The giant Staaken monoplane which carries a crew of two pilots and two mechanics in a cockpit atop the fuselage, and eighteen passengers in the comfortable cabin

The Unusual in Passenger-Carrying Airplanes

By Alfred Longville

SOME very radical changes are being introduced in aviation of late. Just as we had settled down in the comfortable belief that the passenger-carrying airplane, to be truly orthodox, had to have a number of engines each of which drove its own tractor or propeller screw, along came several new machines which cast aside our fond beliefs and start aviation off on a new course. He would be a brave prophet who would attempt to picture the winged passenger-carrier of the future, in view of the many new and promising ideas now being worked out.

The latest F.I.A.T. 12-seater biplane is a leader among the aeronautical revolutionists, so to speak. Instead of following the accepted practice of a multi-unit and multi-screw arrangement for the propulsion, the engineers of the Fiat organization have designed their huge machine with a triple-engined power plant mounted in the nose of the fuselage and driving a single tractor screw, as in the usual single-engined tractor machine of the 2- or 3-passenger class. In the new F.I.A.T. machine the engines are mounted side by side, each driving the single tractor screw through a gear box. Should any one of the three engines develop trouble, it is automatically thrown out of engagement; furthermore, simple arrangements are provided so that the pilot or mechanic may disengage any one of the three engines, thus enabling certain repairs or adjustments to be made while in flight. The combined horsepower of the three engines is 900 at 1,850 revolutions per minute; but the normal power developed during cruising flight is 700 horse-power at 1,600 revolutions per minute, giving a speed of 115 miles per hour instead of 125 miles per hour at full power. With two of the engines in operation 600 horse-power is obtained, which is ample to maintain cruising speed. From reports it appears that the Italian engineers have solved the problem of a suitable gear drive in a somewhat different fashion from certain French designs in which two or more engines are arranged in tandem to drive a single tractor screw.

Another departure from standard airplane design is the great German monoplane which forms the cover illustration of this issue. This odd machine is the German "Staaken," built in one of the Zeppelin works where efforts of late have been concentrated on the airplane instead of dirigible type of airship.

The most striking feature of the giant "Staaken" is the arrangement of the engines. Following the lines of the all-metal construction of certain German machines, the "Staaken" has an exceptionally thick single wing which is so braced internally, between the top and bottom surfaces, as to require practically no external bracing. The engine units are mounted in the leading edge of the wing, two on either side of the fuselage, offering a minimum of head resistance. In all, the airplane has somewhat over 1,200 horse-power, and carries 18 passengers and a crew of 2 pilots and 2 mechanics. The nose of the machine is hinged and swings back so as to form a doorway into the cabin situated in the forward part of the fuselage. The pilots and mechanics sit in a cockpit on top of the fuselage and above the single plane, which position affords excellent visibility in almost all directions.

The giant "Staaken" is the outcome of a whole line of giant airplanes developed by Germany during the latter part of the war, and intended for long-distance bombardment of Allied cities and military depots. The all-metal construction is carried out in duralumin. The span of the single wing is 105 feet. The speed of the machine is given as 130 miles per hour, which is exceptionally fast for a machine of such large proportions and great carrying capacity.

Demolition Material as Fertilizer

AT the present time when fertilizer is so much in demand, various materials which could be used for this purpose should not be overlooked. From a French source we find it recommended to use lime and plaster material coming from demolitions, and it contains very useful fertilizing ingredients. Such material can find a very good use on land which is poor in lime and which is situated in the region around good-sized towns. The cost is scarcely anything, and the haulage to the spot would be practically the only

Giant Staaken machine in flight, carrying eighteen passengers with all the comforts of a railroad coach

expense. Material from demolition consists of dry mortar with some fragments of stone, that is, as regards the waste products which cannot be used again. The composition of mortar will be seen by observing how it is made up in the first place, mortar being formed in fact of sand and lime in varying proportions according to use. In general the makeup contains 30 to 40 per cent of lime which afterwards becomes partly transformed to carbonate of lime or chlorohydrate and nitrate. Nitrification is found to be most active in the walls of the ground floor, and there is also formed in many cases nitrate of potash. It will thus be observed

that this material is rich in nitrates, and it can therefore be employed to advantage as a calcareous fertilizer and as a source of valuable nitrogenous substances. From the sand which it contains, this material is best adapted for use on clayey soil than on sandy soil. In fact, after the lime and the different fertilizing substances have disappeared, either absorbed by the plants or drawn off by water, the sand will remain in the soil and it acts to increase the mobility of light earth which would be a disadvantage, while it is precisely this lightening up which is desired in heavy soils of a clayey nature, hence the sand is very useful in the latter case. The material is found to have a specially good effect on meadows and wet pasture land which however is not of a marshy nature. It is favorable to the growth of vegetables such as beans, peas and the like on ground of this class. Such fertilizer is also good for plowed ground, and here the material should be incorporated at some depth in the soil and not spread on the surface, especially on damp soil, for this would reduce their effect. Aside from mortar and the like, we should also consider the use of plaster coming from demolitions. Its action as fertilizer is not as yet very clearly defined, but it is considered that this material acts not only as a lime fertilizer, but also has an effect due to the sulfur which it contains. On the other hand, it is probable that it facilitates the absorption of potash by plants and favors nitrification. In any event, its effects are noteworthy upon certain crops, such as pod vegetables (peas, beans), clover, buckwheat and others, and it increases their output considerably. Grapevines show its action to a marked extent, but root vegetables and cereals hardly at all. Plaster therefore should not be neglected, for it can be a source of great benefit to crops in many cases. Plaster material should be well pulverized before use as such plaster will usually contain various impurities such as pieces of stone, brick, mortar, etc. The amount to be used on the soil will of course vary according to the case.

Making New Blood

A VERY remarkable discovery with regard to the blood has just been made by Dr. W. J. Penfold, director of the Australian Commonwealth Serum Institute, London. In the making of diphtheria and other serums considerable quantities of the plasma or fluid portion of horses' blood is used at the institute. The practice has been to allow the blood, after it has been drawn from the horses, to stand for some time to allow the red corpuscles to settle to the bottom. The fluid is then drawn off and used while in the past the red corpuscles have been thrown away. This struck Dr. Penfold as an economic waste so he began experiments in the way of injecting the corpuscles into the horses again. The results have opened up a new chapter in the study of the blood. It appears that the horse can easily and quickly form new fluid if the red corpuscles are put back into the blood. While the normal average amount of blood in a horse is 36 liters it has been found possible to take 48 liters in a week from a horse to which the red corpuscles are returned and that without its vitality being any more, if as much, affected as was the case with ordinary limited bleeding. The practice of returning the corpuscles has been extended to all the horses, between 30 and 40 in number, which are bled at the institute and wider experience is confirming the results of the earlier experiments. The composition of the blood remains practically normal.

It will take some time to realize anything like the full possibilities of so new and startling a discovery but it is bound to have an important bearing on the practice, as well as on the theory, of medicine. For instance there are diseases in which good results might be expected by an injection of the blood of those recovering from the disease but under present conditions the convalescents cannot spare the blood.

Nose of the Staaken machine, showing the hinged front which swings back so as to give access to the passenger cabin