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MORANE-SAULNIER 180 LIGHT AIRPLANE (FRENCH)

A Single-Seat Training Monoplane

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Washington  
March, 1929

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

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AIRCRAFT CIRCULAR NO. 93.

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MORANE-SAULNIER 180 LIGHT AIRPLANE (FRENCH)\*

A Single-Seat Training Monoplane

By André Frachet.

The cause of light-airplane aviation now has many enthusiastic followers in France. One of our best-qualified firms, the Morane-Saulnier, has now undertaken the construction of light airplanes.

Their first light airplane was designed especially for the training of pilots (Fig. 1). It is a single-seat "parasol" equipped with a 40 HP. Salmson engine. Its weight empty seems a little high, but it was able to show, without rupture, a safety factor of 15.

Its autostable doubly curved wing profile makes it easy to pilot. Nevertheless, as is desirable for the training of military pilots, its controllability enables it to execute all the customary stunts of looping, spinning, and rolling.

It has a large axleless landing gear, low and with a wide track gauge, enabling it to land without difficulty in a cross wind or on a poor field, and facilitating its control on the ground. Its ground control is further facilitated by an orientable tail skid operated by the pilot.

The Morane-Saulnier 180 was given its finishing touches by

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\*From Les Ailes, November 22, 1928.

Michel Detroyat at Velizy-Villacoublay. Robert Morane has also devoted much time to its development. During its trial flights, the small airplane behaved extremely well.

Under these conditions, it is quite possible that we shall see these airplanes in service long before the clauses of the specifications for the training centers become effective, clauses which provide for the adoption of airplanes of not over 40 HP. It will then be time for the military and maritime air services to provide their schools and squadrons with them.

As soon as the engines and cells are made in large numbers, light airplanes will become accessible to numberless pilots whose financial means, unfortunately, are inversely proportional to their interest in aviation.

Wing.— The M.-S. 180 is a single-seat monoplane with a very high "parasol" wing (Figs. 2 and 3). The wing is divided into two symmetrical parts and is attached to the fuselage by a cabane of steel tubes forming two N's. Each half-wing is rigidly braced by a pair of oblique struts. These struts, without cross wires, are duralumin tubes covered with streamlined fairings. They are attached to the wing spars and to the bottom of the fuselage.

The wing section or profile is of medium thickness, auto-stable and with double curvature, as already used on the M.-S. school airplanes. The profile is uniform throughout the whole span, except, however, at the two tips, where it is tapered so

as to fit the edge strips. The wing has no lateral dihedral, but has a  $15^{\circ}$  sweep back.

The nonbalanced ailerons measure about 2 m by 0.4 m, with hinges parallel to the trailing edge.

The wing structure is mixed, the spars being rectangular duralumin tubes and the ribs spruce plywood. The covering is fabric, doped and painted.

Fuselage.— The framework consists of four spruce or ash longerons united in front by two metal frames. Aside from these frames, the girder is set up in the usual manner with spruce uprights and cross beams and piano-wire bracing. This framework supports a light cowling of wood covered with fabric throughout its whole length, except at the front end which is provided with removable metal hoods.

The pilot's seat is under the rear part of the wing, which is cut away at this point, to allow easy access, good visibility and facility in using a parachute (dorsal or seat), for which space is provided.

The horizontal surface consists of a stabilizer, adjustable on the ground, with a span of 2 m (6.56 ft.), and a two-part elevator.

The vertical surface consists of a fin and a rudder. The rudder and elevator are not balanced. They are mounted, like the ailerons, on ball bearings. All the flight controls are also provided with ball bearings or ball-and-socket joints.

The framework of all the tail members is light metal and is covered with fabric. The whole tail group is held by eight streamlined wires of high-resistance steel.

Engine-propeller group.-- The M.-S. 180 is equipped with a Salmson A.D.9 engine, developing 40 HP. at 2000 R.P.M. This engine operates, by direct drive, a two-bladed wood propeller of 1.8 m (5.9 ft.) diameter. It is mounted overhang, without cowling, on a removable frame attached at four points to the nose of the fuselage.

The fuel tank, which can be dropped during flight, is placed in the bottom of the fuselage. It holds sufficient fuel for three hours' flight at full throttle.

Landing gear.-- This is of the axleless type with a 2-meter (6.56-foot) track gauge. Each half consists of a V, hinged at the bottom of the fuselage to the same fittings as the wing struts, and of an elastic strut attached to the front strut. The latter is braced at this point by two fixed bars, one at the top of the fuselage and the other to the rear strut. The shock absorber consists of rubber rings, without ligature, enclosed in a duralumin case. The orientable tail skid is controlled by the pilot.

## Characteristics

Span	9.00 m	(29.53 ft.)
Length	6.05 "	(19.85 " )
Height	2.29 "	( 7.52 " )
Wing chord	1.55 "	( 5.09 " )
Wing area	13.00 m <sup>2</sup>	(139.93 sq.ft.)
Weight of glider	199 kg	(438.7 lb.)
Weight of power plant	107 "	(235.9 " )
Pilot with parachute	88 "	(194.0 " )
Fuel	35 "	(77.2 " )
Full load	433 "	(954.6 " )
Wing loading	33.4 kg/m <sup>2</sup>	( 6.84 lb./sq.ft.)
Power loading (for 46 HP.)	9.4 kg/HP	(20.44 lb./HP.)
Power per unit area	3.5 HP/m <sup>2</sup>	(.325 HP./sq.ft.)

## Theoretical Performances

Horizontal speed, near ground	135 km/h	( 83.9 mi./hr.)
Ceiling	4000 m	(13123 ft.)
Flight time	3 hr.	at full throttle

Translation by Dwight M. Miner,  
National Advisory Committee  
for Aeronautics.

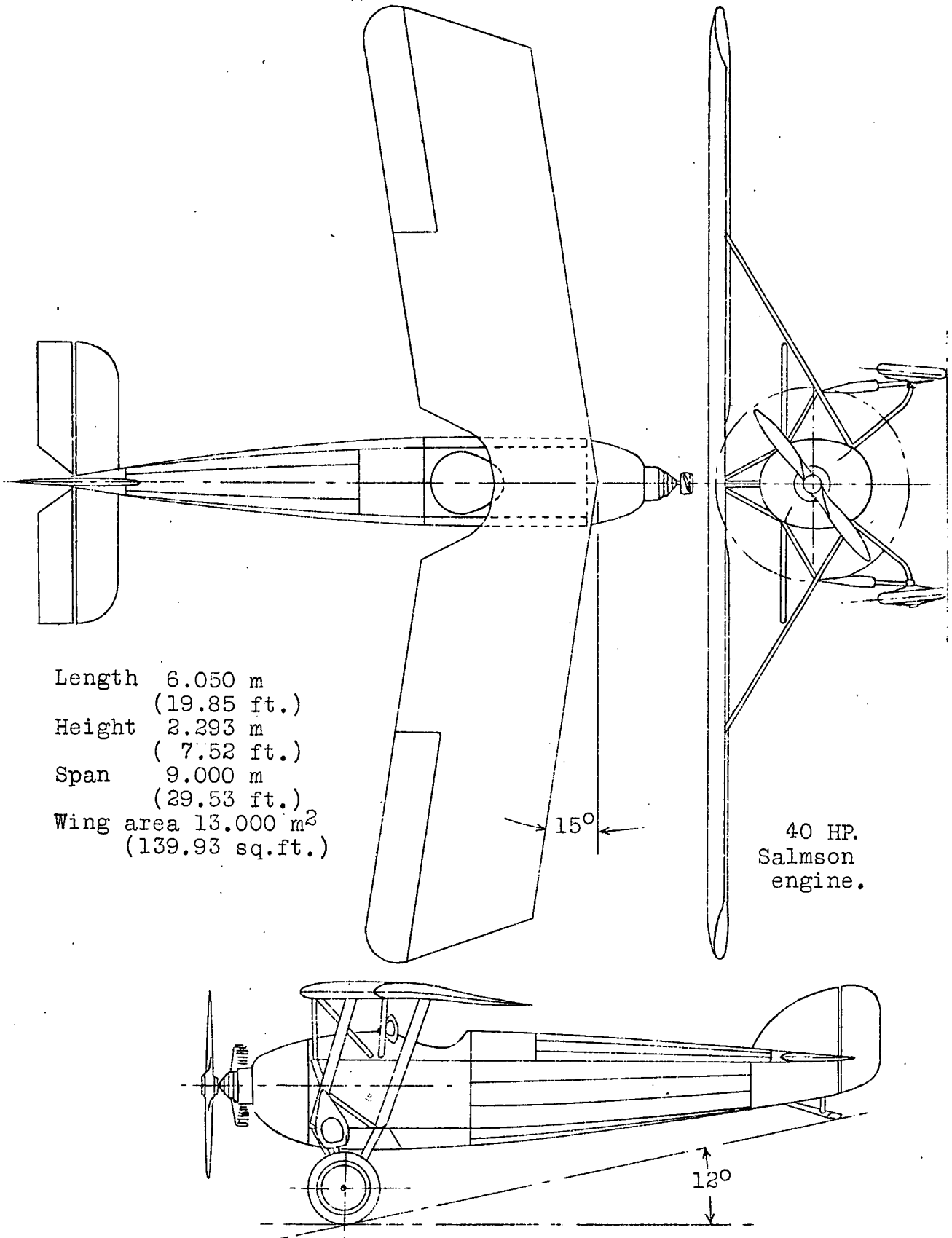
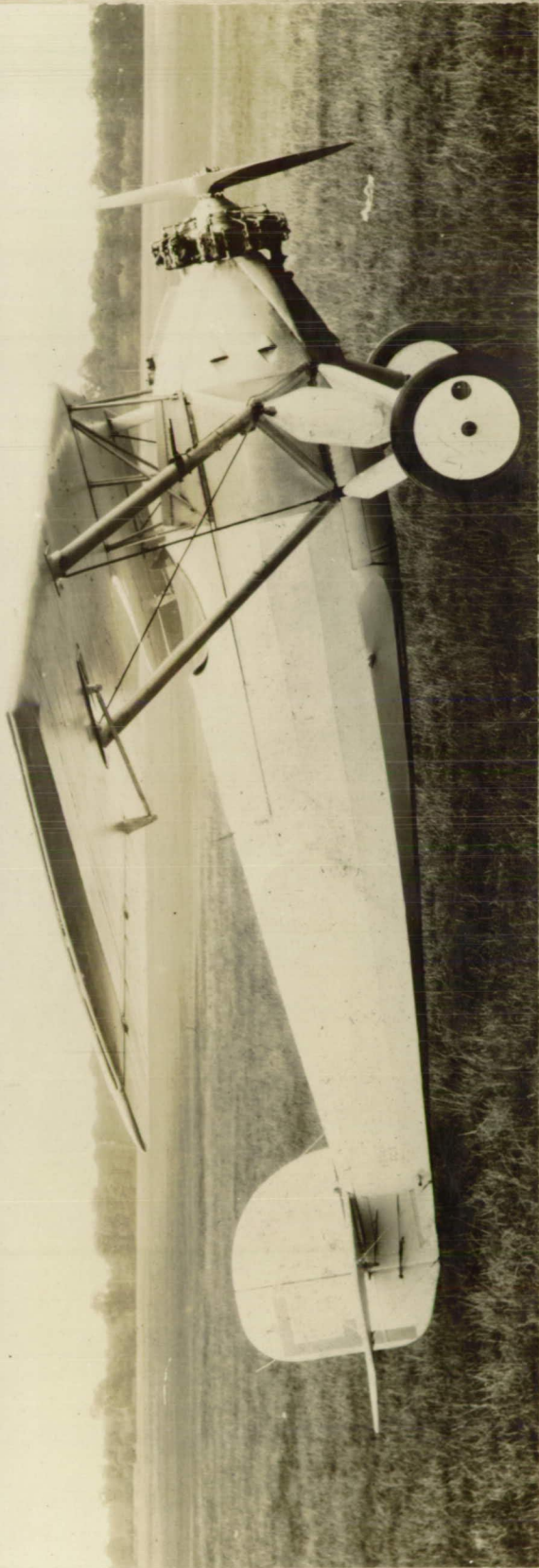
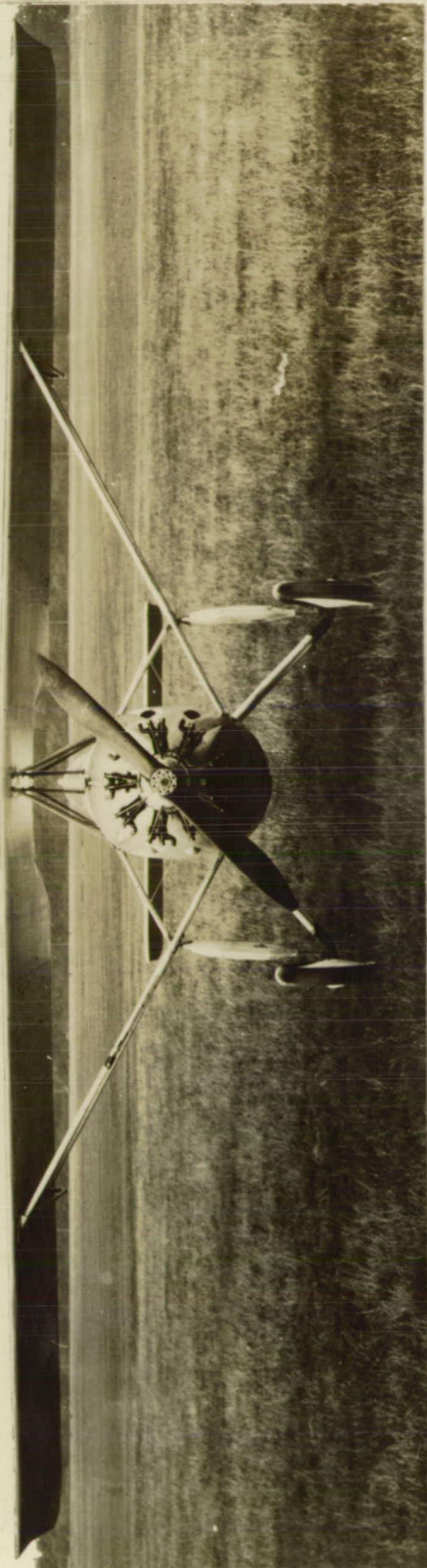


Fig.1 The Morane-Saulnier 180 single-seat training light airplane.





Figs.2,3 Views of the "Morane-Saulnier 180 light airplane.