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TO CORRESPONDENTS.

In order to avoid trouble and confusion we find it necessary to inform correspondents that letters of inquiry addressed to the public and intended for insertion in this column, must in all cases be accompanied by a large envelope, legibly directed by the writer to himself, and stamped, in order that answers received by us may be forwarded to their destination. No notice can be taken of communications which do not comply with these instructions.
All letters intended for insertion in THE ENGINEER or containing questions should be accompanied by the name and address of the writer, not necessarily for publication, but as a proof of good faith. No notice whatever can be taken of anonymous communications.
We cannot undertake to return drawings or manuscripts; we must therefore request correspondents to keep copies.

THE ENGINEER.

NOVEMBER 21, 1913.

The Future of the Aeroplane.

THE amount of capital and intellect now being expended on the construction of aeroplanes is truly extensive, yet so far few signs have become apparent that the industry contemplates any market for its wares other than the naval and military. A study of recent aeroplane progress and invention seems, indeed, to point quite clearly to the deduction that there is a tendency to concentrate attention more and more exclusively on the craft as instruments of war. Here and there, it is true, as in the case of the immense Sikorsky biplane, we have the promise, at least, of a machine more especially designed for the purposes of peace than of warfare. In the institution of an official aerial mail service by the French Minister of Commerce between Paris and Nice we have another attempt to apply the aeroplane to a directly utilitarian end. But apart from these and a few similar efforts, it remains true that the aeroplane of to-day is not an instrument of commerce. Why it is not, and whether it ever will be, are questions those interested in the industry may well ask themselves. The demand for aeroplanes for purposes of war will, as years go on, steadily grow, but it is clear that even if the Government is content always to rely on outside firms for its supply and does not manufacture the craft for itself—a proceeding which we do not think likely—the work available will be strictly limited, and will scarcely suffice to keep the works at present in existence in remunerative employment. What, then, is hindering the development of the aeroplane as a commercial means of carrying passengers or transporting goods?

The answer may be given in a sentence. Constructionally the aeroplane is still very far from being perfect; financially the expense of running it is quite out of proportion to its dividend-earning capacity. But in neither direction are we hopeless of improvement. We have on previous occasions sharply criticised the construction of the aeroplane from the engineer's point of view, and we still hold that in many directions the manner of realising the designer's ideas is crude. The design itself is, too, not free from objection, and in the near future we are prepared to see a radical change in it. Some nearer approach, for instance, is required to the realisation of the ideal that, so far as is reasonably possible, each part should have one, and only one, distinct duty to perform. The wings of a flying machine, to take a specific example, are primarily a means of obtaining lift. Yet in many, nearly all, instances the rolling of the machine is controlled by warping the wings—a method of arriving at the desired results which, even if the wings had no other function to perform, would strike us as barbarous. The designer, however, is, we are aware, restricted on all sides by what is and is not possible in the constructive departments. These departments, in turn, are severely handicapped by the limited choice of material at their disposal. The question of improving the aeroplane, constructionally and in design, thus resolves itself down to one of whether the future will give us materials better suited to the purpose than those of the present. As we have said above, we are not hopeless in this matter. To take a specific example again, we feel certain that success in the search for a light, strong alloy will one day make it quite possible to construct the wings and their entire covering of metal. Certain it is that the abandonment of wood in every part of an aeroplane called upon to support a stress should be the goal aimed at by all progressive designers. Coming now to the motive power required to propel an aeroplane, let us ask the question: Is there any reasonable prospect of reducing the present comparatively enormous running expenses? Here, again, it seems to us that the future holds good promise. The evolution of the light high-powered motor occupying a small space has only just begun, and we confidently expect that in a

very short time the aeronautical motor, instead of its present extravagance of fuel and oil, will show an efficiency as great as that of a modern motor car engine tested under similar circumstances. But efficiency is only one side of the question; the total power consumption is even more important. Are there, then, any grounds for believing that we shall be able to decrease one day the total power required to propel an aeroplane? With an improvement in the construction of the body and wings of the machine a certain lessening of the horse-power required will follow automatically, and this, with the improved efficiency of the engine itself, should perceptibly decrease the running charges. But if we take into consideration the performances of to-day we are bound to admit that before the aeroplane establishes itself as a means of commercial transport the improvements effected will have to show not simply a perceptible reduction in the running expenses, but one so large as to be beyond the hopes of the most enthusiastic. The lowest horse-power used on an aeroplane worthy of the name is, so far as we know, 9; with this power Mr. A. V. Roe actually accomplished some flights in 1907 with his triplane. But no one would dream of repeating the experiment; it is too clearly recognised that only in high speeds is there an approach to safety. We find, accordingly, that anything less than 50 horse-power is now rarely regarded as sufficient, and that the average is about 70. Yet if the aeroplane is to compete financially with other forms of transport, even 9 horse-power per passenger or per hundredweight of goods carried will scarcely be small enough. At the very least we will have to cut down the horse-power to about a tenth of the present requirement. Instead of carrying about 1½ cwt.—80 kilos., to be exact—the 100 horse-power Doutre machine to be used on the Paris-Nice mail service would then carry 15 cwt. With its 400 horse-power the Sikorsky biplane would carry about 150 passengers instead of 15. We neglect the undoubted increased speed of an aerial service in these calculations because it is manifestly impossible to consider it in general terms. The acceleration of the mails between Paris and Nice will no doubt have a financial value, but who will venture to estimate it? On the other hand, it may only be fair to neglect the increase of speed. The aeroplane is, for reasons of safety, compelled to travel at high velocities. It is conceivable that its inability to move slowly may stand for as much on the debit side of the account as its rapidity of motion does on the credit side.

In spite of the improvements which we may reasonably hope to see in the aeroplane in the near future, it seems certain that there is practically no chance of its becoming a commercial means of transport. Safer and stronger it no doubt will be, and as a vehicle in which to ride it will become more comfortable. But, short of some entirely new principle of obtaining sustentation or of developing and applying the propulsive force required, its high running costs will always limit it to those duties in which flight through the air is required for itself and not as a means to an end, which can be reached by other methods. Were the speed at which it progresses vastly superior to that of other modes of travel, were its goings and comings less liable to be affected by climatological conditions, were its motion easier to the human frame or less likely to cause damage to special goods by vibration and shock, its special properties would find it special work to do. But with the exception of greater speed, its only claim to distinction as a means of transport is the fact that it rises through the air. In all other respects it is actually inferior to our other means of moving from place to place. To accelerate the delivery of a letter by an hour or so or to indulge us with a new sensation is hardly a sufficient reason for expending life, money, and time on its evolution, and but for the fact that its property of moving through the air is of peculiar value to an army or navy in time of war, the future of the aeroplane would, indeed, present but a barren prospect.

Labour in the Coal Trade.

IF current troubles in the coal trade are not well handled while prices and wages are high they may provoke a crisis when depression comes. The new conditions that have arisen in this industry must be faced. The non-union question, for example, is a big problem that has lately assumed a new form. When the Minimum Wage Act was passed, following upon the Eight Hours Act, we ventured to say that coalowners would have to look upon trade unionism in a new light. Some have done so; but, unfortunately, others have evidently failed to grasp the significance of the new legislation. With some coalowners assisting the Miners' Federation to coerce

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Half-yearly (including double number) .. £0 14s. 6d.
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Advertisements cannot be inserted unless delivered before Five o'clock on Thursday evening, and in consequence of the necessity for going to press early with a portion of the edition, ALTERATIONS to standing advertisements should arrive not later than Ten o'clock on Monday morning in each week.

Letters relating to Advertisements and the Publishing Department of the Paper are to be addressed to the Publisher, Mr. Sydney White; all other Letters to be addressed to the Editor of THE ENGINEER.

Telegraphic Address, "ENGINEER NEWSPAPER, LONDON."
Telephone—No. 13352 Central.

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"THE ENGINEER" PORTRAIT GUIDE.

As already mentioned in these columns, a small book containing a large number of portraits and brief biographical notices of members of the Iron and Steel Institute was presented to each member attending the recent Brussels meeting. Copies can now be obtained by application at this office, price 6d. each, or 7d. post free.

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