

THE TRANSPORTATION OF SUBMARINES.

BY P. A. HESLAM.

In the latter part of 1906 the Japanese government placed an order with the British firm of Vickers, Sons & Maxim for the construction of two submarines, the conditions of the contract stipulating that the vessels should be delivered at a Japanese port before the close of the present year. The submarines are vessels with a submerged displacement of 314 tons. They are 135 feet long, 13 feet 6 inches beam, and 12 feet deep, and are fitted with 16-cylinder gasoline engines, the horsepower being 600 on the surface and 180 submerged. The corresponding speeds are 13 and 8 knots. The armament consists of two 18-inch torpedo tubes, and sufficient fuel is carried to give the vessels a radius of 1,500 miles.

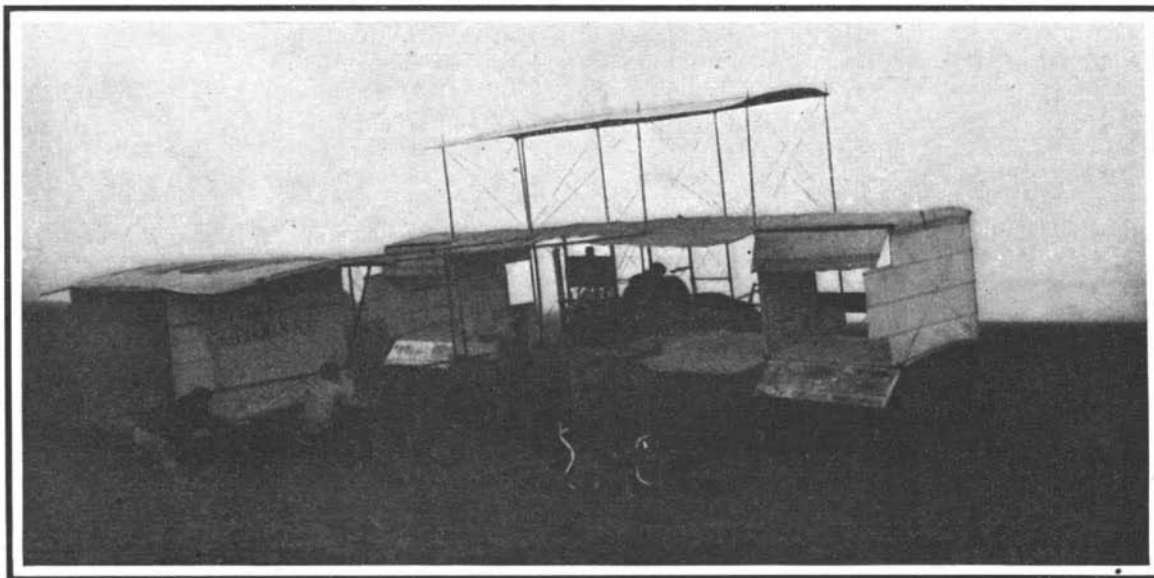
In order to overcome the difficulty of transporting the vessels to Japan, Messrs. Vickers, Sons & Maxim designed and built a transporter of unique type. The vessel, which is 225 feet long, is constructed with a very short fore-castle, while the engines are placed as far aft as possible, thus leaving a very large clear space amidships. The break of the poop is also the fore engine-room bulkhead, and a wide hatchway extends forward from this practically to the break of the fore-castle. The athwartship hatchway beams are removable, so as to admit an object almost the entire length of the hold. There is, of course, a very large number of these beams, and they are made especially strong, in order to compensate for the huge deck opening.

The method by which the submarines were placed on board was as follows: The "Transporter," as the vessel is named, was drydocked, the port bulwark taken down, the hatch combing on the same side removed, and a portion of the steel deck taken up. The water was then admitted to the dock, totally submerging the hull with the exception of the upper portion aft. One of the submarines was then floated into the dock, hauled into position over the hold of the submerged ship, and held there while the water was pumped out of the dock. As the submarine sank into the hold, it was placed in specially arranged chocks by divers, and finally secured in position on the starboard side of the hold. This operation was then repeated in the case of the second submarine, so that eventually the two vessels lay side by side in the hold

FARMAN'S EXPERIMENTS WITH HIS TRIPLE-SURFACE AEROPLANE.

By the addition of a third surface to his aeroplane Henry Farman has recently changed the appearance of his flyer somewhat, and has made it capable of lifting considerably more weight. The third plane, as can be seen from our photograph, extends only over about two-thirds of the total width of the lower surfaces. In addition to this plane, Farman has also lengthened the top surface of the box tail, so that the sides now extend beyond the vertical partitions.

On the 21st ult., Farman expected to give a demonstration before some Senators and members of the



THREE-QUARTER REAR VIEW OF FARMAN'S AEROPLANE WITH TRIPLE SURFACES.

Note the extension out at the sides of the upper surface of the box tail; also the hinged flaps on the rear edges of the main surfaces.

National Aerial League who had journeyed from Paris to his experimental ground at Bouy, near Reims. Unfortunately, there was a strong wind blowing and Farman did not dare to make a flight until this had moderated. Finally, at dusk, he made two short flights lasting about two and four minutes, respectively. In the second of these flights he circled twice around the parade ground. He had fitted automobile acetylene headlights to his aeroplane, and the effect of the machine flying at night is said to have been very weird.

Not until the 24th of November had the weather improved sufficiently for Farman to make a demonstration. Even on this day there was a strong wind of from 6 to 14 meters per second or having a mean speed of 21¼ miles an hour. Despite this wind Farman flew successfully, though the sudden puffs would raise and lower his machine suddenly a distance of from 45 to 60 feet. The oscillations thus produced were very curious. Farman was obliged to fly quite

Aeronautical Notes.

WILBUR WRIGHT'S NEW RECORD.

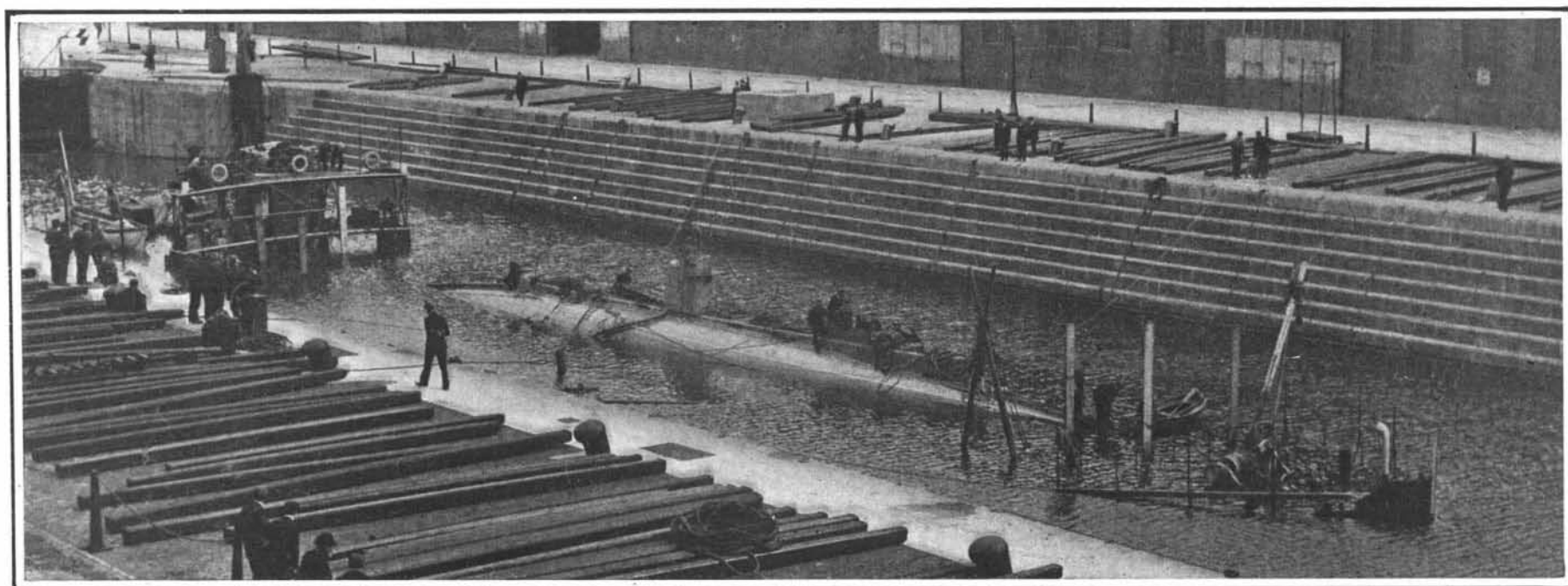
On Friday, December 18, Wilbur Wright improved by 22 minutes and 8 seconds his previous record of September 21, for length of time in the air. On this occasion he made forty-five complete circuits of the Anvors parade ground at an average height of 24 feet and at an average speed of about 36 miles an hour. The total official distance was 99 kilometers (61.47 miles), but on account of the wide turns he made around the posts at the ends of the field, it is estimated that fully 120 kilometers (74.52 miles) were covered. The latter distance gives an average speed

for the flight of 39.2 miles an hour, and the former one of but 32.4. The average of these two speeds—35.8—doubtless gives a fair approximation of the actual speed of the machine. For a motor of but 25 to 30 horse-power, this is a very high average, and it forms but one more demonstration of the efficiency of the Wright aeroplane. After making this record flight for the Michelin cup in the morning, Mr. Wright in the afternoon competed successfully for the height prize of the Aero Club of the Sarthe. A line of small captive balloons was placed at a height of 100 meters (328 feet), and, after making a 9-minute flight, the aeroplane passed over the line at a height of some 25 or 30 feet above it.

FLIGHTS OF THE "SILVER DART."

The new Bell aeroplane the "Silver Dart," after making four short flights on the 14th instant, on December 17 made a flight of over a mile at Hammondsport, N. Y. The aeroplane flew in a snowstorm and against a wind of about 10 miles an hour at the start. After traversing a distance of less than a mile, a turn was made and the machine flew successfully with the wind about half way back to the starting point. The flight lasted 1¼ minutes and the estimated speed was about 40 miles an hour.

Two days previously Mr. Wright made a new demonstration of the possibilities of his aeroplane, when used as a glider. He drove his machine sharply upward to a height of nearly 300 feet. Then, shutting off the motor, he glided down to the ground very easily. In so doing he traversed a distance of about three-quarters of a mile. This demonstration proved the advantage of height when navigating an aeroplane and gave a good idea of the distance that can be traversed in a



FLOATING A SUBMARINE INTO A VESSEL FOR TRANSPORTATION.

of the "Transporter." The decks, hatch combings, and bulwarks were then replaced, and the vessel afterward returned to Barrow to complete the preparations for her voyage to the far East. With their arrival the Japanese navy will include ten submarines, two of which, of 85 tons, were built in Japan. Seven other vessels, of the same size as those built in England, are about to be laid down in Japanese yards.

The photograph shows the submarine on the port side sinking into the hold of the "Transporter."

high in order to take the turns successfully. When he flew with the wind his aeroplane traveled at the rate of about 55 miles an hour, while against the wind it almost stood still. These flights are the first in a closed circuit by this type of machine. The aeroplane showed such a marked improvement in stability when flying in a strong wind, that Farman, although he found in a subsequent test on November 28 that the machine was much faster with but two surfaces, nevertheless decided to return to the use of three.

horizontal direction should the motor stop when the aeroplane is high in the air.

A German company has recently been formed to carry on the aerial transportation of passengers, by means of huge airships of the Zeppelin type. Seven of these airships, with a capacity of ten passengers each, in addition to the crew, have been ordered, and are now under construction. The airships will start from Friedrichshafen, on Lake Constance, and touch at many of the leading German cities.