

# The Etrich Monoplanes

## Description of Several of the Latest Aeroplanes of the Austrian Pioneer

By Stanley Yale Beach

THE Etrich monoplane has perhaps one of the most original wing designs among all machines successfully flown. The ribs are made very flexible at their rear ends, and the wing tips extend back beyond the rear edge of the main plane a considerable distance.

The extremely pliable rear edge of the supporting surface gives under a sudden wind puff, and the equilibrium of the machine is not upset as when a rigid plane is used. The backwardly-extending pliable wing tips still further add to the transverse and longitudinal stability. On the latest Etrich machines these rear wing tips are up-curved normally. The front edge of the wing is also curved slightly upward at the end of the wing, the result being that if the machine starts to dive the pressure on the top of the up-curved rear tip of the wing and beneath the up-curved front edge, tends to check the dive and to right the monoplane. This machine is well balanced, all movable weight being confined to a section a foot or two in width (fore-and-aft) at about the center of the wings. As a result of the above points, the Etrich monoplane has great fore-and-aft as well as transverse stability.

The guiding of this monoplane in a vertical plane is made doubly sure by a long, broad tail, about half of which is flexed upward and downward to elevate or depress the nose of the machine. Triangular vertical rudders of small dimensions are fitted above and below this elevator.

The machine shown in the large picture at the bottom of our front page is the military Etrich monoplane, known as the "Taube" ("Pigeon") type. One of these machines has recently been purchased by the British war office, and the German war department has thirty of them, built in that country by Rumpler. As can be seen from the photograph, this machine has a triangular body. A 60 horse-power four-cylinder, Austro-Daimler water-cooled motor is mounted in the boat-like bow and carries a 6-foot 9-inch "Integrale" propeller on the front end of its crankshaft. The propeller runs at 1,300 revolutions per minute. An A-shaped radiator is mounted against the shear legs which support the guys and which are placed over the rear of the passenger's seat. This seat is directly back of the motor and is separated from it by a curved hood. The aviator's seat is behind the passenger's and is separated from it by a similar hood.

The wings are guyed below to the chassis by a number of cables and are reinforced by a bridge truss of light weight steel tubing to the end king posts of which, projecting above the wings, run up six or eight guys to aid in supporting the wings. A small wheel is placed on the bottom of each end king post. The wings are built up on three main spars. The flexible trailing edge is obtained by means of bamboo strips, which are spliced to the ribs. Nearly half of the breadth of the wing is warped, together with the rearwardly extending tips.

The German aviator Hirth's racing "Pigeon" has a spread of 12.04 meters (39.5 feet), an over-all length of 9.52 meters (31.23 feet), and a height of 2.78 meters (9.12 feet). The chord of the wing is 2.34 meters (7.67 feet) at the body, and the width of the tail is 2.8 meters (9.18 feet).

A second successful type of Etrich monoplane is the "Swallow," shown in one of our illustrations, as well as in plan and elevation, on this page. This machine has wings curved backward, like those of a swallow, the wings being flexible at their rear edges. Although the wings and tail have been shaped as nearly as possible like those of the swallow, the "Zanonia" form, which is patterned after the blades of the small herb of this name, is still made use of, as can be seen by the negative angle of incidence of the wing tips. There is a decided change in angle from the body out toward the tip. Near the body the wings have a decided camber and an angle of incidence of about 5 degrees, while at the tips they are turned upward so that a distinct negative angle is produced. This machine is built largely of steel tubing, the fuselage being made up of wooden rings fastened to the long tubes and the whole being covered with fabric. The machine is a three-seater, the seats being arranged in tandem. Small celluloid windows are placed in the right-hand wing. The control consists of a vertical steering column the wheel of which is moved forward and backward to operate the elevator, and is turned to work the vertical rudder. There is no wing warping on this machine, the flexibility of the wings alone being depended upon to maintain the transverse equilibrium. In flight the machine oscillates rather rapidly about its longitudinal axis. The weight of the machine is 500 pounds. It is fitted with a 60 horse-power motor, and has been driven at well over 70 miles an hour when carrying three

persons. It has fuel capacity for three hours with a full load.

Another interesting machine is the "Limousine," shown in profile in one of our illustrations. The large fish-shaped body of this machine is built up of wooden channel section longitudinals and 12 wooden rings covered with thin sheets of aluminium in the front and with

machine). The machine is provided with a change speed device, which allows of varying the pitch of the propeller when in flight. This machine has flown successfully with three passengers at Josefstadt. Its dimensions are the same as those of the "Pigeon," and the motor is of 60 horse-power.

Another noteworthy machine built by Etrich is the two-motor, 200 horse-power monoplane, constructed for the Russian Government. This machine has one 4-cylinder Daimler motor high up in the bow and carrying the propeller on its crankshaft, while the other 4-cylinder motor is mounted just back of the first motor, low down in the body, and drives a second propeller, mounted concentrically with the first, by means of sprockets and a chain. This second propeller is slightly smaller than the first one, and both revolve in the same direction. This machine has made excellent flights although its speed was not anything extraordinary.

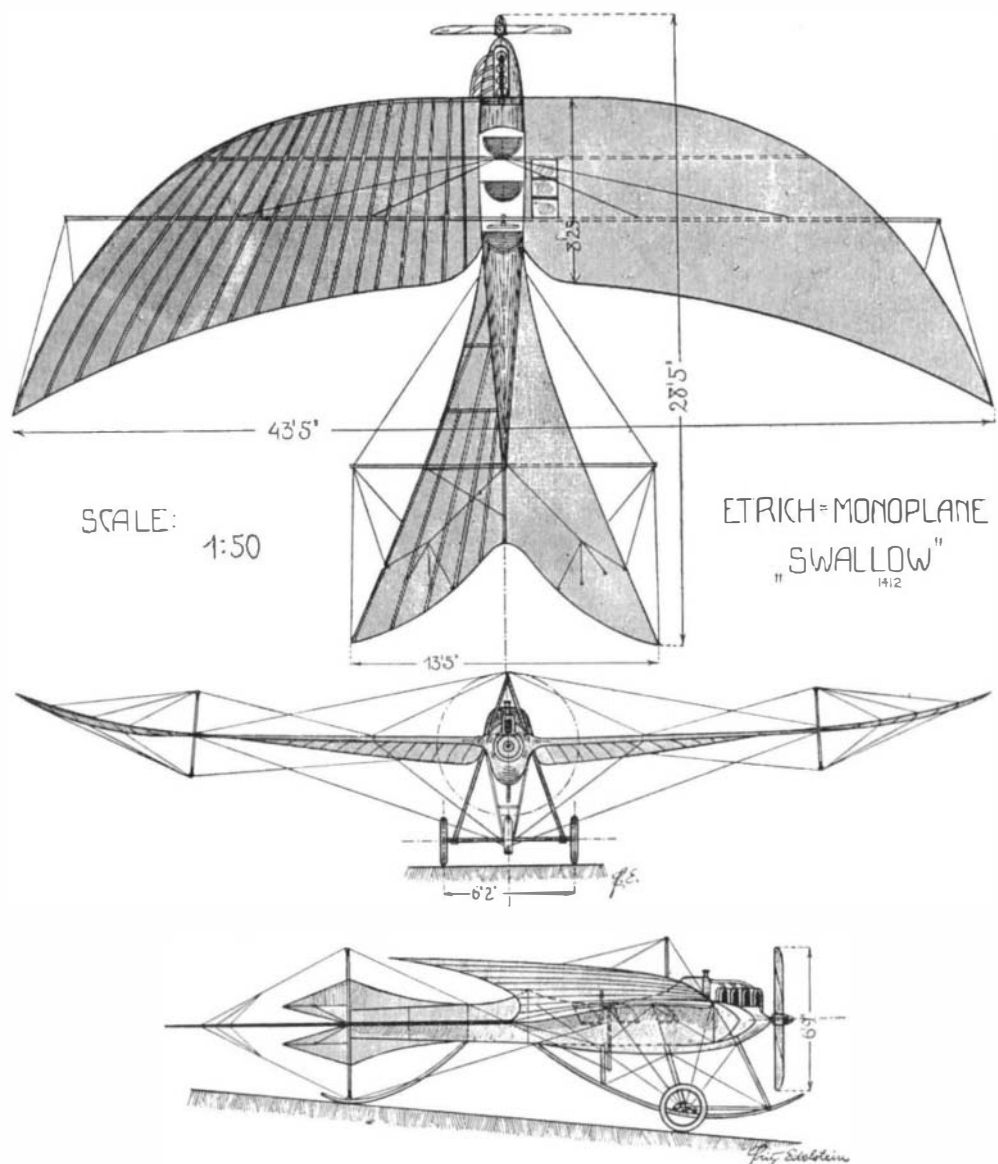
The German aviator Helmuth Hirth has been flying during the last four or five months a new fast Etrich monoplane, fitted with a 95 horse-power Mercedes motor. With this machine he has won a number of the chief events of the past year, such as the upper Rhine circuit, the Berlin to Vienna race, and a circuit race the middle of October, starting at Mannheim and finishing at Munich. In this last event, out of 14 machines which started, six monoplanes, five of them Rumpler "Pigeons," were destroyed and two officers lost their lives, though not in these machines. Only three other aviators succeeded in finishing the circuit. During one stage Hirth's propeller was badly damaged by hail, and the aviator met with terrific wind gusts. Nevertheless, he made the stage of 102 miles from Frankfurt to Nuremberg in an hour and fifty minutes, while Lieut. Joly on a similar machine covered this distance in two hours and six minutes, including a five-minute stop at Wurzburg. Bad weather lasted throughout this circuit, which consisted of a total distance of 515 kilometers (320 miles), and was covered by Hirth in the total time of 3 hours 51 minutes, or at the rate of 83 miles an hour. Hirth has written a very interesting book entitled "20,000 Kilometers in the Atmospheric Ocean," in which he details his experiences in flying 120,000 miles in Etrich machines.



Front of Etrich "Swallow."

Note simple undercarriage, celluloid window in wing, and automobile radiator.

cloth in the rear. Inside the body there are four seats arranged in pairs. In front the spaces between these rings are covered with wire gauze and celluloid, in order to form windows and protect the occupants of the machine from the wind. The motor is placed high up in the bow, and the radiator is located behind the motor as in the "Swallow" (see photograph of latter



Illustrations courtesy Aeronautics.

The scale of above drawing, as reproduced, is about 1:103.

Plan and Front and Side Elevation of "Swallow" Monoplane.

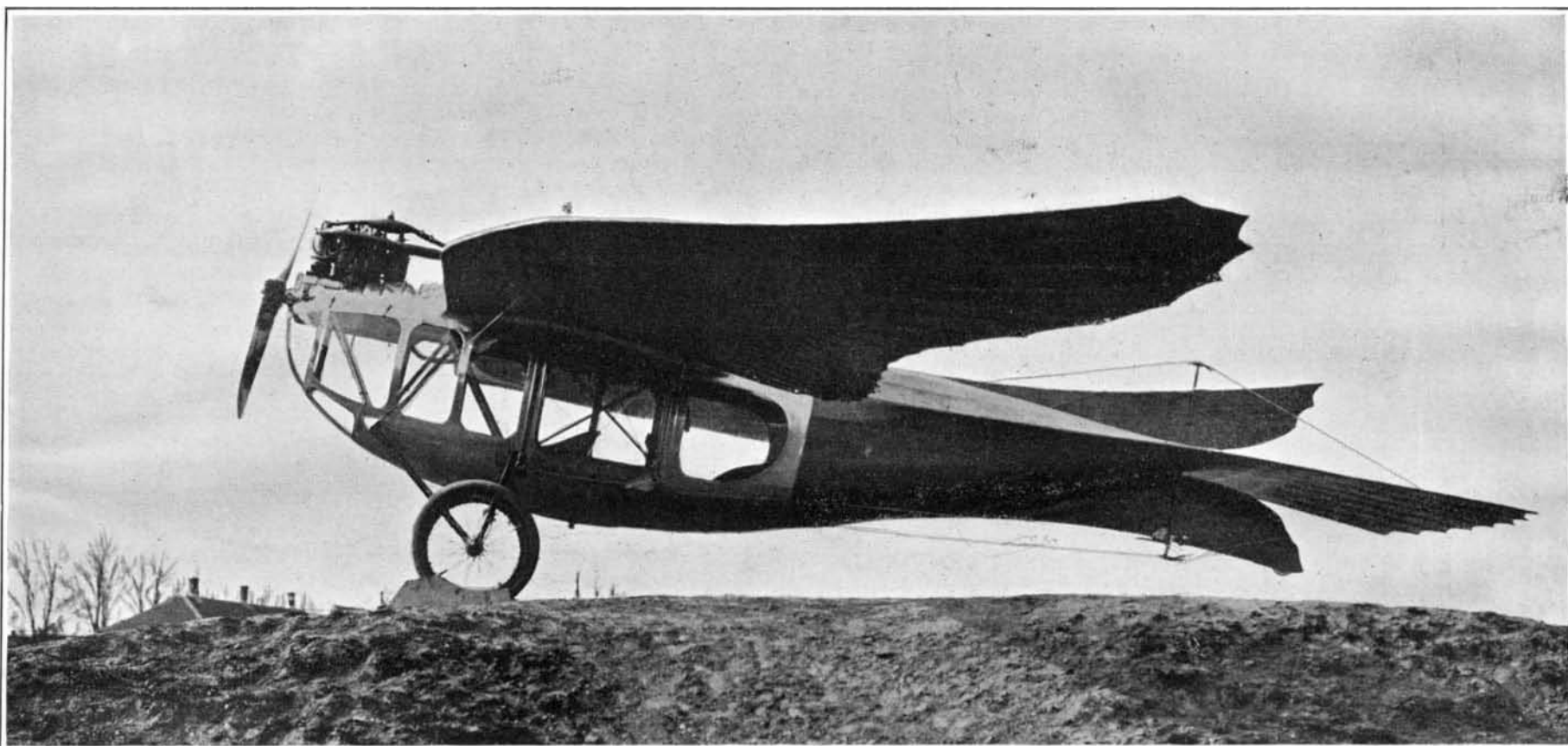
# SCIENTIFIC AMERICAN SUPPLEMENT

Copyright 1913 by Munn & Co., Inc.

VOLUME LXXV ]  
NUMBER 1933 ]

NEW YORK, JANUARY 18, 1913

[ 10 CENTS A COPY  
\$5.00 A YEAR



By Courtesy of *Aeronautics*.

**The Etrich "Limousine"—the Latest Type of Austrian Monoplane.**

The four inclosed seats, arranged in pairs, can be seen in profile through the celluloid windows.



By courtesy of the *Sphere*.

**Three-quarter Rear View of the Military "Pigeon" Type, Seen from Above.**

This picture gives a good idea of the relative positions of motor, passenger and pilot. It also shows the bird-like wings and their guy-rope bracing.

**TWO OF THE LATEST ETRICH MONOPLANES.—[See page 44.]**