C. (Chairman), Capt. Bertram Dickson, Mr. Frank K. McClean, Mr. Mervyn O'Gorman, Mr. A. Mortimer Singer, and Harold E. Perrin (Secretary).

International Code of Aeronautical Signals and Signs.

The question of establishing an international code of aeronautical signals and signs will be considered at the conference of the Fédération Aéronautique Internationale in Rome in November next, and the Committee of the Royal Aero Club will welcome any suggestions from aviators, aeronauts, airship pilots and others interested in the movement.

It is proposed to hold a meeting shortly to go thoroughly into the question, and suggestions are invited on the following points:—

Signals placed on the ground.

Communication between an aviator when flying and persons on the ground.

Aeronautical maps.

British Empire Michelin Cup, £500.

Intending competitors are again reminded that the competition for this year closes on October 31st.

The minimum distance to be covered in order to qualify for this prize is 250 miles.

This prize can be competed for on any recognised flying ground.

Entries must be sent to the Royal Aero Club, 166, Piccadilly, W., from whom full rules can be obtained.

The Brighton-Shoreham Aerodrome has deposited with the Royal Aero Club the sum of £50 to be awarded to the competitor who makes the longest flight (not being less than 250 miles) in the above competition at the Brighton-Shoreham Aerodrome.

Presentation to the Club.

Mr. J. L. Longstaffe has kindly presented four mounted heads of Indian game to the Club.

HAROLD E. PERRIN,

166, Piccadilly.

Secretary.



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With a view to giving to Boy Scouts a specially simplified aeronautical training, useful for scouting purposes, the

Young Aerial League, formed some two years ago under the auspices of the Women's Aerial League, have submitted to Major-General Baden-Powell a scheme for the formation of a special branch of the League to be called the 'Boy Scouts' Division. The principal objects of the new branch would be:

(a) to provide a new field of action in which the Boy Scouts' services to their country would be of very great value, for, in case of invasion by an enemy's air fleet, with their special training they would be able to identify machines in flight, estimate their height, speed, direction, &c., and report to the right authorities; (b) to develop the inventiveness and powers of observation of the scouts; (c) to provide an elementary course which will be a sound foundation for those wishing

afterwards to study the subject further with a view to entering some branch of the new industry.

It is proposed that Boy Scouts should receive instruction in Aerial Navigation in its relation to Scouting, as well as in the general principles of aeronautics, and it is hoped that by the method of instruction embodied in the scheme, the boys will be able to report, concisely and accurately, full information concerning any air-craft flying over the country.

MODEL CLUBS.

Blackheath Aero Club (5, LIMESFORD ROAD, NUNHEAD, S.E.).

The Club has now secured a private flying ground conveniently situated near Lee Green tram terminus and during the past week a number of splendid flights have been made. Several members have also had to indulge in some tree-climbing, greatly to the amusement of the other members and spectators.

A large variety of models have been in evidence lately, as one or two members are experimenting with original types of models and planes in an endeavour to prove their own pet theories.

There will be a special meeting to-day, Saturday, at 3 p.m., at the "Kidbrooke Aerodrome," and impromptu competitions will be arranged on the ground. Afterwards members will be shown the new "Lee Aerodrome," where they will meet in future, except when otherwise advised. On each Thursday evening (until further notice) there will be demonstrations of illuminated model flying from 7.30 till 9 p.m. Further particulars will be supplied on application to Mr. A. Rippon, Hon. Sec., at the above address.

Bristol Model Flying.

A MODEL aeroplane meeting will be held on the Downs (Sea Walls) to-day, Saturday, at 3 p.m. sharp. Will competitors note to bring their machines with them instead of leaving them behind. For particulars address, R. V. Tivy, 3, Royal York Crescent, Clifton, Bristol.

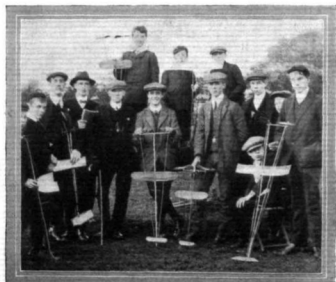
Conisburgh and District Model Aero Club.

At last Saturday's meeting a good field was got together for the model flying, and although the afternoon was marked by an extraordinary number of smashes, which occurred owing to the strong wind, some sound work was got out of the machines. The result of the club contest was: (1) F. J. Wright, 630 ft., 37 secs., (2) J. E. Dickinson, 270 ft., 20 secs., G. N. Wilton, T. S. Wallis, S. Forster and C. C. Allport also taking part in the competition.

Leeds Model Aero Club (5A, HULLAND ST., HUNSLY RD.).

On Saturday last a meet was held on Woodhouse Moor, when some very good flights were witnessed. Enquiries respecting the Club are invited from residents of Leeds and district, as surely there are more than 20 in all Leeds interested in this fine pastime.

Will F. Hoggett who published particulars of his 102.



Conisburgh and District Aeroplane Society Meeting on Saturday last.—Some of the competitors. The winner, F. G. Wright, is the second, with a model, from the right, and J. E. Dickinson, who got second place, is standing highest at back.

model in FLIGHT a fortnight ago, kindly communicate with the Hon. Sec. at the above address.

Liverpool Model Aero Club (39, BROOK ROAD, BOOTLE).

At the meeting on Saturday last, W. S. Ledward took first place with a flight of 21 seconds duration, A. G. Pugh, second, with 12 seconds.

The people about here are becoming quite intelligently interested, actually ceasing to watch their beloved football, and new members are coming in. Still others are wanted, and the Secretary asks those interested to attend the General Meeting which will be held at the above address on the 20th inst. There will be a committee meeting on the 17th.

To-day, Saturday, an unofficial flying meeting will be held on the Waterloo shore at 3 o'clock.

Manchester Model Aero Club (40, BIGNOR STREET, CHEETHAM).

EXCELLENT flights were again the order of the day on Saturday at the Trafford Park Aerodrome when the Model Club held a meeting there. The record flight for the afternoon was 1,104 feet, but there were numerous flights ranging between 600 and 1,000 feet. One model flew for 42 secs. and at one time was entirely lost to sight. Another caused excitement by skimming above the heads of the spectators.

Another meeting will be held to-day, Saturday, at 2.30 p.m. at the same place. Mancunians and others interested in models would be made very welcome by the officials of the Club.

Scottish Aeronautical Society Model Aero Club.

BRILLIANT weather attended the meeting of the flying members last Saturday at Bannock Aerodrome. Mr. Jas. Balcanal started well right from the beginning, his first flight being 43 seconds, which he rapidly improved upon during the afternoon. Mr. J. S. Gordon, however, had the best flight of the day, the duration being 53 seconds, which is an advance of 12 seconds on the old Scottish record held by Mr. Gordon.

Afterwards some excellent flying was done for the benefit of a cinematograph operator, who had a lively time of it endeavouring to focus his machine properly at the elusive models. The day's work showed a great improvement in model flying, the average flights of the leaders being between 40 and 50 seconds.

A meeting of hydro-aeroplanes will be held at the Boating Loch, Great Western Road, Glasgow, to-day (Saturday) at 3.30 p.m. prompt. A full attendance of members is requested. Glasgow readers of FLIGHT who are not members are cordially invited to attend.

Sheffield Model Aero Club (35, PENRHYN ROAD).

A GENERAL meeting will be held at the Wentworth Café, Pinstone Street, opposite St. Paul's Church, on Wednesday, October 18th, at 8 o'clock. All members and model enthusiasts should endeavour to be present at this meeting as some very interesting items will be made known.

Mr. T. Pashley was the winner of last month's competition with a flight of 250 yards.

A Sheffield Model Meeting.

A MODEL flying competition is to be held under the supervision of Mr. W. R. Blake to-day, Saturday, weather permitting at Millhouses, Sheffield. All competitors to be at the Millhouses car terminus at 2.30 p.m., and flying to commence at 3 p.m. prompt. The entrance fee is 6d. for each model, to be paid to Mr. W. R. Blake, West Street, Sheffield. The prizes will be the entrance fees divided up into three prizes, and they will be awarded for length, height and duration.

Suggested New Model Clubs.

Mr. L. MARLOW, 30, Fairfield Road, Manningham, Bradford, wishes to know whether there is a Model Club in the neighbourhood, and if not whether anyone interested would communicate with him so that one might be formed. It is also proposed to form a Model Club in Aberdeen and particulars can be had from Mr. W. R. Anderson, 68, Mile End Avenue, Aberdeen.



Memorial to the late Hon. C. S. Rolls.

On Thursday next the 19th inst., the statue of the late Hon. C. S. Rolls which has been executed by Sir W. Goscombe John, R.A., and erected in front of the Shire Hall, Monmouth, will be unveiled by Lord Raglan. As a considerable sum is still required to cover the entire cost of the memorial the Mayor of Monmouth has made another appeal for subscriptions, which should be sent to the honorary treasurer, Mr. H. T. Simmonds, Agincourt Square, Monmouth.

FROM THE BRITISH FLYING GROUNDS.

Brooklands Aerodrome.

WEDNESDAY, October 4th, being the last day for the Manville and also for the Brooklands Aggregate Prize, opened in a perfectly appalling manner. As early as 6.30 the wind was about 12-15 m.p.h. Porte, who wanted to go to Farnborough, after doing a couple of circuits with Bell as passenger on the Deperdussin two-seater, decided that it was too bad and came down. Pixton ascended with his E.N.V.-Bristol and flew a circuit. Even he thought it was too bad. However, later on it rained hard, and afterwards got moderately calm. A lot of excellent flying was seen. The account of this day is recorded on p. 893.

On Thursday rain and wind prevented any early morning flying. Mr. Passat brought his seagull monoplane out, and despite the wind tried to do some flying. Luckily, the engine was not sufficiently powerful to gain flying speed, so no harm was done. Being of peculiar construction, the machine came in for a good deal of criticism, which was taken very good-naturedly by its owner.

Thursday evening was rather gusty, but Bell took up Mr. Garne as passenger on the Deperdussin two-seater, and Fleming tried the E.N.V.-Bristol and carried a passenger. The Howard-Wright biplane was out, but did not do any circuits, owing to some slight mishap in rolling for a start.

Friday morning was perfectly calm but rather misty. Quite a lot of flying was got in, though. S. V. Sippe flew some circuits on the Avro-biplane. The Walton and Edwards machine made some good straight flights and then retired for adjustments. Blackburn informs me that he is getting it into excellent shape now, and that the balance is perfect, so that we shall expect some circuits soon. The Howard-Wright, with Longstaffe, was flying circuits very strongly, the Green engine running like a clock. Kemp flew some low circuits on the Flanders monoplane. He lost his cap at one of the corners, and spent the best part of the early morning looking for it. Lieut. Wilkins and Capt. Richey of the Deperdussin school were out rolling and doing straight flights, and Spencer took his pupil, Mr. Frank Ballard, for a flight, then handing the machine over to him for some straight flights. At about 10 o'clock Porte and Bell set off for Farnborough on the two-seater Deperdussin. They reached there safely, and gave a demonstration before the War Office authorities. In the evening Moorhouse arrived on his Blériot from Hantington. He gave us an excellent demonstration of what a Gnome Blériot can do if it is put to it. S. V. Sippe flew some circuits on the Avro biplane, and then Young made some excellent straight flights at about 10 or 15 feet, Venkatasubba Setti following with some rolling practice.

Saturday morning was rather breezy, and so not much flying was indulged in. Pizey, on the Bristol, took up Major Benwell for a

passenger-instruction trip. Raynham flew a couple of circuits on the Avro, but found the wind too bad. The rest of the day was windy, but Moorhouse turned out on his Blériot and gave us a fine exhibition flight. The way he twists and turns reminds one of a seagull, and his ascents give us cold shivers down the back.

Sunday was a perfect flying day. Misty in the early morning, it turned out fine after breakfast. Porte came back from Farnborough, and Richey was out on the Deperdussin straight flying, whilst Young was doing the same on the Avro, but unfortunately fell in the landing-chassis came adrift and broke the propeller. In the evening every one turned out. Gustav Hamel was down, and flew the "Big Bat" for some circuits; it does not seem to have any power in it now, and will not rise as it used to. Graham Gilmour was flying on the Bristol; he gave us an exhibition of trick flying in his own inimitable style. Pizey and Fleming were also up. The Elephantoplane indulged in straight flights, and Snowdon-Smith and Blondeau were out on their Blondeau-Farmans.

Monday morning was very windy so that no flying was got in. In the evening Mr. Moorhouse went up on his Blériot. He found the wind very strong but continued for nearly half an hour, getting tossed about a lot.

Tuesday morning was glorious and the Deperdussin school assembled in force. Bell took up Sabelli for a passenger trip and then the school 'bus was brought out. Garne flew a circuit of about 150 ft., this being his first. He is very glad he has got past the straight flight stage. Richey and Wilkins were making good straight flights, as also was Chataway. The whole batch of pupils will be in the breeze stage soon. Maj. Benwell was up with Pizey, as also were Lieuts. Harford and Harrison. Frank Ballard was making straight flights on the Spencer, and Graham Wood gave an exhibition on the Blondeau-Farman. In the evening, Moorhouse flew on his Gnome-Blériot. Jumping up into the air at a terrific angle he first flew a few circuits, and then disappeared in the direction of Hendon on his way back to Huntingdon. Cecil Pashley had the Humber monoplane out, and made some straight flights. One of the plug wires was shooting out to the frame, so he brought the machine in. Pizey was flying with Lieut. Harford as passenger, and Kemp got in a couple of circuits on the Flanders monoplane. Afterwards Maj. Benwell and Lieut. Harrison had trips on the Bristol, Captain Richey was making straight flights on the Deperdussin, but landed abruptly, unfortunately breaking a skid.

Filey School (Blackburn Aeroplane Co.)

BEYOND a few flights by Mr. Oxley there has been very little flying during the past week owing to the wind. On Sunday he put in a good morning's work and made several trips over the Bay.



Mr. Gustav Hamel arriving last week at Bushey Hall Golf Club on his Blériot monoplane. He is seen just descending on the fifth green after having flown the seven miles from Hendon in about 5½ mins.

Lanark Aerodrome.

The ideal weather which continued throughout last week gave the school a grand opportunity for flying, and more work was got through during the week than was ever possible since the school opened. Two of the pupils, Warren and Jackson, are now ready to take their brevets on the Deperdussin, the same machine which Mr. Ewen recently used to cross the Firth of Forth. The fact of these two pupils joining at the same date and being ready to take their certificates together certainly proves the systematic method of teaching adopted to turn out pilots. Another hangar is to be erected, and Mr. Barnwell, of Stirling, who won the £50 offered to the first Scotchman to fly a mile, is bringing his monoplane to the school so as to continue his experiments on a more suitable ground.

Nield still indulges in short flights, which keep getting longer every day, while Warren and Jackson are attempting half circles.

On Thursday afternoon, after Warren had been practising landing from heights of 30 to 50 feet, Mr. Ewen took the Deperdussin out and made the five figures of eight necessary for one set of the brevet test, at a height of about 400 feet.

Saturday afternoon saw Mr. Ewen start away on a flight to Glasgow. Rising rapidly to a height of 1,000 feet, he crossed over the outskirts of Lanark, and following the Glasgow railway disappeared in the distance. After flying about eight miles he ran into a bank of fog, which made it impossible for him to see any distance, so he gave up further attempt for the time being and returned to the aerodrome.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—There is unfortunately little to record this week of the doings of the school, partly by reason of the inclement weather, and partly because all energies are centred on the completion of the shops that are being installed with machinery for the more extensive construction of air-craft. This plant should be in full working swing within a week or ten days. On Sunday he in full working swing within a week or ten days. On Sunday evening, however, Lieut. Parker and one of the Gnome-Farman made three good flights, each of about ten minutes' duration. From thence nothing occurred until Tuesday evening, when Mrs. Stocks flew several circuits of the aerodrome at a height of 100 ft. on Grahame-White's old exhibition Farman. She terminated this flight with a *vol plané*, and landed perfectly. Mrs. Stocks' progress all along has been very pronounced, and we are confident that she will graduate into one of the foremost of the world's lady aviators. Salmeston was out flying his Gnome-Bleriot during the evening, and continued for a considerable length of time over the surrounding country.

Portholme Aerodrome, Huntingdon.

Mr. W. B. R. MOORHOUSE, after his essays the previous week, was last week making a series of remarkably successful flying trips. On the Monday, he, on his Gnome-Bleriot with Chauviere propeller, made four good flights in the morning, travelling well outside the aerodrome, in the afternoon putting up a further five flights, again outside the aerodrome, keeping well up at above 2,000 ft. or so. The next day he flew from Huntingdon to Northampton, accomplishing the distance (4½ miles) in the half-hour; most of the time being at an altitude of fully 1,200 ft. Mr. Moorhouse is a fearless flyer, and merely took in Northampton, having started there via Bedford, Turney and Yardley Hastings en route, during a visit to his parents' house, Spratton Grange, a few miles northward of Northampton. This was Mr. Moorhouse's first cross-country flight, and the machine he was using was the identical Bleriot on which Mr. Morison not so very long ago took a dip into the Channel near Folkestone. On his return journey to Huntingdon Mr. Moorhouse again passed over Huntingdon, and continued on by Wellingborough and Kettering, reaching Portholme at 3½ p.m., having started a little after 2 p.m. from Spratton. On Wednesday and Thursday work was in progress on the new Radley-Moorhouse monoplane, but on Friday Mr. Moorhouse resumed his cross-country work by flying from Huntingdon to Northampton, where, after partaking of lunch, he struck out again for Brooklands, encountering en route some extremely gusty winds and fogs, although he rose to a height of 4,000 ft. to get away from this trouble. Saturday afternoon, testing was again the chief work on the R. and M. monoplane, which appears to be working very successfully, as he, during the day, was up on the machine and actually passed for his certificate on it. Mr. Morison subsequently had a flight

round in the new machine and appeared to be well satisfied with its behaviour.

On Tuesday last Mr. Moorhouse left Brooklands in his Bleriot for Huntingdon, but running short of petrol near Cambridge, he came down at Parkers Piece, having made a magnificent gliding descent commencing at about Trumpington, two miles south of Cambridge. He flew on to Huntingdon on Wednesday morning at 6.30 a.m.

Salisbury Plain.

JULLEROT, on Monday last week, took Mr. Stanley White, the managing director of the British and Colonial Aeroplane Co., for a flight round the 5-kilom. course, which has been laid out for speed tests, &c. He next went up with Mr. Harry Delacombe for a trip over Fargo and Stonehenge, afterwards making two trial solos on Nos. 43 and 19. Busted carried Mr. Smith Barry, a very promising pupil, for lessons in *vol plané*, following with a solo, after which Baron Roenne was taken up as passenger by this instructor for several circuits. Baron Roenne is a well-known aeronautical and aviation enthusiast. Pupils' solo flying followed, Lieuts. Cross and Stover, and Mr. Smith Barry each flying twice, and Mr. Mellersh once. Hotchkiss took Mr. Lang, who is concerned with propellers, for a flight.

The two-seater monoplane was then brought out, Prier putting in a solo, then taking Baron Roenne, exhibiting a very fine turn of speed. In the evening, conditions continuing favourable, Busted started things off by taking Mr. Hooper as passenger as far as No. 2 Pylon of the course. Jullerot carried Baron Roenne for two small circuits, and Prier flew the single-seater monoplane for ten minutes. Mr. Smith-Barry took over machine No. 12, and flew a solo, making a good landing at No. 4 Pylon. Hotchkiss flying the machine back to the hangars. The day's work was brought to a close by Lieuts. Cross and Stover each making good solos.

The next morning was very gusty, and after Gordon England had been up for 10 minutes, with Jullerot as passenger, further work had to be abandoned till the afternoon, when, in spite of a 20-mile-an-hour wind, Busted, England, and Jullerot each made solos. In the evening there was a slight and short-lived calm, during which England took Mr. Dacre, a new pupil, for his first passenger flight, Busted taking Lieut. Hooper. Jullerot followed up with Baron Roenne for a 15-minute's flight, during which he climbed to 1,000 ft., where he found that strong gusts prevented him from rising any higher. He then made a solo, his object being to make a quick climbing trial in order to test a new propeller. He flew a circuit of 3½ miles, rising to a height of 1,200 ft.

Wind flying was again the order of the day on Wednesday. Jullerot, who was out on No. 43, was tossed about in quite an alarming manner, being at last forced to retire from the combat, as the wind was gaining in force every minute. Needless to say no further flying was possible during the day.

The wind had all its own way throughout the next day, not one calm moment being vouchsafed to tempt the pilots into the upper regions. There was, however, plenty doing in the hangars.

Busted ventured up for a short trial on Friday, but found the wind was too aggressive to permit any further work. A calm was forthcoming a little later when Pixton, first making a solo, took Mr. Dacre, after which Lieuts. Cross and Stover, and Messrs. Hooper and Lee, each made solos, Prier following up with supplementary tests of the single-seater.

Busted tested conditions on Saturday. Mr. Smith Barry following with a solo. Busted took up Mr. Mellersh, and Jullerot Baron Roenne. Lieut. Stover secured his certificate, observed by Mr. Cockburn and Busted. He showed a wonderful control over his machine, and two of his *vol planés* from 300 ft. with engine partly shut off were quite masterly. Lieut. Stover joined the Bristol school on September 2nd, and was away for about ten days during his course, so that his time of tuition, including days when flying was not possible, amounted to only 3½ weeks a days.



The Gordon-Bennett Balloon Race.

THE Annual Race for the Gordon-Bennett Balloon Trophy has resulted in a victory for Germany. Last year the trophy remained in the United States, being won by Mr. Hawley in the balloon "America II," which covered a distance of 1,171 miles.

This year's race started from Kansas City, and in the Berlin II Lieut. Gericke covered a distance of 440 miles, landing at Halcombe, Wisconsin. An American balloon, the Buck eye, was second with 360 miles, a second German balloon, Berlin I, being third with 330 miles; Condon III (France), fourth, 305 miles; Million Population (United States), fifth, 295 miles; and America II (United States), sixth, 275 miles.

THE AGGREGATE PRIZES AT BROOKLANDS.

WEDNESDAY, the last race day of the season, was from the aviator's point of view a brute of a day. Luckily things quietened down about 4 o'clock in the afternoon, and a great deal of excellent flying was witnessed. Quite a number of cars were lined up beside the palings, and for so late in the year a lot of people assembled.

The first man out was Pixton flying on his E.N.V. Bristol for the Manville prize, carrying as his passenger Lieut. Harford. The wind was blowing at about 22 m.p.h., and very gusty at that, so that one can imagine that Pixton had all his work cut out to control the machine. He flew for 17 mins. 7 secs. and then came down for a rest. Shortly after the rain came down hard, but getting a bit tired in about half an hour passed away, taking with it a good part of the wind. Louis Noel then came out on the Avro, being closely followed by Spencer and Pixton. Kemp, Raynham and Blondeau also flew. The following are the official times:—

		Results.		h. m. s.		L. S. d.		L. S. d.	
April 17	H. Pixton	...	Avro B.	...	1	27	32	30	0 0
May 10	"	...	" B.	...	0	40	17	36	17 6
June 5	"	...	Bristol B.	...	0	58	22	27	0 10
" 17	"	...	"	...	0	39	15	04	13 1
July 20	"	...	"	...	0	10	17	22	5 6
Aug. 7	"	...	"	...	1	43	20	56	19 0
Oct. 4	"	...	"	...	1	48	40	31	12 0
				7 33 43		269 7 11			
June 5	F. P. Raynham	Farman B.	...	1	1	47	62	0 10	
July 20	"	"	...	0	43	37	37	5 6	
Aug. 7	"	Avro B.	...	1	30	25	21	19 0	
Oct. 4	"	"	...	0	29	41	1 12 0		
				3 44 30		122 17 4			
Oct. 4	Noel	...	Avro B.	...	1	34	10	16	12 0
" 4	H. Spencer	...	Spencer B.	...	1	26	25	6 12 0	
" 4	G. Blondeau	...	Blondeau B.	...	1	1	37	1 12 0	
Aug. 7	Chevalier	...	Nieuport M.	...	0	45	0 11 19 0		
June 5	Watkins	...	Howard Wright B.	...	0	38	6 17 0 10		
Oct. 4	Kemp	...	Flanders M.	...	0	35	6 1 12 0		
Aug. 7	Montalent	...	Breguet M.	...	0	35	0 6 19 0		
June 5	G. England	...	Bristol B.	...	0	20	0 12 0 10		
April 17	H. Hamel	...	Bériot M.	...	0	19	3 15 0 0		
May 10	D. G. Gilmour	...	Farman B.	...	0	16	49 21 17 6		
				111 5 2					
				503 10 5					

B. = biplane. M. = monoplane.

Aggregate for season: Pixton, £150; Raynham, £100; Noel, £50. Pixton, it will be seen, won the £30 for day's total and the Manville £500.

Later in the evening Gordon Bell took up as passenger Mrs. Cochrane on the two-seater Deperdussin.

Percival carried a passenger on the "Ouseley Bird." Unfortunately the engine gave out over the sewage farm and "Ouseley Bird" settled down over heavily. No one was hurt, but there were broken skids, planes, &c.



THE NEW VALKYRIE RACER.

This latest emanation from the workshops of the Aeronautical Syndicate, while it presents little or no difference in its broad outline to its Gnome-engined predecessor, is chiefly remarkable for the care that has been bestowed upon the detail design in general and the excellence of the workmanship throughout. Indeed it would be impossible to cite a machine in which these features, especially that of finish, have been the subject of such careful consideration.

The use of aluminium, except for those small lugs which serve as bases for the nuts that tighten the bracing wires, has been altogether discarded and mild steel has been substituted in its place.

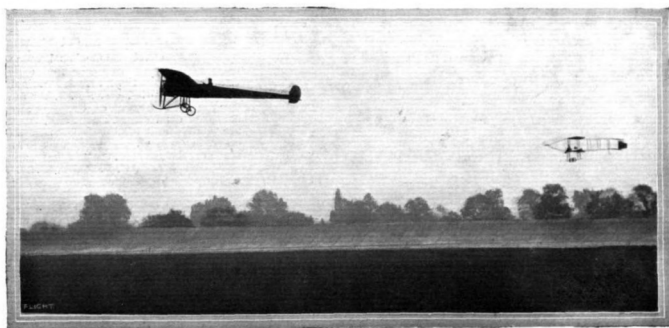
Each welded steel socket is doubly plated, first with a deposit of copper and then with a coating of nickel. This absolutely eliminates rusting and is claimed to be far more effective than if only one deposit were applied. The pressed steel engine bearers, the eye-bolts and even the cylindrical coils of steel wire that are used in place of copper ferrules for attaching wires, are all nickel-plated in a similar fashion.

Mr. Barber has introduced a refinement in the design of the attachment of the heavy gauge wires that brace the wings from the underneath. Each of these wires is threaded and screwed into a conical steel adapter, machined from the solid. To its upper end is bolted a length of stout strip steel which is bent at an obtuse angle, according to the angularity of the particular wire to which it is attached. This angle-piece is applied to the wing spar by a single bolt, from which also depend the wires that cross-brace the wings, that take their weight when stationary, and that take their drift in flight.

At the point where the bolt is passed through, the spar is armoured by a shoe of mild steel embracing its near side. Unfortunately the sketches that we have in preparation of this and other fittings are not ready for insertion. They will appear in next week's issue.

The unit comprising the engine bed and pilot's and passenger's seats is so arranged as to be readily detachable for transportation purposes.

Varnish has been applied to the supporting surface immediately in the wake of the propeller draught in order to protect the fabric from the rotting effect of the oil thrown out by the engine—a 50-h.p. Gnome.



FLYING AT BROOKLANDS ON WEDNESDAY OF LAST WEEK.—The Flanders monoplane, and, over the track, the Avro biplane making circuits.

BRITISH NOTES OF THE WEEK.

Mr. B. C. Hucks Demonstrates at Cheltenham

AFTER his exhibition flights at Cardiff, Mr. point was Cheltenham, where he terminated aviation tour in the west. Some excellent flights were made on the 5th and 7th inst., a special exhibition being given on the Gnome-engined Blackburn monoplane for the benefit of the Cheltenham collegians, who showed the greatest enthusiasm for the treat afforded them. On Saturday, whilst flying at a height of somewhere near 1,000 ft., Mr. Hucks' petrol gave out, but this in no way disconcerted him, as he made a graceful *vol plané* landing without damage in a neighbouring field to the Whaddon Farm, where his hangar was erected.

Hucks' next his recent

Statue of Liberty prize. The Royal Aero Club also propose to suggest the desirability of establishing an International code of aeronautical signals and signs.

Another Aeroplane to be Presented to the Navy.

AFTER considerable correspondence between the Liverpool branch of the Navy League and the Admiralty, the Lords Commissioners have agreed to accept from the citizens of Liverpool an aeroplane, to be subscribed for under a fund raised for this purpose by the Navy League. The necessary amount to procure the aeroplane is £600, and the League ask us to state that subscriptions will be gratefully received by the Secretary, Tower Building, Water Street, Liverpool.

Next Meeting of the F.A.I.

THE meeting of the Fédération Aéronautique Internationale, which takes place in Rome on November 1st, promises to be one of the most important yet held. The agenda is a lengthy one, and, in addition to the revision of the rules of the Fédération, it is proposed to consider the rules for the issue of pilot aviators' certificates. It is also proposed to make some rules concerning the age and weight of passengers to be carried in official competitions. The conditions for the next competition for the Gordon-Bennett Trophy has to be decided upon, while the Royal Aero Club of the United Kingdom will again bring forward its protest in regard to the award of the



Mr. B. C. Hucks' Blackburn monoplane being brought back to the shed at Cheltenham last week followed by an admiring crowd of Cheltenham collegians, for whom Mr. Hucks has just made an exhibition flight.

Thames Conservancy and Aviation.

At first glance one would think the Thames Conservancy had little enough to do with aviation, but at its last meeting a recommendation was received from the Finance Committee that the Home Secretary be asked to issue an order under the provisions of the Aerial Navigation Act, 1911, prohibiting flights over the Thames on the occasions of Henley Regatta or at other times when numbers of persons are expected to congregate on the River or its banks. The recommendation was approved.

British Naval Flyers in France.

AMONG the visitors to the Henry Farman works at Bouy on Monday last were the four naval officers, Capt. Gerrard, and Lieuts. Samson, Longmore, and Gregory, who learnt to fly at Eastchurch, and who have been visiting the works of most of the leading French constructors. They were much interested in the design and workmanship of the latest machines which are being turned out at the Farman shops.

Ballooning from the Centre of Birmingham.

QUITE a novel scheme has been put into execution recently from the roof of Heath's Garage in John Bright Street, Birmingham, in co-operation with Messrs. E. T. Willows, Ltd. On the huge flat roof of Heath's Garage, this being the dead centre of the city, the balloons are inflated and trips undertaken according to order beforehand. The initial ascents were made on the 7th inst., the "Alpha" carrying as passengers Messrs. G. F. Heath, W. A. Smith, L. Farquhar (one of the Birmingham Daily Mail staff), and Master Graham Heath, with Mr. E. T. Willows, of the "City of Cardiff" dirigible fame, as pilot. Another balloon, a smaller one, carried one passenger, viz., Mr. Willows' mechanic. Both made successful trips, the larger balloon passing over the city of Birmingham, Castle Bromwich, Whitacre, Atherstone and on to Leicester, finally coming to earth about 5 p.m. at Cadby, about 3 or 4 miles from Leicester, on the Market Harborough road, the start having been made at 1.40 p.m. We give a couple of photographs of this novel departure on this page.



BALLOONING FROM THE CENTRE OF BIRMINGHAM.—A couple of balloons on the flat roof of Heath's Garage, John Bright Street, Birmingham, from whence they ascended, under an arrangement with Messrs. E. T. Willows, Ltd., of Willows dirigible fame. A regular series of such ascents have been booked for carrying out. In the left view the balloons are seen from the street, and on the right is the scene on the roof ready for the ascent.

AIR EDDIES.

I HEAR that Mr. J. R. Durgan, of Mia-Mia, Australia, who has done much pioneering in aviation in that country, has bought one of the new Avro mono-biplanes.

He intends taking this machine out with him when he returns to his native land.

The portly Piggott monoplane, of which nothing has been heard since its advent at the Aero Exhibition last spring, has become the occupant of one of the hangars at Hendon. Sundry alterations have been made in the position of the pilot's seat, for it was quite conceivable that the pilot would have had none too comfortable a time enclosed in the body-work in company with his engine. The seat is now arranged so that the pilot's head emerges from the top of the body, at a point directly above the trailing edges of the wings. A different propeller has been fitted. Parr is in charge of the testing, and his experience on a Blériot should stand him in good stead.

Re-reading my notes of last week, I noticed that I had made an assertion which might easily be misconstrued. The offending sentence was "Mr. Barber, just back from a short holiday on the Continent, has returned with new inspirations in aeroplane construction." Anyone who does not know Mr. Barber and who is not acquainted with his innate attribute of sound originality, might infer that he was about to construct a machine as the result of an idea—"cribbing" expedition on the other side of the Channel.

Nothing is further from the truth, so I hasten to apologise for the slip. As a matter of fact, the innovations that he is going to incorporate in his new biplane have been established in his mind for the past three months.

B. C. Hucks is really the complete aviator. At Cheltenham, where he was lately giving exhibitions, he not only made an effective speech in reply to the official welcome accorded him by the Mayor and all the prominent townsmen—I know he would have sooner flown in a gale than have done it—but he was induced to deliver a lecture on the principles of flight, illustrated by blackboard diagrams, to the Grammar School boys at the Chemical Lecture Theatre.

I know for a fact that, amongst a crowd of fellows, his fluency is a source of keen delight, but I had no idea that his attribute of rhetoric was so extensive.

Anyhow! Jolly good luck!

The school Avro biplane at Brooklands has now been fitted with a 45-h.p. Green engine with auxiliary exhaust ports, in place of the 30-h.p. one of the same ilk. It is more than probable that Raynham will fly this machine in connection with the Michelin prize.

A notable figure, the Rev. R. J. Campbell, made his appearance at Brooklands last Thursday week, whether he had been conducted by Lieut. W. Lawrence, a late Bristol pupil, in order that he might experience the sensations of flying. So delighted was the reverend gentleman with his flight that he signified his intention of renewing his acquaintance with *le plein air* at the earliest opportunity.

The new engine-in-front Bristol biplane that is evolving under the direction of Gordon England, should soon be

The Wright Brothers and their Experiments.

JUST as we thought, the cable report of the Wright Brothers being engaged in mastering soaring flight is merely the result of a vivid imagination of an American correspondent. Wilbur Wright states that the suggestion is entirely without foundation.

At the same time it is true that they are experimenting at Kitty Hawk for the improvement of prolonged gliding, but all ideas of flapping-wing or helicopter principles are foreign to their thoughts.

ready and going through its trials. It will be engined with a Clerget of 50-h.p., while the chassis will be of the central-skid and wheels type.

There are signs that the torpedo type of fuselage will enjoy as much popularity as the torpedo body did and still does in automobile body design. Tatin's machine built at the workshops of Louis Paulhan, has of late been giving good results. One of its most evident characteristics is its torpedo-shaped body. Those heavenly twins, Leageneux and Martinet, are, I have been told, commencing on the construction of an all-metal monoplane, which will incorporate a fuselage of this same type. The machine is being designed for a speed of 94 miles per hour.

Having lost little time since his recent dissolution from the Borel firm, Leon Morane has already two new all-metal monoplanes under construction, both of which have been designed to fulfil military requirements. One of them is modelled on the same torpedo-like lines and the other is a *canard*.

While some of us are liable to get excited over the *canard* movement in French aeroplane design, we must not lose sight of the fact that a British-built, tail-first machine—and a very good one, too—has been flying almost daily for the last 18 months within 6 miles of London, to wit, the Valkyrie. It is really very cheering to notice that the French constructors are falling in line with a point in design of which our most noted English pilot constructor has been the lonely but nevertheless sincere advocate for many months past.

Versepuys has now taken his Bristol biplane to Issy-les-Moulineaux, near Paris, where he is about to establish a flying school. Throughout the past season Versepuys has been busy with exhibition and passenger flights at Vichy.

It is surprising that Moorhouse has been so long in taking up practical flying considering that he has been connected with Radley ever since the latter commenced his first experiments at Huntingdon. He always did give one the impression of having the making of an exceptionally fine pilot and he certainly has not belied this impression. His cross-country trips from Huntingdon to Brooklands via Northampton—roughly 130 miles—must be a record for rapid acquisition of proficiency, for he did not make the acquaintance of a Gnome-Blériot until six days previously.

Lieut. Parke has joined the Grahame-White staff at Hendon as demonstrator and instructor at the school. Parke is a really good flyer and just the one to maintain the reputation that the school has to its credit.

I notice that Mr. A. V. Roe does not confine himself entirely to the Avro type of body construction, for this week falls to me the pleasure of having to congratulate him and his wife upon the advent of a little baby girl.

"OISEAU BLEU."

A New Zealand Aero Club.

CHRISTCHURCH, New Zealand, boasts an Aero Club, the members of which, although up to the present they have not been able to do much beyond model work, are very keen. They are building one or two gliders and some of the more ambitious of the members have started on a full-sized flying machine. At the end of August some model competitions were held at Hagley Park, and although a north-east breeze made the conditions rather trying some good flying was seen by a large crowd which had assembled.

THE FRENCH MILITARY COMPETITIONS.

THE work of weighing the thirty-one machines which are taking part in the Competitions was concluded on the 4th inst., with the results shown in the next page.

On the previous day several of the machines had been taken out for a trial flight, and a Nieuport was put over the course for the speed trials from the Rheims ground to the Obelisk at Mourmelon,

Sommer was up on his biplane, with which he had hoped to take part in the trials, and carried four passengers besides himself for a short trip. On the following day Beaumont was at work in the air on the 100-h.p. Blériot, Bill was on the Henry Farman, Dubreuil on the Hanriot, and Renaux and Barra on Maurice Farmans, whilst the Astra biplane was also out. On Friday



The New 3-seater Biplane that is representing Henry Farman at the Military Tests at Rheims.—This machine has a span of 16 metres, and is driven by a 70-h.p. Gnome engine. It will be noticed that Farman has changed his method of setting planes, for they are now staggered after the manner of the Goupy and the later Zodiac. The manner of seating the three occupants considerably in advance of the main plane is evidently meeting with favour in France, but it will remain to be seen how far it jeopardises the aviator's safety. The landing carriage has also undergone a modification to enable it to stand the strain of the extra weight. In flying trim the machine weighs 950 kilogs.

a distance of 59.5 kiloms. On the 4th inst. the first trial flights were made, and although it rained heavily Vidart was out on the Deperdussin, Fischer and Bill on the Henry Farman, Dubreuil on a Hanriot, besides three Breguet machines. One or two other non-competitors were also seen in the air, and

of last week Beaumont was the first up, flying with the 140-h.p. Gnome-Blériot, which has a span of 11.35 metres. He made a good flight in the direction of Mont Cornet, and then had to come down owing to a petrol pipe bursting. Having had this repaired, he made another trial, but cut matters too fine in



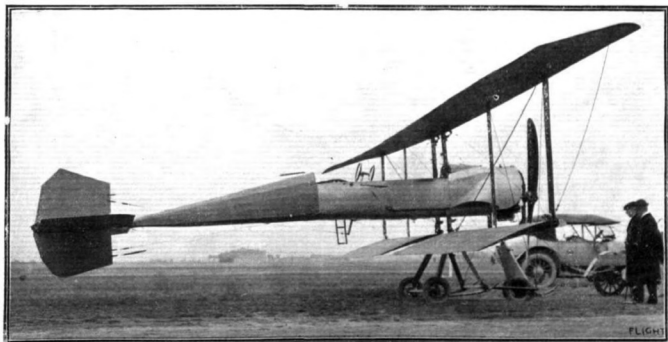
The latest Model Astra Biplane, which is representing the Société Astra at the French Military Tests.—This machine, with the exception of the landing chassis, which is reminiscent of Antoinette practice, has a striking resemblance to the Avro biplane. It is furnished with double control, and the propulsive effort is obtained from a 75-h.p. Renault motor driving at half speed a "Normale" propeller. It will be noticed that the Horatio Phillips wing cross-section, brought into prominence by the late Edouard Nieuport, has been made use of.

1.	†Breguet (Gnome 100-h.p.)	...	652	kilogs.
2.	†Breguet (Danette, 110-h.p.)	...	722	"
3.	†M. Farman (Renault, 70-h.p.)	...	680	5 "
6.	†Voisin (Renault, 75-h.p.)	...	674	"
7.	†Farman (Renault, 70-h.p.)	...	691	"
8.	†Coanda (2-p. Gnome, 140-h.p.)	...	—	"
9.	†Breguet (Gnome, 140-h.p.)	...	637	"
10.	†Goupy (Gnome, 100-h.p.)	...	637	"
11.	†Goupy (Chenu, 70-h.p.)	...	618	"
12.	*Antoinette (Antoinette, 60-h.p.)	...	935	"
13.	†Breguet (Canton-Unne, 120-h.p.)	...	703	"
14.	*Blériot (Gnome, 100-h.p.)	...	405	"
15.	†Voisin (Gnome, 140-h.p.)	...	622	"
16.	†Astra (Renault, 75-h.p.)	...	700	"
18.	†Breguet (Chenu, 80-h.p.)	...	704	"
19.	†Paulhan (Renault, 75-h.p.)	...	751	"
20.	*H. Farman (Gnome, 100-h.p.)	...	471	"
22.	*H. Farman (Renault, 70-h.p.)	...	650	"
23.	†Breguet (Canton-Unne, 85-h.p.)	...	700	"
24.	†Savary (Labor, 70-h.p.)	...	708	"
26.	*Blériot (Gnome, 140-h.p.)	...	515	"
27.	*Morane (Gnome, 100-h.p.)	...	517	"
28.	*Hanriot (Clerget, 100-h.p.)	...	578	"
29.	*Deperdussin (Gnome, 100-h.p.)	...	452	"
30.	*Deperdussin (Clerget, 100-h.p.)	...	526	"
31.	†Astra (Chenu, 75-h.p.)	...	862	"
33.	†Astra-Wright (Renault, 60-h.p.)	...	624	"
34.	†Voisin (Gnome, 100-h.p.)	...	634	"
35.	*Nieuport (Gnome, 100-h.p.)	...	483	"
* Monoplane. † Biplane. ‡ Triplane.				

the quick landing test, and the machine stood on its nose. Fortunately the pilot and his two passengers escaped injury, but the chassis of the machine was badly damaged. Barra then made a couple of tests on the Maurice Farman and Vidart on the Deperdussin, Paulhan on his triplane being also out. In the afternoon Beaumont brought out a 100-h.p. Blériot, but it seemed to be his unlucky day, for in landing after a short flight the machine completely capsized, and the pilot was badly hurt, his injuries including a broken shin bone. The doctors, however, hope to have him up and about in about a month's time. The weather on Saturday last was very bad, and none of the machines were seen out of the hangars, advantage being therefore taken of the opportunity to indulge in a little tuning up. The weather was much better on Sunday, when it is estimated that 30,000 people visited Rheims to see the flying. As a matter of fact, this was rather a pity, as the crowds considerably hampered the work, and led to an accident which might easily have been much more serious. Prevost on the three-seater Deperdussin was landing, when he had to turn suddenly to avoid the crowd, and unfortunately a soldier was knocked down and so seriously injured that he died in the military hospital on the following



day. The machine was badly smashed, but the pilot and passengers escaped injury. Fischer and Bill on Henry Farman machines, and Renaux and Barra on Maurice Farman's, all made tests, as also did Vidart on the Deperdussin, who, however, capsized his machine in landing. On Monday the weather was bad again, so that it was impossible to continue the tests, but late in the afternoon Prevost on his Deperdussin and Mollau on the Breguet each made a good flight.



The Colossal "Double Monoplane" which has emanated from the Breguet Workshop for the purpose of upholding the firm's honour in the Military Tests.—This machine, whose appearance was foretold in "Air Eddies" columns, is furnished with a Gnome engine of 130-h.p. Its weight, with pilot, passengers, and fuel aboard is 2,420 lbs. Although this machine has been designed to lift three passengers, Breguet is confident of its ability to carry eight.

NASSAU BOULEVARD MEETING.



Miss Mathilde Moisant in the pilot's seat of her machine just before the start for the Rodman Wanamaker Trophy for height for women at the Nassau Boulevard Meeting on September 24th.

THE international meeting under the auspices of the Aero Club of New York brought together a magnificent lot of aviation talent, although the whole of the flyers did not actually take part in the practical work of the competition. There were 34 aviators on the ground and on the first day, September 23rd, 16 of these gave the public a taste of their prowess. As usual, the prescribed programme was not adhered to, and the actual opening took place with a biplane instead of a monoplane race, which was given by the judges to Beatty, the decision resulting in a protest by Sopwith,

who claimed that he was the winner, but the final cast was in favour of the American. After an aerial scouting contest, which was none too successful, a curious competition was put up, entitled "Communication from land to air forces," in which small balloons, to which were attached messages, were set loose and the aviators had to catch them in the air. A certain amount of success in this went to Lieuts. Milling and Atwood, but otherwise it fell very flat. A cross-country flight to Belmont Park and Mineola back to Belmont, and then to the flying grounds at Nassau, was secured by Grahame-White, his time being 17 mins. 39 secs., with Sopwith second in 18 mins. 46 secs., messages having to be taken at both Mineola and Belmont. Here again protest was made, this time by Lieut. Ellyson, as he claimed the regulations had been altered without having been brought to his knowledge, but this, like the first one, was overruled by the judges.

On the Sunday trouble arose by reason of the laws of the county forbidding contests on the Sabbath for money prizes. Bishop Burgess, of Long Island, and Canon Chase, of Brooklyn, had put the law in motion and caused the County Sheriff to take active steps to prevent the meeting being held. As a consequence some of the items were cancelled, and those which were carried through by the aviators were flown for with all the prize monies cancelled, so that the concourse of spectators that gathered were in no wise deprived of their anticipated enjoyment. In the Relay Race, Sopwith and Grahame-White again got first place with 13 mins. 15 secs., beating Ovington and Milling with 15 mins. 21½ secs. In a cross-country race from Belmont to Mineola, a distance of about 18 miles, Grahame-White secured first place on his Neuport in 17 mins. 5½ secs., followed by Sopwith in 18 mins. 45½ secs.

In the event for greatest altitude for women aviators, Miss Mathilde Moisant was the only one entered, and she made a bid under these circumstances for the Rodman-Wanamaker trophy by climbing in her 50-h.p. Gnome-Moisant-Bleriot to a height of about 1,200 ft., descending with a spiral of *plissé*.

The experiences on last Sunday were a little bit more unpleasant, as the Sheriff's officers in this case actually chased Miss Moisant, as she refused to refrain from flying, she claiming that no money prizes being offered, she was entitled to give exhibitions. However, she upset the calculations of the officers by flying away from the Nassau aerodrome to her brother's place at Mineola, where she was followed by the officer in a motor car, who ultimately secured touch with his prey. The farcical position was brought to an end by the fact being discovered that the Sheriff had no warrant with him, and he was further placed completely outside the law by a magistrate to whom he applied refusing to grant a warrant under the ridiculous conditions prevailing.



Amongst those machines taking part in the tests promoted by the French military authorities at Rheims the new Bleriot 3-seater possesses considerable interest. It will be seen from the above photograph that Bleriot has reverted to the lifting tail and balanced elevator planes which formed a feature of his early cross-Channel model. Its span is 11.35 metres, and length 8.5 metres. Triple wheels have been fitted to the strengthened landing chassis, and, like the Breguet, is equipped with a Gnome engine of 130-h.p.

AIR PRESSURE ON PLANE SURFACES MOVING NORMALLY.*

By L. BLIN DESBLEDS.

WE know that aeroplanes rise from the ground only when the upward vertical component of the pressure of the air on their "lifting surfaces" is great enough to balance the weight to be lifted. Since the lifting force, or, as it is often called, the lift of an aeroplane depends upon the pressure exerted upon those surfaces as they move through the air, it is, therefore, important to know how to estimate the pressure which the air exerts on surfaces moving through it.

The essential facts that we must know in trying to design rationally an aeroplane are the following:—

Being given a particular type of surface, what will be (a) its lifting capability, (b) its corresponding resistance to propulsion or its *drift*, and (c) through what point in the surface will pass the resultant of the pressures of the air on the different portions of that surface.

(a) and (b), i.e., the lift and drift of a surface would be determined if we knew (1) the magnitude of the total air-pressure on the surface and (2) the exact direction of that air-pressure. For then, knowing the magnitude and direction of the air-pressure, we should be able to resolve that pressure into two components: a vertical component, and a horizontal component. The vertical component would give us the lift, and the horizontal component would give us the drift.

We thus see that in order to establish, rationally, the project of an aeroplane we must know:—(1) the magnitude; (2) the direction; (3) the point of application of the pressure which the air exerts on the different types of surfaces which it is proposed to use, and for the different positions and speeds of those surfaces.

The point of application of the pressure of the air on a surface has been called its *centre of pressure*.

Very many experiments have been made by numerous experimenters to find out in what manner the pressure which the air exerts on surfaces moving in it varies with their size, shape, inclination and speed. We shall, however, especially study the conclusions arrived at by Prandtl at the laboratory of Göttingen, and those by Eiffel, based on results which he obtained in his experiments from the second floor of the Eiffel Tower or in the laboratory he has installed at the foot of the tower bearing his name.

A sub-committee of scientific experts appointed by the *Académie des Sciences*, to which body M. Eiffel had submitted his work,† has issued a report which contains the following paragraphs:—

"We can admit that the results obtained by M. Eiffel and contained in his work represent to-day the most exact values known to measure the resistance which the air opposes to the rectilinear motion of surfaces of the dimensions and shapes which he indicates, and moving at speeds comprised within the limits of his experiments.

"We can, therefore, advise all those whose business it is to know and use those values, to consult the quantities and results contained in his work and we can consider that the principal conclusions he arrives at are established with sufficient exactness."

The simplest case that can be imagined for the determination of the pressure exerted by the air when a surface moves in it, is that of a plane surface placed at right-angles to its direction of motion. A plane surface placed at right-angles to its direction of motion is said to be moving *normally*.

Eiffel has determined the pressure which the air exerts on a plane surface moving normally by means of two distinct and independent methods:—

Firstly.—By experimenting on surfaces dropped from the second floor of the Eiffel Tower.

Secondly.—By experimenting on surfaces placed in an artificial air-current.

The results of his experiments lead to the following conclusions:—

1. The pressure of the air on a plane surface moving normally can be represented by the formula:—

$$R = K S V^2$$

in which R = pressure or resistance of the air, S = area of

* Notes on Lecture I on "Aerodynamics," given in connection with the Aeronautical Course of the Session 1911-12 at the Polytechnic, Regent Street, London.

† Recherches expérimentales sur la Résistance de l'air exercées à la Tour Eiffel, by G. Eiffel (Librairie Aéronautique, Paris).

surface, V = speed of translation of surface, and ρ = a coefficient whose value depends on the density of the air, and on the shape and area of the surface.

2. Experiments with plane surfaces whose areas varied from $\frac{1}{16}$ sq. metre to 1 sq. metre, and the density of the air being reduced to the normal (15° C. and 760 mm.), the mean value of ρ is found to be 0.074 (using the metre-kilogramme-second system of units).

$$[N.B.—K^1 \text{ (foot-pound-second unit)} = 0.01962 \times \text{(metre-kilo.-second unit).}]$$

3. The value of K increases with the area of the surface, but tends towards the limiting value K = 0.080 (metre-kilogramme-second unit; density of air, normal). This value of K is reached when the area of the surface is 1 sq. metre. For surfaces of areas greater than 1 sq. metre K is constant, and always equal to 0.080 (metre-kilogramme-second unit; density of air, normal).

This result is confirmed by Dr. Staunton's experiments.

4. For square surfaces whose areas vary from $\frac{1}{16}$ th of a square metre to 1 sq. metre the value of K (metre-kilogramme-second unit; density of air, normal) increases continuously from 0.065 to 0.080.

The increase of the value of K up to a maximum with the area of the surface seems to be capable of a simple explanation in view of certain indisputed experimental results. It is now established that when a surface moves in air the total pressure which the air exerts on that surface is made up of a positive pressure in front, and of a negative pressure, or suction, behind the surface. The negative pressure is now known to be an important part of the total pressure, and it can be easily realised that certain linear dimensions are necessary for the establishment of a zone of negative pressure behind a surface. The total air pressure on very small surfaces is diminished because no zone of negative pressure can exist behind them.

The two methods of experimenting which have been adopted by Eiffel, and which we have already alluded to, have given results which are remarkable for their continuity. This is a most important point to bear in mind, because it proves that the pressure which the air exerts on a surface moving in it is the same as the pressure which the air in motion would exert on the same surface maintained stationary in it, supposing the speed of the surface in the first case and the speed of the air in the second case to be the same. It, therefore, establishes a principle, the correctness of which was at various times questioned, namely:—

The pressure of the air on a body depends only on its relative motion with respect to the fluid, whether that relative motion is due to the displacement of the body or of the fluid.

NEW VARNISH FOR AEROPLANE FABRICS.

A NEW varnish, writes Mr. A. J. A. W. Barr, will shortly be placed on the market by an English Company under the name of "Cello," which is a solution prepared by Dr. Eichengrün, of Berlin, with a base of non-inflammable celluloid. Cello can be applied either after the aeroplane is constructed, or the fabric can be first treated and surfaced with it by passing through rollers. The effect on the fabric is to render it air and waterproof and to make it impervious to the rotting effect of the oil from the engine, and also to tighten the fabric so that it cannot afterwards sag. The varnish not only forms a film but also permeates the warp and weft of the material, thereby rendering it waterproof.

Solutions in various strengths up to 50 per cent. can be prepared, a property that is not possessed by any other proofing agent. This enables a thick coating to be put on under rollers in one application in place of the numerous applications usually required. Cellonised fabrics have important points in common with rubber-proofed cloths, among which is that by treating the surfaces with a solvent they can be joined as easily and as firmly as rubber solution joins rubberised fabrics. The cello surface does not crack and is quite flexible. For general use the Cello Solution is made up in transparent form, but it can also be made up in any colour without its properties being affected. The company will also place upon the market a varnish that sticks to rubber with great tenacity and protects it against the action of deleterious agents, rendering it impervious to the effects of humidity and extremes of atmospheric temperature.

FOREIGN AVIATION NEWS.

After the Battle.

THE Quentin Bauchart Prize having been won by Renaux, Maurice Farman and Fourny went over to Etampes on the 5th inst., to take back to Buc the two spare machines which had been kept at Etampes in case of emergency. Each taking a passenger, the two aviators returned home in company, maintaining a distance of about 100 metres between the two machines.

Point-to-Point on a Biplane.

HAVING taken delivery of one of the little Farman racing machines, the Chevalier de Laminne on the 5th inst., accompanied by his brother, left his chateau at Oudoumont and passing over Verlainne, Amay, Echange, the Hoyoux Valley, Molave Castle and Meuse & Engis, he eventually landed in his own park again.

Long Trial on a R.E.P.

TESTING one of the new R.E.P. two-seaters, Bobba on the 6th inst., at Buc took up in succession two officers, and mounted to a height of 1,200 metres was flying for over an hour.

A New Military Deperdussin Pilot.

AT Courcy, near Bethany, on the 6th inst., Delacour, on a Deperdussin monoplane, easily passed the three tests to qualify for his superior military certificate.

Two Hours in a Military Bleriot.

AT the Bleriot Military School at Etampes, on the 6th inst., Lieuts. Lanthecume and Silvestre mounted one of the two-seated machines and were flying for a couple of hours on it.

Touring by Aeroplane.

ON Saturday last, Count J. de Castellane left Buc on one of the Farman biplanes piloted by Mr. Maurice Farman for an aerial tour in the Touraine district and South of Normandy.

At the Sommer Works.

ON Saturday last, Crombez was flying a Sommer monoplane for over an hour, while Bathiat was testing one of the new military monoplanes.



Sapper Henri Bregi, who has recently flown with a passenger and spares and tools from Cassablanca to Fez on a Breguet machine.

More Tests with the Voisin Canard.

TAKING his seat in the Voisin Canard fitted with floats, Collex, on Sunday morning rose from the surface of the river Seine and flew over to Issy, and after a brief stay returned the same way, landing at Billancourt, in front of the Voisin works.

A Benefit for Frey at Juvisy.

A SPECIAL meeting arranged for the benefit of Frey, who, it will be remembered, had both his legs broken while attempting to fly from Rome to Turin, attracted a large crowd to Juvisy on Saturday last. Unfortunately the weather was not suitable for flying during the early afternoon, but about 4 o'clock Verrept came out on his Morane monoplane, on which he had arrived from Etampes in the morning, and gave an exhibition of high flying. He was followed by Audemars, who gave a most amusing display on the Demoiselle, Paschoff on his monoplane, Henry on a Henry Farman biplane, Demarzi on a Caudron biplane, Divetain and Ladougue on Goupy biplanes. All these made splendid flights, which were greatly appreciated by the spectators.

The Michelin "Target" Prizes.

ALTHOUGH the full regulations governing the competition for the latest prizes offered by MM. Michelin et Cie. have not yet been settled, some idea has been given of the lines upon which the sub-committee of the Aero Club of France are working. They have decided to only consider the first year's prize of 50,000 francs, leaving the rules for the second year's competition to be drawn up according to the experience gained in the first competition. It is proposed that the competitors should be required to drop 15 projectiles, weighing 7.1 kilograms each, from a height of 200 metres, on to a target 20 metres in diameter. The test will probably be carried out in the neighbourhood of Châlons Camp.

A High Flying Morane.

USING one of the new Morane monoplanes built specially for altitude work, Verrept, on the 4th inst., was putting in some useful practice at the Vidamee aerodrome, in view of his intention to shortly attack the height record. He got up to 1,150 metres in 7 minutes and came down in 43 minutes, and, on the second attempt, he reached 2,450 metres in 21 minutes, and then glided to earth in 15 minutes.

The Johannishal Meeting.

THE official results of the National Week at Johannishal show that Pietschker, on his Albatross biplane, was first in the duration competition with 13 hrs. 46 mins., and Savelack, on a Rumpler-Taube monoplane, was second with 12 hrs. 13 mins.; Grulich, on a Harlan monoplane, third, 10 hrs. 10 mins.; Fraulein Beese, Rumpler-Taube monoplane, fourth, 9 hrs. 22 mins.; Kahnt, Grade monoplane, fifth, 7 hrs. 32 mins.; and Engelhard, Wright biplane, 6 hrs. 49 mins. There were eleven other competitors whose aggregates ranged from 5 hrs. 35 mins. to 1 hr. 16 mins. Hirsh, on a Rumpler-Taube monoplane, was awarded a medal for his height record of 2,475 metres.

Fraulein Beese has a Fall.

WHILE flying at the Honover Meeting on Saturday last, Fraulein Beese brought her monoplane down very suddenly from a height of 15 metres, and besides breaking up one wing of the machine was slightly injured about her face.

New Double-Passenger Height Record.

AT the Wiener Neustadt aerodrome, on the 29th ult., Lieut. Bier, on his Ehrlich monoplane, succeeded in beating the height record with two passengers, increasing it to 1,220 metres. Up to the present, no record of this type has been accepted by the F.A.I., but the previous best was made by Moineau, on a Breguet, at Douai last August, when he got up to 876 metres.

New German Military Zeppelin.

A NEW Zeppelin airship, built for the German War Office, was put through her trials last week, and it is stated that the speed attained was 47 miles an hour. The new vessel is 8 metres shorter than the "Schwaben," and has two cars.

Flying at Luxemburg.

ON Sunday last a week's flying meeting opened at Luxemburg, but there was not a great deal of flying seen. Alfred Lanser, on his Deperdussin monoplane, made four flights, ranging from five to ten minutes each, and Felix Lamblotte, on a Farman biplane, put up four similar flights, and then took a large number of passengers for short trips.

A Dane after Transatlantic Honours.

We recently noted the fact that an American pilot is said to be anxious to fly across the Atlantic, and it is now announced from Copenhagen that a Danish aviator is also contemplating a flight from Copenhagen to New York next Spring. Stops are to be made at London, Queenstown, and various vessels stationed at set distances across the Atlantic.

Aeroplanes in Tripoli.

It appears, as we mentioned last week, that Italy has not lost sight of the possibility of employing aeroplanes in connection with the fighting in Tripoli, and on the 5th inst., five Lieutenants and Captain Piazza, who is in charge of the Military Aviation School at Udine, were despatched to Tripoli with all possible haste.

Russian Army and Aviation.

A BILL introduced by the Minister of War into the Duma on Monday last provides for a Government subsidy of 100,000 roubles (£10,000) being spent annually for three years for the maintenance of a Military Aviation School, the subsidy to commence next year.

An Austrian Flying Week.

ON the opening day of the flying meeting which started at Weiner-Neustadt, just by Vienna, on the 1st inst., Lieut. Bier, on his Etlich monoplane, secured three prizes: that for duration with 2h. 42m. 27s., that for distance with 250 kiloms., and for height with 958 metres. The second place in the altitude competition went to Sablatnik, on an autplane, with 933 metres. Col. Blaschke, who was not competing in the competition, climbed to 1,193 metres. A race from the aerodrome to Vienna and back was secured by Col. Blasche, who covered the 84 kiloms. in 1 hr. 20 mins., and a race to Neunkirchen and back was won by Adolph Warchalowski, who took 24 mins. for 33 kiloms. Some exciting incidents occurred during the day, one being when Sablatnik's aeroplane caught fire in the air at a height of 400 metres. Fortunately, there were no serious consequences. On the following day not quite so much flying was seen, and the two best performances were Sablatnik's, 1h. 3m. 51s., and Lieut. Bier's flight at a height of 670 metres. The wind then interfered with the flying for two or three days, although on the fourth Lieut. Bier made cross-country trips to Vienna and back, as also did Col. Blasche, while Col. Miller went to Fischamend and back. Some good cross-country flying was also seen on Saturday last, while on Sunday the chief performances were high flights by Lieut. Bier, 2,300 metres, Widner (Blériot), 1,700 metres. Illner secured the first place in the passenger duration competition with 4 hrs. 5 mins., and Warchalowski was second with 3 hrs. 17 mins.

Mishap with the Antarctic Aeroplane.

WHILE practicing in the neighbourhood of Adelaide, with the monoplane which was to be used in the Mawson Antarctic Expedition, Lieut. Watkins and Mr. Wild, according to a cable to hand, had a smash. Both the aviators were slightly injured, and the crowd, which had become very excited at seeing the machine in the air, made a rush to secure pieces of the broken aeroplane as souvenirs.

AMERICAN ITEMS.

WELDON B. COOK, an amateur, covered a measured mile at Black Diamond, Cal., in 47 secs. on September 13, after two weeks' practice, using a Curtiss type biplane and 4-cyl. Elbrige engine.

Walter Edwards on a Curtiss type machine flew half a mile out to sea at Santa Cruz, Cal., on September 15, falling into the ocean by reason of a broken propeller.

Lincoln Beachey, on September 16, at Milwaukee, Wis., was up for 1 hour 10 minutes, reaching an altitude of 10,250 ft.

Beckwith, Havens, on September 17, at Manitowoc Depot, Wis., made three flights, rising to a height of 2,000 ft.

Louis Rosenbaum, of Chicago, on September 19, at Dewitt, Ia., flew 22 miles, and losing control through dipping at too great an angle when alighting, crashed to earth from about 50 ft. He was fatally injured, the motor breaking from its fastenings and falling on to him.

Frank Miller, on September 22, at Dayton, O., was flying when the petrol tank exploded, the machine falling to the ground, Miller being killed.

Antonio Castellane, on September 22, at Elmira, N.Y., whilst cross-country flying, suddenly lost control of his machine, and was fatally injured in the wreckage.

CORRESPONDENCE.

Correspondents communicating with regard to letters which they have read in **FLIGHT**, would much facilitate ready reference by quoting the number of each such letter.

Naturally Stable Monoplane.

[1387] I notice in current issue of **FLIGHT** (October 7, 1911, a contribution from the Rev. Harold Kelk (1384) wherein he advocates the construction of a full-size monoplane upon my irregular central diamond-box-shaped dihedral-angled monoplane (Letters Patent, 18481-10). Your readers may remember that my model was awarded a special certificate by the Manchester Aero Club (Model Section) in November, 1910. I fully described it in your issue of January 27 of this year. You also honoured me by choosing my model amongst your illustrations of models exhibited at Olympia, 1911 (see issue March 11, 1911).

I wish to correct the statement that the diamond-shaped box-plane has been applied to kites for years as the feature of their stability. The square-shaped cellular-ended box kite and my irregular diamond-centred monoplane are totally different in effect and construction. I am pleased to state that I hope to form a company in the near future with a view to, and for the purpose of, constructing a full-size monoplane as advocated by your contributor. I should be pleased to hear from any of your readers interested.

"Redwalls," Eccles, Manchester.

WILL H. BOOTH.

Taking-off Distances.

[1388] Could any of your readers inform me, through the medium of your valuable paper, the average distances travelled along the ground by the following machines before rising: Blériot, Depedussin, Breguet, and the double-engined Short biplane?

43, Carlisle Road, Hove, Sussex. F. WIEDMANN, JUNR.

The Aeroplane in War.

[1389] Agreeing fully with your editorial comment that the gaining of intelligence is the first duty of an aeroplane in war, I would remind you that, in what is known as "the fog of war," intelligence worth having generally has to be fought for.

There can be no doubt that, even at the present day, a constructor who could instal a maxim gun effectively in an aeroplane, and so enable it to destroy hostile air craft, will be doing good service, especially if he does not give away his secret to other powers.

Then, again, our naval officers say that it is essential to have a dirigible carrying a wireless installation to cruise off an enemy's coast. If war were declared to-morrow, is it not certain that such a vessel would be attacked by hostile aeroplanes?

Again, when hostile armies are in face of each other for days, as was the case in Manchuria, and may well be the case again, is it not exceedingly probable that the aeroplanes of both sides would be employed at night to disturb the enemy's camps as much as possible, and prevent his men from getting sleep? I think so.

An aeroplane may come across a hostile aeroplane doing a temporary repair on the neutral ground between the fronts of two armies. How will she destroy her unless she is herself armed? Scores of such contingencies may have to be provided for.

The analogy with cavalry cannot be far wrong. It is nowadays the most important duty of cavalry to scout. Yet it is trained to charge mounted and to fight on foot with the rifle as well.

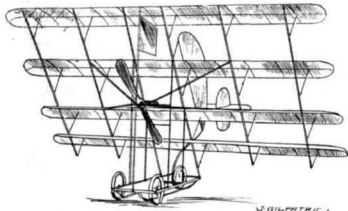
As you say, it seems probable that shrapnel will be the projectile used against aeroplanes but it has the great disadvantage that its bullets return to earth with velocity enough to disable a man. Consequently care must be taken not to open fire in a direction that may injure one's friends. It is possible that a high explosive exists, or will be discovered, that, even in a small shell, will develop air pressure enough, when detonated by a time fuze, to strain or break the wings of an aeroplane within a reasonable distance of its burst. Such a shell would be almost harmless to friends, as the greater part of it would be shivered into dust on detonation of the bursting charge.

R. A. (RETIRED).

Low Powered Flight.

[1390] A correspondent, R.G.P., has asked for particulars of the Gordon and Sellers machines, which are notable on account of their ability to fly with small power. The Gordon machine is a familiar 2-2-P-1 Curtiss, apparently very lightly constructed.

The Sellers machine I consider distinctly novel and fairly safe. Its formula is O-P-4-1. The main planes have a pronounced



"stagger," as in the Goupy. The motor and tractor are mounted on the second plane from the bottom. I regret I am unable to furnish any dimensions, but enclose a sketch.

The machine illustrated is by no means standard; it is only one of this type used for experimental purposes by Mr. Sellers, Port Washington, L. I., U. S. A. J. G. GILPATRICK.

The Twisting Tail.

[1391] In reply to the various first claimants to "tail twisting" fame, it may particularly interest Mr. Cochrane to know that eight years prior to him—in 1894—I made and experimented with so-called twisting tails on models, which in some cases carried weights of 5 lbs. and more. They were capable of being steered in all three directions, and I found this method very effective in practice. In 1897 I showed this device to one of the most eminent men in the science of aeronautics.

I have also invented a direct or instinctive control and steering device, Pat. No. 14114/10, which steers in all directions with one tail and one control handle.

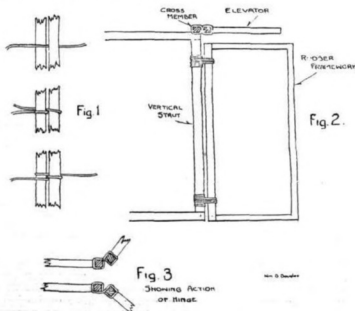
Fulham, S. W.

A. Fox.

MODELS.

Rudder Mounting.

[1392] A simple and neat method of mounting rudders, or of making any other rocking joints, which has the advantage of being light yet strong, is as follows :—



Procure some thread of suitable strength and wind it round the two pieces which are to be hinged together, in "figure of eight" fashion, as shown in Fig. 1. This should be done in two or more

places. If two or three turns are wound round the stationary member before commencing and after finishing the "figure of eight" winding (Fig. 2) the appearance is improved.

Dublin.

WILLIAM D. DOUGLAS.

Model Construction

[1393] In answer to letter 1362 in FLIGHT of September 16th, why not fit a gear-wheel to the propeller shaft, and also decrease the dihedral angle of the planes slightly?

Lichfield.

E. D. P. WARDLOW.

IMPORTS AND EXPORTS, 1910-11.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

	Imports.		Exports.		Re-Exportation.	
	1910.	1911.	1910.	1911.	1910.	1911.
January...	2,516	1,196	750	1,088	550	Nil
February	437	3,129	2,950	1,786		
March...	7,516	1,616	1,327	1,828	600	357
April	6,395	1,110	950	807	1,470	4,343
May...	840	1,707	400	2,471	350	1,972
June...	7,991	3,225	642	2,432	558	1,082
July...	11,608	9,822	336	2,250	830	643
August...	6,188	2,873	812	1,153	1,455	205
September	1,034	1,839	4,340	1,183	1,608	—
	44,411	37,228	11,308	20,135	7,481	9,262

Aeronautical Patents Published.

Applied for in 1910.

Published October 12th, 1911.

24,352. J. F. F. W. URE. Aeroplanes.
27,702. A. J. A. DEPERDUSSIN. Aeroplanes.

Acknowledgments

Applied for in 1911.

2,041. G. MEEN. Stabilising and steering aeroplanes.
2,064. H. DITTMAR. Balloon envelope.
2,521. J. CORDNER. Flying machines.
12,480. R. BLUM. Driving gear.

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