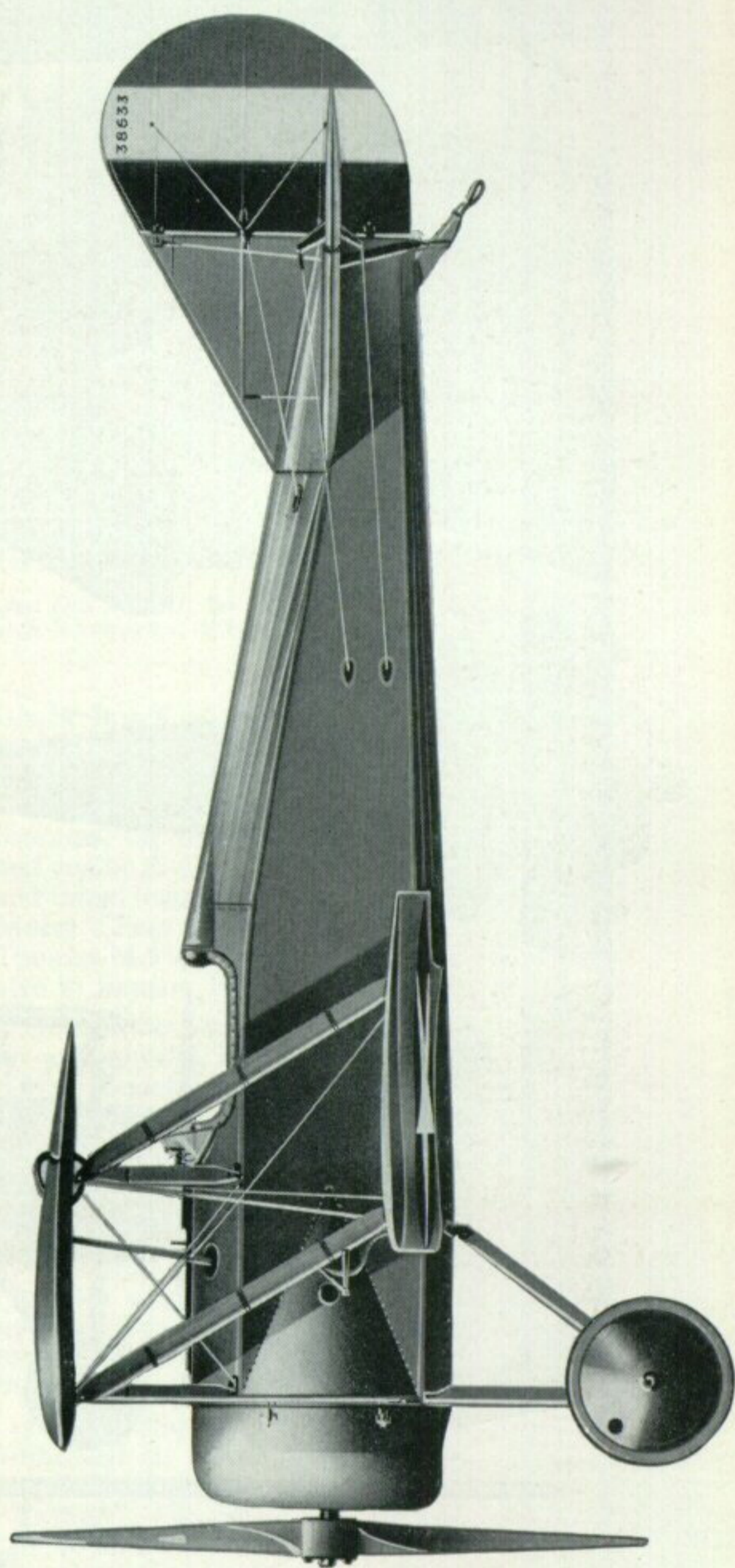
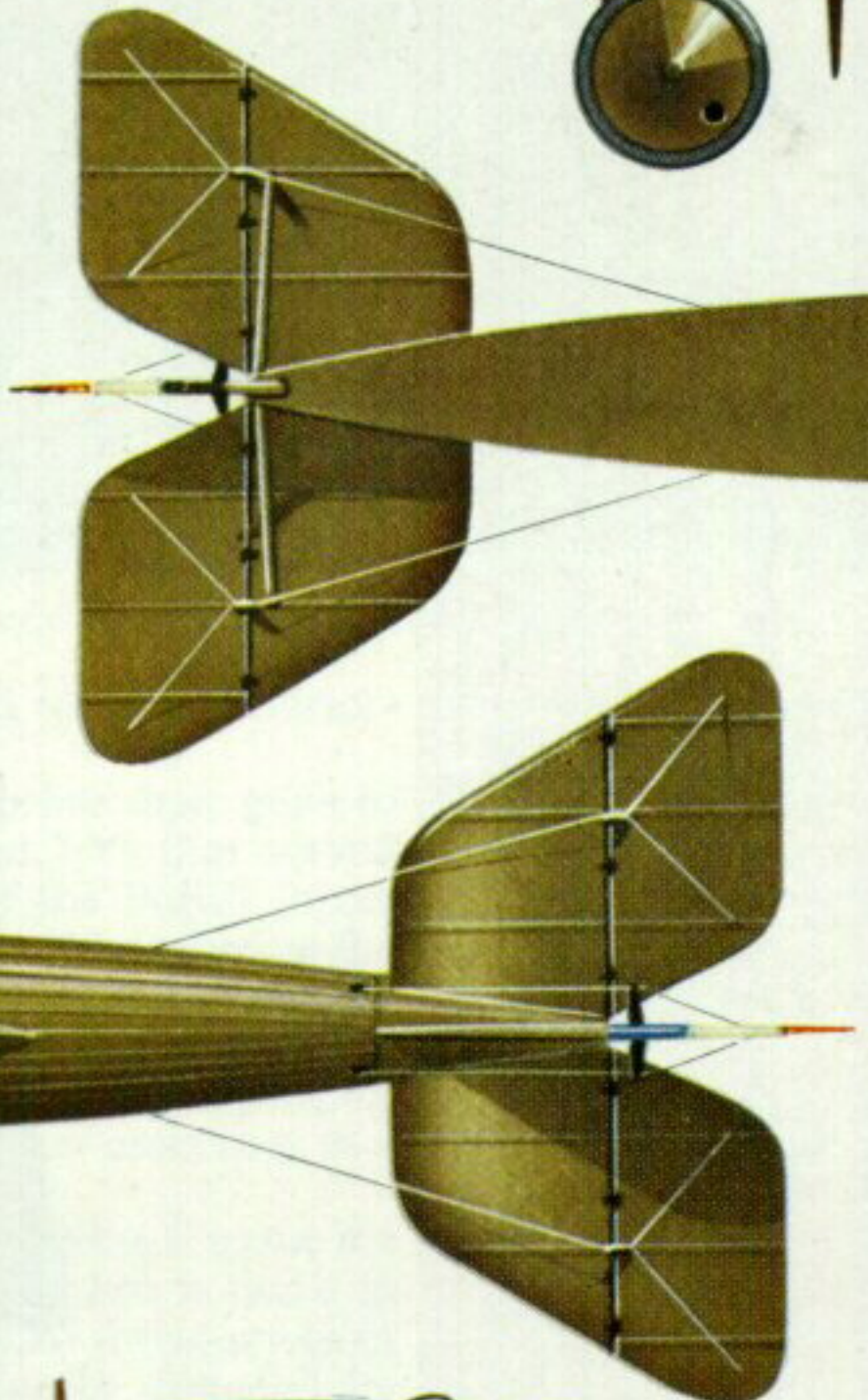
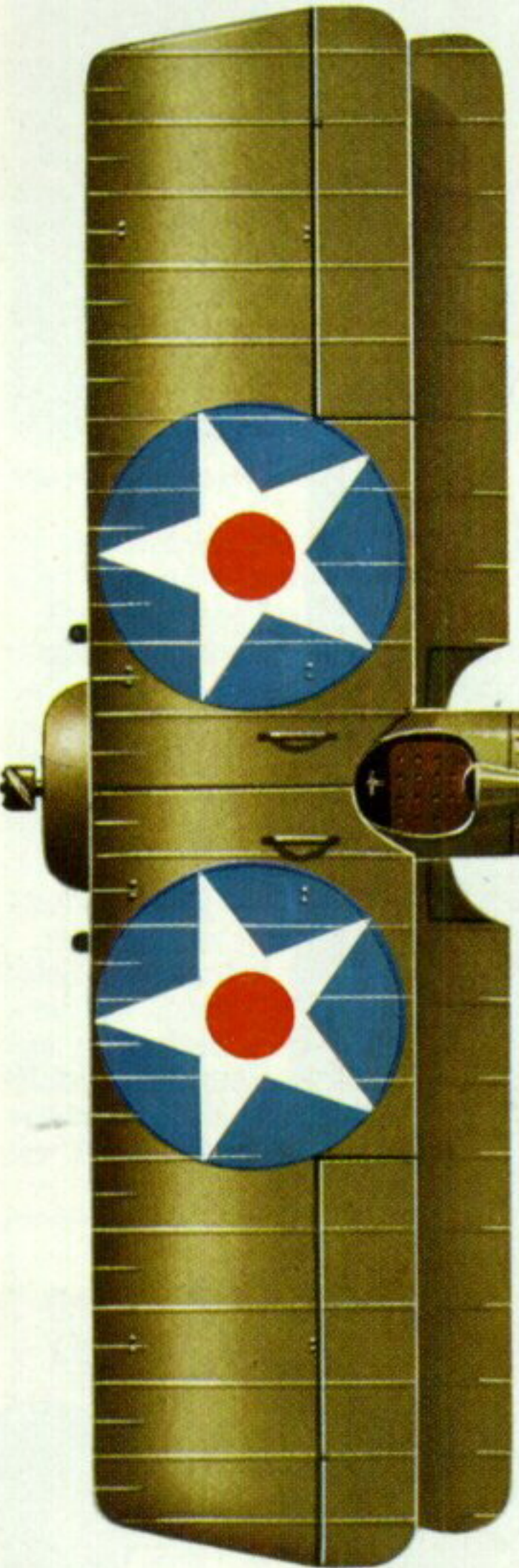
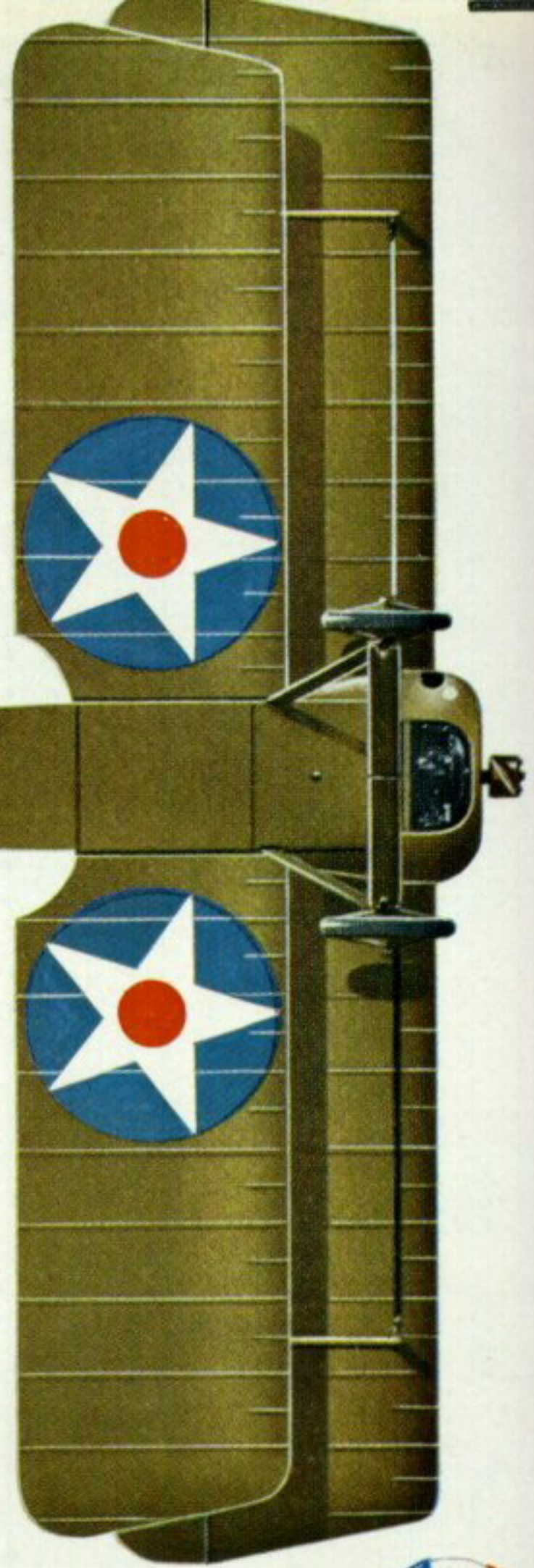


**PROFILE
PUBLICATIONS**

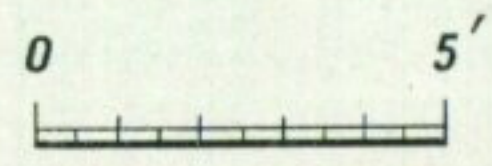
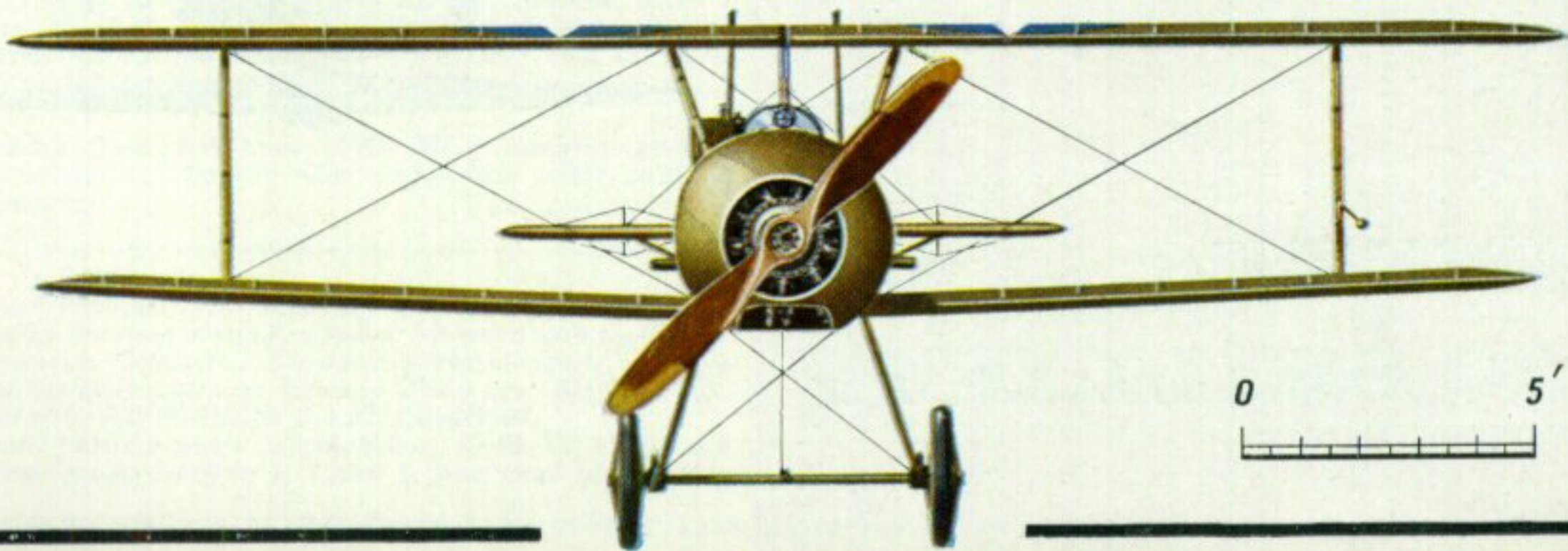
The
Thomas-
Morse
Scout

NUMBER 68
TWO SHILLINGS





THOMAS-MORSE S-4C SCOUT (38633)
(80 h.p. Le Rhône)



The Thomas-Morse Scouts



by Frank Strnad

Thomas-Morse S-4C owned by Paul Kotze of N. Merrick in New York. This aircraft, No. 552, Signal Corps serial 38934, is to be donated to the Smithsonian Institute National Air and Space Museum in Washington, D.C., when the museum is built.

(Photo: the author)

Almost as familiar as the famous Curtiss Jenny, the "Tommy-Scout" will be remembered long after some of the more glamorous aircraft of its era are forgotten. The Thomas-Morse S-4C, more forgiving of mistakes while still retaining the flying characteristics and appearance of the combat types, endeared itself to student pilots. The "Tommy" became the most famous single-seat aircraft built in the United States during W.W.I.

The S-4C was built by the Thomas-Morse Aircraft Corporation, Ithaca, New York, formerly the Thomas Brothers Airplane Company, Inc., founded in Hammondsport, New York in 1910. A young man named William T. Thomas graduated as a mechanical engineer from the Central Technical College of London, England in 1908. Emigrating to America to work for Glen Curtiss at Hammondsport, New York where he had been assisting in the design of aircraft engines, he was soon joined by his brother Oliver W. Thomas. When their experiments led to a successful pusher biplane in 1910, the Thomas Brothers formed their own company at Bath, New York.

By 1913 the Thomas brothers had built a number of successful types of aircraft from metal-hulled flying boats to passenger carrying pusher biplanes and tractor monoplanes.

The same year B. Douglas Thomas (no relation to the brothers) became their chief engineer and aircraft designer. He had an excellent background, having previously worked as assistant aircraft designer for Vickers, Ltd., and later with Sopwith Aviation Co. following his graduation from King's College, London. Glen Curtiss induced him to come to Hammondsport, New York where he assisted in the designing of the Model J tractor, which later became the "Jenny". With Lt. Porte, he also planned the "America", the first multi-engine flying boat built for a proposed trans-Atlantic flight.

In 1914 the Thomas brothers were invited by the

Ithaca Board of Trade to move their plant to that city. At the same time, they operated the Thomas School of Aviation and the Thomas Aeromotor Company. By 1916, with the war growing in intensity overseas, the time seemed ripe to merge the aircraft and engine divisions with the flying school and obtain additional financing. With the financial backing of the Morse Chain Company of Ithaca, New York, the Thomas-Morse Aircraft Corporation was incorporated in January 1917.

At this time, the company concentrated their efforts on a single-seat scout plane. With the entry of the United States into the war only months away, the Aviation Section of the Signal Corps realised the great gap between the Curtiss primary trainers and the French pursuit aircraft then flying in France. The Tommy was unique in that it was the first single seater designed for the purpose of training pursuit pilots. Most foreign governments used obsolete or war-weary types for advanced training. That the United States was starting from scratch, with no pool of old machines to draw on, was the major factor leading to the birth of the Tommy.

In designing the S-4, B. D. Thomas was apparently influenced by his work at Sopwith. The empennage and the wing arrangement were similar to the Sopwith "Tabloid". The use of rotary engines was new in the United States and it was necessary to obtain a 100-h.p. French Gnome for the prototype. The S-4 first flew in June 1917 and attained a speed of 95 m.p.h. Paul D. Wilson, Thomas-Morse test pilot, said of the S-4 prototype: "It landed easily and general flight characteristics were not bad for that period".

During the summer of 1917 flight tests were conducted on the S-4 at the Army Experimental Air Station at Hampton, Virginia (now Langley Field). The following letter explains the proposed changes on the B model as a result of the tests:

Thomas-Morse Aircraft Corporation,
Ithaca, New York
August 9, 1917

Chief Signal Officer of the Army,
Aircraft Engineering Division,
Washington, D.C.
Subject: Changes to Gnome-engined Scout Machine.
Dear Sir:

We wish to acknowledge receipt of your wire of yesterday by Major Souther, and enclose, herewith, confirmation of our reply.

As a result of the tests to which our Gnome-engined Scout machine has been submitted at Hampton, Va., and in accordance with recommendations made by the Engineering Division, it has been decided to put through with all possible speed, an entirely new Scout embodying the following changes:

1. Tailskid increased in section and heavier shoe added.
2. Trailing edges on wings and ailerons changed from wood to steel for greater stiffness and to prevent warping.
3. Flexibility of lower wing overcome by increasing depth of rear spar.
4. Leather toe-clips fitted to rudder bar.
5. Instruments suitably located on dashboard in front of pilot.
6. Stick control replaces Deperdussin wheel control.
7. Throttle lever as supplied by the General Vehicle Company replaces hand wheel.
8. Propeller clearance has been increased by 3 inches.
9. Lift cables in wings moved from their staggered position to a take-off point just aft the engine. These cables are in substantially the same plane as the load.
10. Struts behind the seat in fuselage increased by section.
11. Engine hood to be a spun job and rigidly secured, and not built up as formerly. Provision made for reducing oil leakage to a minimum.
12. All tail control surfaces reduced 10% in area and the ailerons 25%.
13. Fuselage shortened 2 feet 9 inches.
14. Windshield increased to give substantially 100% more protection than formerly.
15. Oil from inboard end of hollow crankshaft prevented from leaking into fuselage.
16. New swivelling king posts fitted to secure direct pull for turnbuckles and control cables.
17. Gasoline tank, gauges, and piping changed in accordance with the recommendations made by the Engineering Division.
18. The workmanship throughout to meet the regular inspection. (The original machine tested at Hampton solely for determining the characteristics of its type. Speed of construction was given first consideration and finish and minor details were treated as of secondary importance.)

We request that authority be given the Army inspector stationed at our plant, to inspect this second scout machine so that a complete report regarding constructional details, changes, and workmanship can be made.

We appreciate and wish to thank you for your suggestions, and trust that the above changes made in accordance with your recommendations, will permit the release of an order for these machines.

Yours very truly,
THOMAS-MORSE AIRCRAFT CORPORATION

Until 3rd October 1917, when an order was placed for 100 S-4Bs (Signal Corps serials 4276 to 4375), all previous contracts had been for less than six planes



Thomas-Morse S-4 prototype during flight tests at Hampton, Va., in summer 1917. (Photo: from the author's collection)



S-4B No. 153, the only surviving example, owned by the late D. B. Woodward and now on loan to the U.S.A.F. museum, Dayton, Ohio. A machine gun has been added, and original 100 h.p. Gnome has been replaced by 80 h.p. Le Rhône. (Photo: Logan Coombs)



Speed Holman's "Gold Medal" S-4C with 90 h.p. OX5 engine. Won second place in 1924 "On to Dayton" race from Minot, N. Dakota, advertising Washburn's Gold Medal flour. (Photo: U.S.A.F.)

except for one order for 25 T-2 biplanes for Britain. The production of 100 S-4Bs inaugurated considerable expansion in the Thomas-Morse organisation.

The B model was a sturdy machine and although used for aerobatic training, no structural failures were ever reported. Unfortunately the 100-h.p. Gnome rotary engine, built under licence in the United States by the General Vehicle Company of Long Island City, New York was a problem. It was hard to start unless skilfully handled and because of the pressure petrol

S-4C, 80-h.p. Le Rhône, used by U.S.N. during W.W.I. Note unusual installation of .30 calibre ground type Lewis gun, apparently with camera attached.

(Photo: U.S. Navy official)





Harry Perry, cameraman on film "Hell's Angels", by S-4C line up, modified to resemble Sopwith Camels. Note centre-section cut-out. (Photo: H. Hugh Wynne collection)



S-4C cracked up for 1930 version of film "Dawn Patrol", in fictional "R.F.C." markings. Actor is Richard Barthelmess. (Photo: from the author's collection)



S-4C now at Air Force museum, Dayton. Seen here in Marine Corps display at Miami, Fla., during early 1960s. Note spurious markings and armament. (Photo: from the author's collection)

system, the fire hazard was high. Overhaul interval was usually under sixty hours. Castor oil consumption was over three gallons per hour, and after several hours flying, the fuselage and the inboard end of the lower right wing would be almost completely covered

with it. It was tail heavy and would ground loop easily if the engine was not kept clear during landing roll. Due to control cable contraction as the temperature dropped, controls became difficult to operate. Ailerons were heavy and did not match other controls. A change was made in the elevator cable to correct high speed elevator flutter, but modifications were relatively few during the production run. Despite these difficulties, the B model had a short take-off run, climbed at about 700 ft. per min., and had a ceiling of over 16,000 ft.

While the first S-4B was being built, the S-4 prototype (a twin-float seaplane) was being demonstrated to the U.S. Navy. Although the floats reduced the rate of climb to 450 ft. per min. and the top speed to 90 m.p.h., an order was placed by the Navy for six aircraft to be known as the S-5 (Navy serial numbers A-752 to A-757).

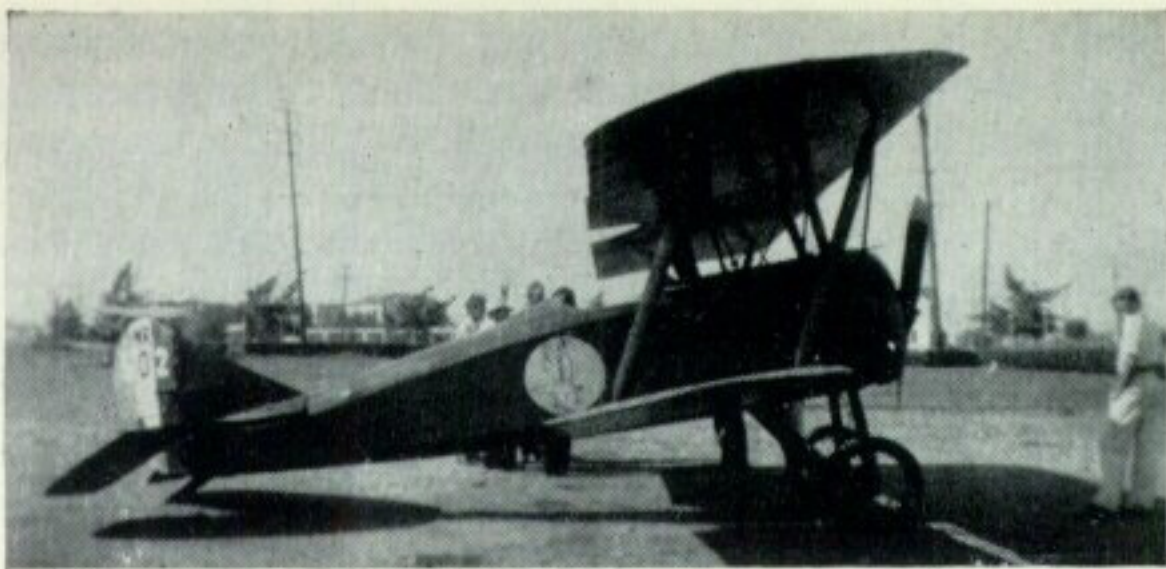
Production aircraft were identical to the S-4B, except two forward "sea sled" floats and a tail float replaced the landing gear. The wooden floats required constant repair. Each compartment required removal of water after every flight and in service they would ship enough water to affect flight performance. Despite these shortcomings, the Tommy was the favourite single-seat seaplane Scout tested by the U.S. Navy at the Naval Air Station at Dinner Key, off Miami, Florida.

The success of the S-4B and the need for additional advanced training planes led the U.S. War Department to place an order for 400 of the improved S-4C model on 9th January 1918.

The major difference between the B and C models was a change from the cable aileron control system to a torque tube system, smaller ailerons and elevators (reduced nearly one-third in area), provision for one machine gun and the 80-h.p. Le Rhône rotary in place of the 100-h.p. Gnome. The ailerons, connected by steel tubes running along the rear spar, were linked to the control stick by pushrods and oval bellcranks, as used in the Nieuport Scouts. Stick forces were reduced and controls more nearly matched, although it was still tail heavy and had the same tendency to ground loop as its predecessors. The temperamental Gnome was replaced by the dependable 80-h.p. Le Rhône rotary which was manufactured under licence in America by the Union Switch and Signal Company of Swissvale, Pennsylvania. The first 50 S-4Cs built (serials 41359 to 41408) used the Gnome until the Le Rhône was placed in production. The 350 Le Rhône-powered Tommies carried Signal Corps serial numbers 38633 to 38982.



Yackey "Sport" flown by W. D. Addems (seen in photo) in 1925 Ford Reliability Tour. Basically an S-4C converted to two-seater, with 90-h.p. OX5 engine, four upper wing panels, lower ailerons sealed over. (Photo: Ford Motor Co.)



Left: S-4C, 80-h.p. Le Rhône, photographed at Los Angeles in early 1930s. Once used as a "movie ship" by the late Paul Mantz, this aircraft has been restored and is now flown by owner Ed Carlson of Spokane. Military serial 38898. Right: Side view of the Mathiesen-Nissen S-4C now in California. (Photos: William T. Larkins collection)



THE S-4C DESCRIBED

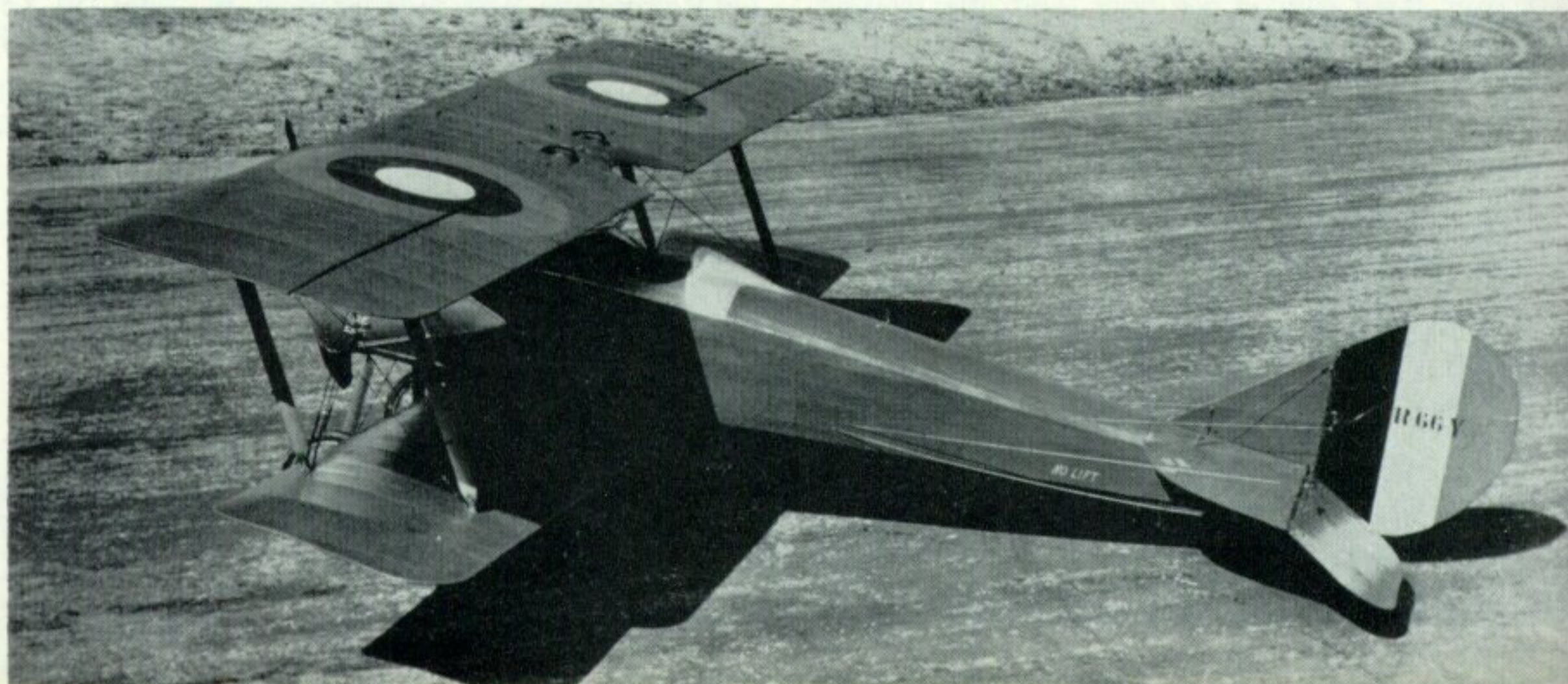
Overall design of the S-4C was typical of the Scouts produced during the war, being a low-aspect ratio biplane. Upper wing span was 26 ft. 6 in. with the lower 25 ft. 6 in. The upper wing chord was 5 ft. 6 in. and the lower 4 ft. 3 in. Twenty-five sq. ft. of the 234 sq. ft. of wing area was used for the ailerons in the upper wing only. The wings were staggered 32 inches on the 100-h.p. Gnôme model and 29 inches on the 80-h.p. Le Rhône model, with the upper panels set at 1° positive incidence and the lower panels at ½°. The upper wing was made up of two panels, without dihedral, bolted together. The lower wing panels were identical in construction to the upper wing and were bolted to fittings attached to steel cross-over tubes on the lower longerons. Both wings were of wooden two-spar construction with spruce spars milled to an "I" beam except at points of attachment to the seven spruce air-foil-shaped compression members. Ribs were webbed spruce plywood with milled spruce capstrips. Leading edge was plywood rolled around and taped to formers. Trailing edge was a thin spruce strip fitted between the trailing edge of the ribs. The R.A.F. 15 air foil was used. Interplane and centre-section struts were streamlined solid spruce with stamped steel fittings at each end. Empennage was typical for the time, fabric covered with non-balanced rudder and elevators controlled by stranded cables. The triangular vertical fin made of steel tubing and wood was bolted to the stern post and a fuselage former, braced with cables from the fuselage and stabiliser. The rudder was also of wood with a steel tube trailing edge and was

attached by three steel strap hinges to the stern post and fin. Stabiliser and elevators were of the same construction with the stabiliser strut braced on the underside.

The fuselage was made of ash longerons and vertical spruce compression members with conventional wire truss bracing. The straight lower longerons and the down sweep of the upper longerons provided a solid mounting for the stabiliser. Light wood formers and stringers provided the fairing for the lower fuselage and the upper fuselage aft of the cockpit.

The fuselage upper deck from the cockpit forward was covered with aluminium. Triangular-shaped engine accessory cowlings on each side streamlined the engine cowling into the flat-sided fuselage. The rest of the fuselage was fabric covered. Some Tommies had a large section of the fabric on the left side of the fuselage held on with lacing so that the panel could be removed for access to the fuselage. A 30-gallon fuel tank and castor oil reservoir were located behind the engine and forward of the instrument panel. The cockpit contained the pilot's leather-covered aluminium seat, controls and the instrument panel. Altimeter, airspeed indicator, compass, tachometer, air pressure gauge, fuel level gauge, and oil pulsator were standard equipment. The engine installation was typical for a rotary. The non-rotating rear engine section of the Le Rhône was bolted to an "X" type steel spider frame that was fastened to the forward end of the fuselage. The circular firewall and the cowlings were of 20-gauge aluminium, the latter being a one-piece construction and fastened with six automotive-type trunk fasteners. Air inlet tubes for the Le Rhône

Probably the S-4 prototype with S-4C wings and elevators, this machine was photographed 6th March 1937 at Tampa, Fla. Registered NR66Y, it is believed to be still in existence in Minnesota. (Photo: Jack Walton)





S-4C owned by J. Mathiesen and J. Nissen of Los Altos, Calif. Seen here in flight, August 1965.
(Photo: Jim Mathiesen)

engine's block and tube carburettor, mounted on the end of the crankshaft, passed through the triangular side cowlings. The landing gear of steel tube struts streamlined with spruce was bolted to the lower longerons. The axle bearer was of ash and slotted to hold the split axle assembly. Shock was absorbed by rubber shock cord at each end of the axle. Tyres were 26 in. by 3 in. high-pressure type mounted on spoke wheels and faired with laced fabric covers.

All the S-4Cs had the basic provisions to mount a .30 calibre Marlin aircraft machine gun, although not all were delivered that way. However, each could easily be converted by adding the gun mount, revised cowling, synchroniser gear, firing mechanism and by drilling through the attachment plate on the right rear centre-section strut. The gun was mounted on the right side of the fuselage upper cowling and synchronised to fire through the propeller. Ammunition was carried in a compartment built into the fuel tank. Expended shell cases and links were ejected overboard although some field modifications added a container to retain them. In place of the .30 calibre Marlin machine gun, a gun camera could be substituted. Some aircraft were fitted with cameras, smoke screen equipment and a radio gear but the majority were used for training in formation flying or aerobatics. They were without a doubt the best advanced trainers of that period, being very manoeuvrable.

Looping was somewhat difficult due to gyroscopic effect of the rotary engine and it was necessary to remove the left rudder stop wire in order to execute a straight loop.

Being rotary powered, the Tommy had some habits common to all such aircraft. *Never* attempt a right-hand turn during a climb-out after take-off. Once a roll to the right was started at low speed, the lateral controls were not enough to overcome the gyroscopic effect of the rotary engine. *Never* attempt a right-hand power-on spin at less than 4,000 ft. to give enough room for a pull out. Conversely left-hand turns and spins were more difficult, but recovery was very rapid. In the early series the front seat bearers were found to be inadequate and were strengthened.

FLYING THE TOMMY

Until the pilot was familiar with the Tommy, a three-point landing without ground looping was difficult. Because the rotary engines could not be throttled down but had to be turned off and on, with the "blip" button on the stick, the resulting alternating periods of sudden applications of torque from that whirling mass, before corrective control could be applied, led

to many a bounce. But, once that tailskid dug in, she stayed down and stopped short.

Henry Garrett Smith's description of his first experience with a Tommy, does more to convey the insecure feeling of a W.W.I novice pilot than anything else in print.

I was a civilian flying instructor and test pilot with the Army in World War I. In 1918 I was sent to Aviation Depot No. 3, Montgomery, Alabama as a test pilot. There they rebuilt all the planes damaged in the South-eastern area of the U.S. Freight cars would come in from all the fields, and sometimes when you opened the doors a conglomerate mess of wreckage would tumble out. The depot had just started operations when I arrived with four other pilots. The first plane to come out of the shop was an S-4B. So they made a big deal out of it. The Governor, the Mayor of Montgomery, all the Army brass, news-cameramen, reporters and several thousand nitwits were there for the formal dedication. As the senior pilot, it was up to me to test-fly the first plane, the Tommy, for the edification of the multitude.

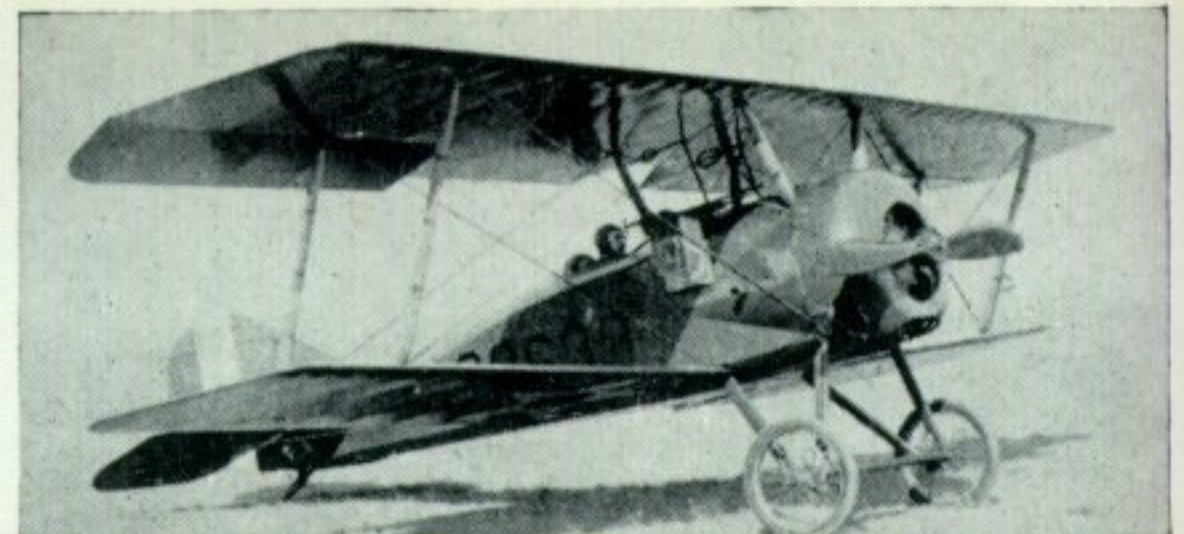
Now, I had never seen a Tommy before, and was scared to death. To make matters worse it had a Gnome. All the reports I had ever heard about the combination were bad, and as you know there was no carburettor and no throttle. All you had to play with was a little lever that controlled the mixture. So one of the mechanics carefully explained that to throttle down for taxiing you 'starved' her . . . and she'd hit on every other cylinder. To take off you opened the valve until they all fired. What he failed to tell me was that if you opened it a little too far, she'd catch fire!

Well, they pulled the chocks and I went rocketing down the side of the field with the engine blipping and blooping, wandering right and left, for the rudder was useless on the ground and you turned her with the ailerons. When I had her more or less straightened out, I gave the handle a half



No. 38898 (now re-named Carlson S-4C) during final stages of rebuilding by Ed Carlson; rigging not complete. Powered by 120-h.p. Ken Royce radial.
(Photos: Ed Carlson)





Left: S-4C formerly owned by Jack Walton of Tampa, Fla., photographed in 1937. This is probably the prototype S-4 with S-4C wings and Le Rhône engine; the fuselage is longer than the standard S-4C. (Photo: Jack Walton). Right: The first Tommy with Le Rhône engine, S-4C 38633, photographed at Taliaferro Field, Hicks, Texas. Note field modification of box for expended cartridge cases, and rudder from different aircraft, 38651. (Photo: Air Force Museum)

a turn and she took off crazily like a bat out of hell. She was so super sensitive on the controls, that it took all the will power I possessed to avoid over controlling. Fifty feet off the ground in my excitement, I had inadvertently pressed the ignition (blip) button that they had failed to tell me was on top of the stick and the Gnome cut out for an instant. Thinking I had starved her, I instantly gave the lever another turn. Immediately she was on fire. Ah, how well I remember! The raw gas whirled around in the cowling and made a terrifying blaze.

I cut the switch. Ahead of me was the end of the field. Across the end ran a telephone line, and 100 feet beyond was a wire fence 10 feet high. In one thousandth of a second I made my decision . . . I dove under the wires and shot over the fence and slammed her down in a cotton field. I jumped out and ran like hell.

So to sum up, there, before the startled eyes of several thousand, I made a perfect ass of myself. Oh yes . . . a mechanic came tearing over on a motorcycle and put out the fire, and the only real damage was a blown tire. This, then, was my introduction to the Thomas Morse Scout.

I had many, many hours in some forty or fifty different ships, all of them Gnome-powered B and C models. Every one was so tail heavy that after a half an hour your arm would get so damn tired from pushing the stick away from you that you would brace your elbow against your gut for relief.

One of the greatest tragedies of my life was that I never got to fly a Tommy with a Le Rhône. I have heard they were far more fun to fly. After I got to know them, I had some swell times. That rotary engine with its terrific torque loused things up for fair when you first tried to stunt them.

Took me a long time to do a clean, straight loop. But their super sensitiveness on the control, conversely, made for precision, and you really felt you were flying.

PRODUCTION INCREASES

With the war effort speeding up, in August 1918, an additional order for 150 S-4Cs was received and on 4th October 1918 another 500 were ordered but on 2nd December were cancelled. A total of 97 aircraft, serial numbers 44578 to 44674 were completed on the August contract, the rest were cancelled. A total of over 600 Tommy Scouts were delivered plus spares equivalent to over 200 aircraft. At the height of production, 30 aircraft a week were being completed. Unlike military aircraft manufacturing methods today,

where every aircraft is flown many times by both company and the Air Force pilots before delivery, during W.W.I, every tenth Tommy was carted by truck to the company flying field for rigging check and a brief performance check. This was done for some time but was found unnecessary towards the later portion of the contract.

Tommies were used at almost all the pursuit flying schools in the United States. The S-5 floatplanes were used at Dinner Key Naval Air Station, off Miami, Florida and small quantities of Bs and Cs were transferred to Naval and Marine training units for the Naval pilot preparedness programme. At the end of September 1918, the three Army fields with the largest numbers of S-4Bs and S-4Cs were Carlstrom Field, Arcadia, Florida with 106 aircraft; Gerstner Field, Lake Charles, Louisiana, 84, and Rockwell Field, San Diego, California, 101. There were also 18 at Barron Field, Everman, Texas, 17 at Taliaferro Field, Hicks, Texas and 20 at Mitchel Field, Garden City, New York and smaller numbers at other fields.

Probably the most famous person to lose his life while flying a Tommy was John Purroy Mitchel, known as "the boy Mayor of New York". Defeated for a second term as Fusion Mayor, he enlisted in the Air Service and had almost completed his training at Gerstner Field, Lake Charles, Louisiana when on 6th July 1918, he fell from his Tommy at 500 feet. Investigation revealed his seat belt was not fastened. Mitchel Field, Garden City, New York was named in his honour.

THE S-4E TO S-7

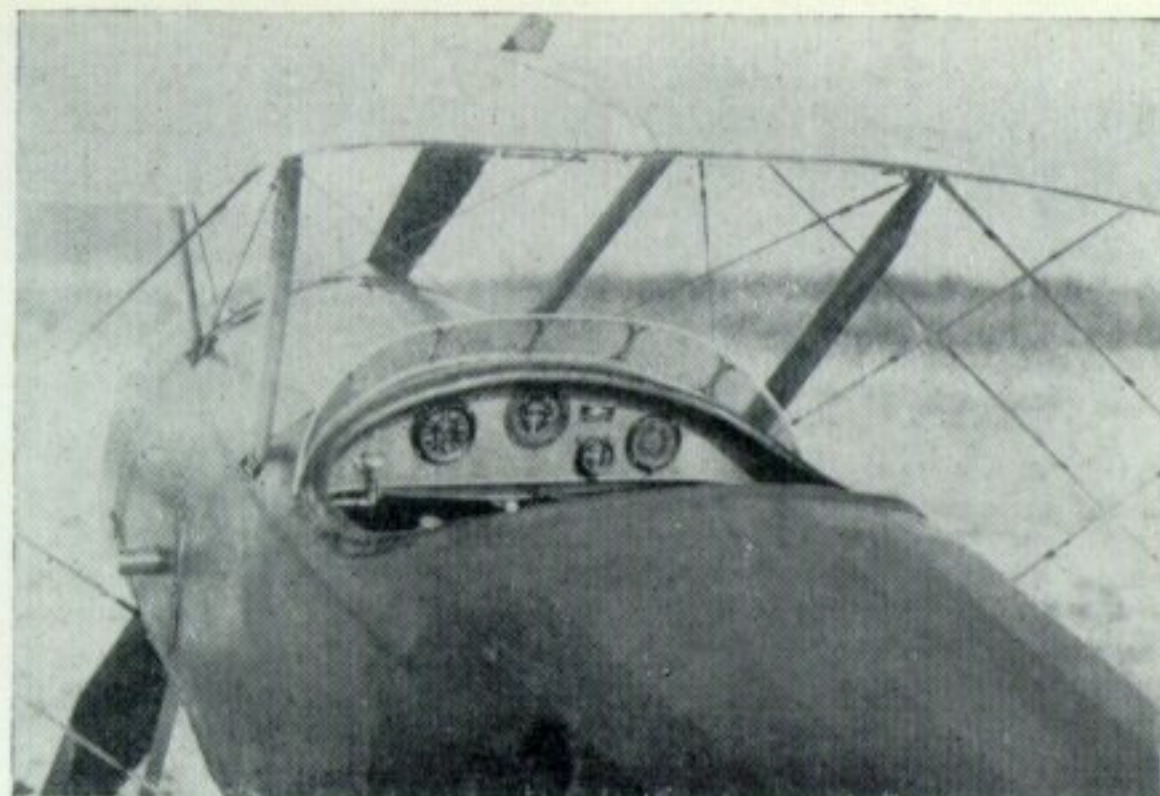
The last single-seat Thomas-Morse Scout model built, the S-4E, was also the most attractive. A highly manoeuvrable advanced aerobatic trainer, it featured sharply tapered wings with about 100 sq. ft. less wing area than the S-4C and was powered with a 110-h.p. Le Rhône rotary. The fuselage was similar to that used in the S-4C, but all tail surfaces were of entirely different design and much lighter. The landing gear

Left: S-4E racer, 135-h.p. Aeromarine engine, photographed in 1925. Carried the legend "Space Eater" below the cockpit. (Photo: U.S. Navy). Right: S-4E, 110-h.p. Le Rhône; last of the single-seat S-4 scouts. (Photo: T-M. Aircraft Corp.)





William T. Thomas, seen here with French Air Force pilot Maurice Tabuteau, inspecting Thomas-Morse scout at Ithaca, N.Y., in 1916 or 1917. (Photo: William T. Thomas collection)



Cockpit of the S-7.

(Photo: William T. Larkins)

was modified considerably and short axles were used. Propeller ground clearance was inadequate and caution had to be used on take-off.

It was also quite tail heavy although not difficult to land despite its higher landing speed (approximately 60 m.p.h.). It could do a fast snap roll and may have been accepted (with modifications) as an advanced trainer but for the fact that the rotary engine was no longer acceptable when the E was built.

The S-4E was flown only in Ithaca until a few years after the war when it was sold to Basil Rowe and Associates who installed an Aeromarine 737 cu. in. engine for racing. The ship was entered in several events in the National Air Races and won one. Its estimated top speed was around 145 m.p.h. The soundness of the design was reflected in the improved performance with a more dependable engine of greater horsepower.

Said to be the best rotary-engined aircraft ever built by Thomas-Morse, the S-6 tandem two-place trainer followed the general lines of the S-4C and with the same 80-h.p. Le Rhône engine had slightly better performance. Completed in January 1919, the company failed to obtain a production contract because the rotary engine was considered too complicated for a student pilot in primary training. It had a ceiling of almost 20,000 feet and a top speed of 105 m.p.h. and a landing speed of 35 m.p.h. According to test pilot Paul D. Wilson, the ability of the S-6 to maintain level flight at low r.p.m. combined with its light controls and good landing and taxiing qualities made it a pleasure to fly. Although it was slightly tail heavy and the cockpit was cramped, its good points outweighed its faults and Wilson's admiration for it is summed up in "it was a honey".

At the same time as the S-6 was being built, a team headed by William T. Thomas was designing and building a two-place, side-by-side trainer, the S-7. Designed, built and flown within a 29-day period, it was the only Thomas-Morse not designed by B. D. Thomas. Using the same 80-h.p. Le Rhône, the S-7 was about 5 m.p.h. slower than the S-6 due to its wider fuselage. It made the newspapers with a non-stop flight from New York City to Ithaca, New York after being displayed at the 1919 New York Air Show.

No orders were forthcoming, again due largely to

the selection of the rotary engine. It was a rugged ship and was later used for mapping in New Jersey when owned by Basil Rowe and Clarence Chamberlain.

THE LAST TOMMY

The last of the Scouts, also with a side-by-side seating arrangement was the S-9. Again only one model was built when no orders were forthcoming from the government. The S-9 used the wings from the S-6, and the fuselage was a widened version of the S-6 but covered with corrugated aluminium skin wrapped full length around oval metal formers. With a 200-h.p. Wright J-3 radial engine, it had a short take-off run, high rate of climb, top speed of 140 m.p.h. and a landing speed of 40 m.p.h. The cockpit was too narrow and the pilot's seat too high when wearing a parachute. On loan to the Air Service at Kelly Field, Texas, the plane experienced structural difficulties during a flight and the pilot was forced to bail out. The aircraft glided down and when close to the ground, lined up with a couple of equally spaced objects, sheared off the wings, and the fuselage continued on to make a belly landing without too much damage. It was later shipped back to Ithaca, but never repaired. The S-9's performance was above average for that type, and was "one of the better aircraft built by Thomas-Morse" according to Paul Wilson.

After the war, with so many Tommies being sold as surplus, the many conversions were limited only by the owner's imagination and/or ability. Because of the large number of surplus Le Rhône, whenever an engine was worn out, it was less expensive to put in another Le Rhône than to overhaul the old engine, consequently Gnome-powered Tommies in civilian use were rare. One company, Tips and Smith, Inc. of Houston, Texas re-manufactured the 80 Le Rhône rotary into a radial called the Super-Rhône ZR-1 of 120 h.p. and ZR-2 of 125 h.p. Some were used in the post-war Tommies. A popular modification consisted of installing the 90-h.p. Curtiss OX5 water-cooled V-8 in place of the Le Rhône and converting the fuselage to carry one or two passengers. Some owners also used all upper wing panels, giving the lower wing a longer span. One company, Yackey Aircraft of Checkerboard Field, Maywood, Illinois was in the business of converting war surplus aircraft. They modified some Tommies into 2- and 3-place aircraft using OX5s and re-named them "Yackey Sports". Their fame was greater than the amount of conversions they did. Not every OX5-powered Tommy was a "Yackey Sport", most of the conversions were done by private individuals. Something similar to the Yackey was the



S-5 floatplane, 100-h.p. Gnome rotary, U.S.N. serial A-762, photographed June 1918 at Dinner Key N.A.S., Florida.
(Photo: U.S.N. official)

Dycer Sport modified in Los Angeles, California in the 'twenties. Since there were spare parts built during the war, the equivalent of over 200 Tommies, many owners bought spare parts surplus and assembled their own ships. Also a lot of spare upper wing panels were used in the home-built Heath Parasol of the mid-'twenties which had been designed specifically for the Tommy wing.

FLYING FILMSTARS

The movies used many Tommies in the Hollywood air epics because they looked like typical W.W.I pursuit ships. They have been disguised, modified and painted to look like British, French and even German aircraft! In *Hell's Angels* the vertical fin was modified and cut-outs added to the centre of the top wings to look like Sopwith Camels. In one of the early aviation movies *The Sky Raider*, featuring Capt. Charles Nungesser, and filmed at Roosevelt Field, Mineola, New York in 1925, the Thomas-Morse S-4C, now owned by Paul Kotze, was painted in German markings. The stories that went around at the time were that Louie Meier flying the Tommy outperformed Nungesser in his Nieuport. While the Tommies flew in the earlier films, by 1938 they cost too much to rebuild and were used mostly for background atmosphere, although the story turned full circle when in 1956 D. B. "Woody" Woodard flew the S-4B he rebuilt in the movie *Lafayette Escadrille*. From 1918 disguised as a British fighter to 1956 as a French pursuit, the Tommies have run the gamut of aviation movies.

S-6, 80-h.p. Le Rhône. Only example of this tandem-seat trainer built.
(Photo: G. Baumwart)



COLOUR NOTES

The lack of gaudy colour schemes or personal markings on the Tommies during the war, because of their use as advanced trainers, was compensated for in later years by the imagination of the Hollywood art directors when they appeared in such air epics as *Hell's Angels* and *Dawn Patrol*. The standard colour of the Tommies, as they came from the factory, was khaki overall, with the military serial number (Signal Corps, later Air Service) in large black numbers on the sides of the fuselage, and small black numbers on the top of both sides of the white rudder stripe. The rudder was marked with red, white and blue vertical stripes with the red at the trailing edge. The wing insignia was a 5-pointed white star on top of a blue circle with a small red circle superimposed on the white star. The regulations called for the star-in-circle insignia to be located directly below on the under-surface of the lower wing if there were no ailerons on those wings, as was the case on the Tommy. Since the ailerons were long in relation to the total wing span, the two insignias were close together and presented an odd appearance. Later in 1918, the regulation was changed, locating the insignia one diameter in from the wing tip. This led to some odd combinations when a new wing

SPECIFICATIONS AND PERFORMANCE

Powerplant	S-4B	S-4C
	100-h.p. Gnome Monosoupape B-9. Mfg. under licence by the General Vehicle Co., Long Island City, New York.	80-h.p. Le Rhône C-9. Mfg. under licence by the Union Switch and Signal Co., Swissvale, Pennsylvania.
Wing span	27 ft.	26 ft. 6 in.
Length	20 ft. 3 in.	19 ft. 10 in.
Height	8 ft. 6 in.	8 ft. 1 in.
Wing area	240 sq. ft.	234 sq. ft.
Max. speed	95 m.p.h.	95 m.p.h.
Gross weight	1,325 lb.	1,373.5 lb.
Empty weight	890 lb.	963.5 lb.
Fuel weight	186 lb.	161 lb.
Oil weight	52 lb.	48 lb.
Wing loading	5.52 lb./sq. ft.	5.88 lb./sq. ft.
Power loading	13.25 lb./h.p.	17.18 lb./h.p.



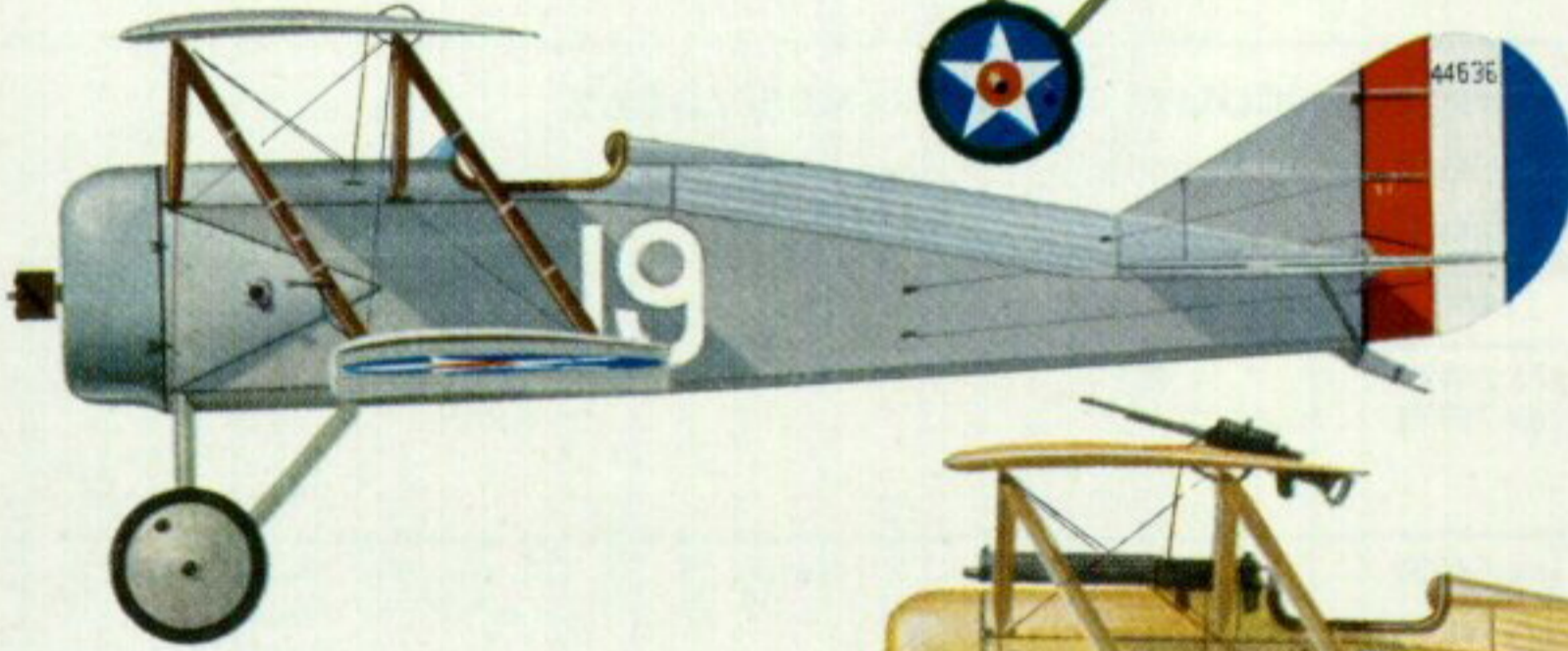
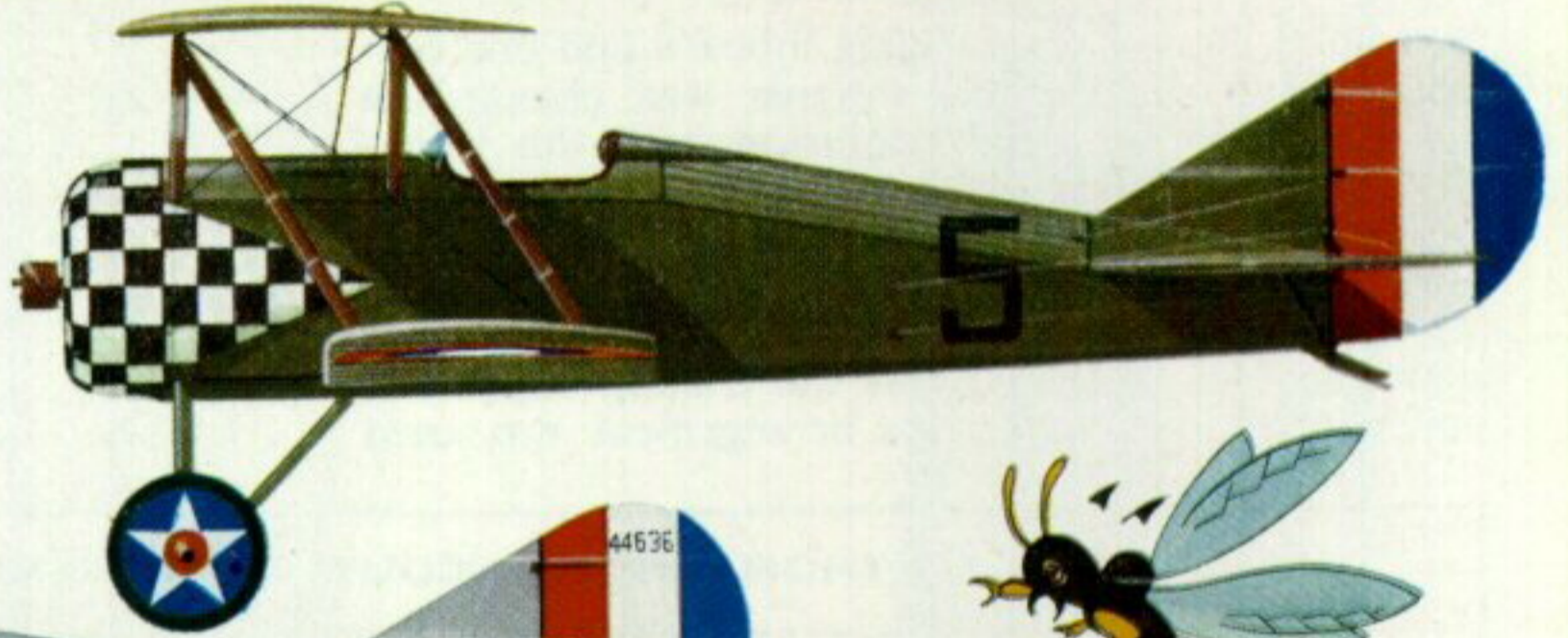
National insignia position 1917-18.

Thomas-Morse S-4B, on loan to the U.S. Air Force Museum, Dayton, Ohio.



Thomas-Morse S-4C.

Thomas-Morse S-4C, owned by Paul Kotze.



Thomas-Morse S-4C, U.S. Navy 1918.



Thomas-Morse S-4C, used in the first film (1930) "Dawn Patrol".



Thomas-Morse S-4E.

National insignia revised position post 1918.

Thomas-Morse S-5 Seaplane, standard S-4B fitted with "Sea Sled" floats and tail float, an arrangement not used since W.W.I.





The S-7 side-by-side two-seat trainer, built and flown in twenty-nine days, January 1919. The only Thomas-Morse aircraft not designed by B. D. Thomas.

(Photo: William T. Larkins collection)

was fitted, having one insignia inboard and one outboard. The star-in-circle insignia was changed in January 1918 to avoid confusion with the white-bordered German Cross. The concentric circle insignia of the former Imperial Russian Air Force was adopted with the red outer circle, blue inner circle and white centre, also the rudder stripes were reversed with the blue stripe now at the trailing edge. The concentric circle and stripe arrangement was used

until the autumn of 1919 when the 1917 system was again used. Apparently no Tommies came from the factory with the concentric circle insignia and any that were painted that way were done in the field or during overhaul.

© Frank Strnad, 1966.

PRODUCTION

All aircraft built by the Thomas-Morse Aircraft Corporation, Ithaca, New York.

1	S-4	Prototype (also used for S-5 Tests) no military serial number.
100	S-4B	Military Serial No. (Signal Corps) 4276 to 4375 on contract No. 20047 of 10-3-17. 10 of the above S-4Bs re-assigned to the U.S. Navy and issued Naval serial numbers A-3235 to A-3244.
50	S-4C	(Gnôme) Military Serial No. 41359 to 41408 on contract No. 20047 of 10-3-17.
350	S-4C	Military Serial No. 38633 to 38982 on contract No. 20448 of 1-9-18.
97	S-4C	Military Serial No. 44578 to 44674 on contract No. 720205 of 8-2-18. 4 of the above S-4Cs re-assigned to the U.S. Navy and issued Naval Serial Nos. A-5855 to A-5858.
6	S-5	Military Serial No. (Navy) A-757 to A-762.
1	S-4E	No Military Serial Number.
1	S-6	No Military Serial Number.
1	S-7	No Military Serial Number.
1	S-9	No Military Serial Number.

THOMAS-MORSE SCOUTS IN EXISTENCE TODAY

Model	Owner	Identification or Registration No.	Manufacturers Serial No. (c/n)	Military Serial No.	Engine	Remarks
S-4B	Mrs. D. B. Woodard, Richland Centre, Wisc.	N 74W (ex-7077)	153	—	80-h.p. Le Rhône	Flyable, on loan to and display at U.S.A.F. Museum, Dayton, Ohio.
S-4C	Western Reserve Hist. Society, Cleveland, Ohio.	(ex-5452)	633	44610	100-h.p. Gnôme	Non-flyable restoration, on display (Thompson Prod. Museum Collection).
S-4C	U.S.A.F. Museum, Dayton, Ohio.	(ex-7695)	—	38944	80-h.p. Le Rhône	Non-flyable. Being prepared for display.
S-4C	J. Mathiesen and J. Nissen, Los Altos, Calif.	N 38976 (ex-18128)	—	38978	80-h.p. Le Rhône	Now flying.
S-4C	Paul Kotze, North Merrick, New York.	N 1115	552	38934	80-h.p. Le Rhône	Flyable, but now stored, destined for Smithsonian.
S-4C	E. D. Carlson, Spokane, Wash.	N 38EC (ex-NR 502)	—	38898	120-h.p. Ken Royce	Now flying.
S-4C	Ernest Freeman, Torrance, Calif.	—	—	41382	80-h.p. Le Rhône	Almost completely rebuilt, enough parts for a second aircraft.
S-4C	Rudy Hazuka, Wilmington, Calif.	(ex-3932)	—	38882	80-h.p. Le Rhône	Being rebuilt, almost enough parts for a second a/c.
S-4C	Herbert S. Fyfield, Washington, Conn.	(ex-3905) (ex-c-1358)	—	38910	—	Ex-Yackey Sport. Being rebuilt.
S-4C	Lloyd A. Milner, Minneapolis, Minn.	—	—	—	80-h.p. Le Rhône	Parts from 2 a/c—slowly being rebuilt.
S-4C	Tallmantz Aviation, Santa Ana, Calif.	—	—	—	80-h.p. Le Rhône	Unrestored, parts from 2 a/c.