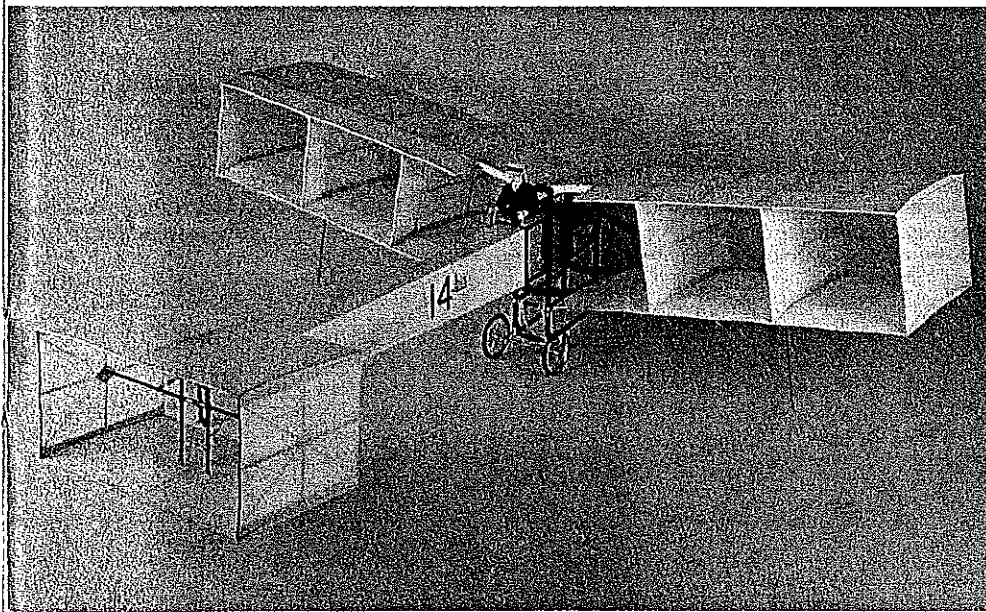


The practiced eye of Paul Garber (l), Curator Emeritus of the National Air and Space Museum, examines Don's RC model of the first heavier-than-air craft to fly in Europe. No, the pilot is not facing the wrong way! The model is covered with Sig Silray and painted with white dope. 355

Don Srull Photos by John Preston and Jack Abell Santos-Dumont

14-bis

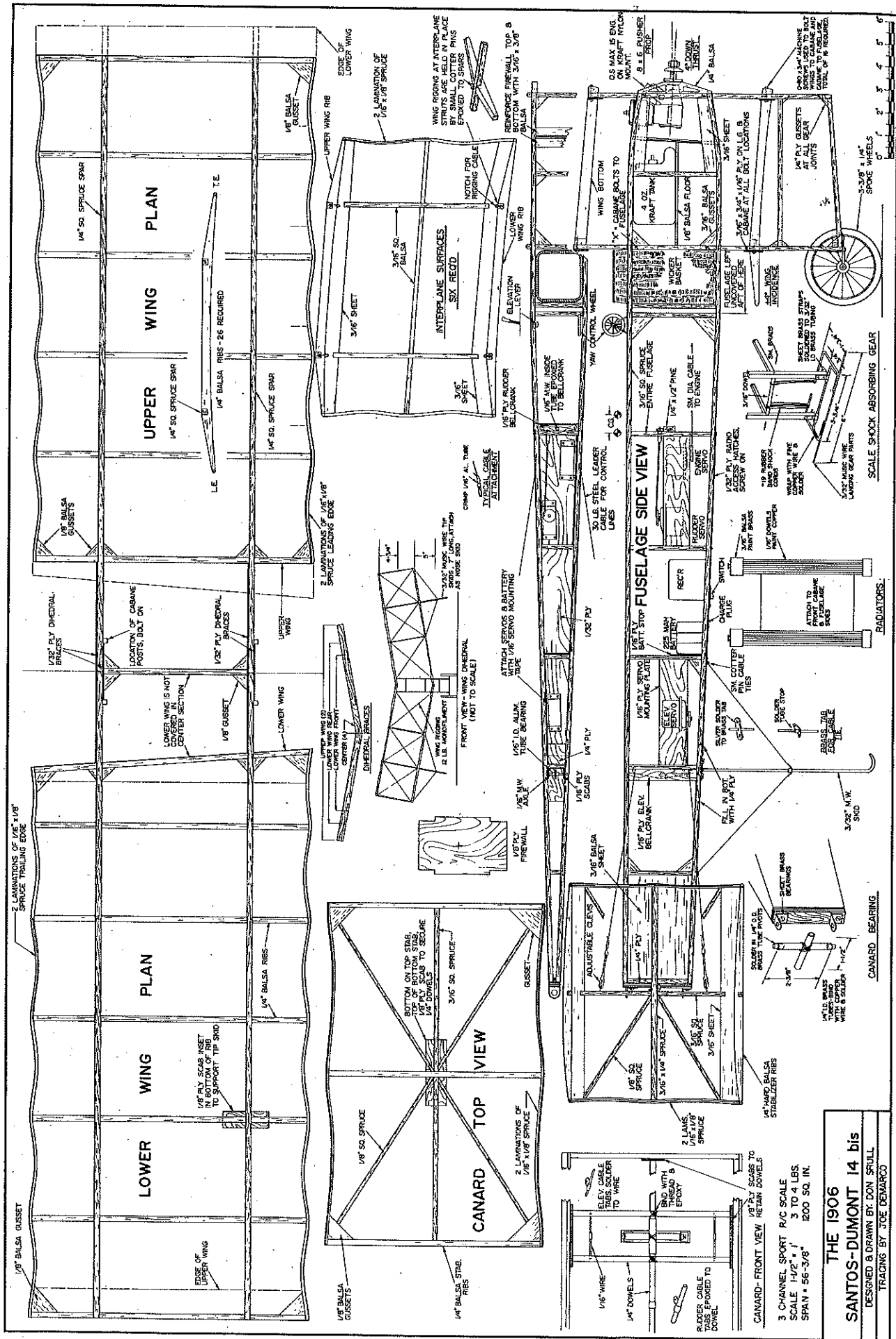


The translucent silk (Silray) covering shows off the model's scale framework to best advantage. The large dihedral and six interplane surfaces provide great directional and lateral stability.

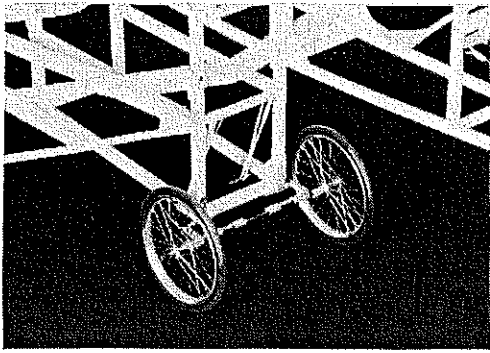
IN SPITE of the very unconventional appearance of the 14-bis, it has proven to be a remarkably good modeling subject. There have been several very successful Indoor and Outdoor Rubber Powered Scale 14-bis models over the years. Recently one placed first in the 1980 AMA Nats Indoor Scale event, and another larger 14-bis model won the 1980 FAC Nats Jumbo Scale competition. I have built four Free Flight models of Alberto's vintage aircraft in various sizes, and can attest to their fine performance.

Partly because of the success with Free Flight models, and partly because of a fascination with canard configurations, I decided to build an RC version of the plane to help commemorate the 75th anniversary of its pioneering flights in Europe. The model was designed to a scale of 1 1/2 in. = 1 ft., which yields 55-in. span and 800 sq.

This unusual airplane makes a very good RC Sport Scale model for calm conditions. Its slow flying speed makes it suitable for small field flying. If you like your modeling subjects to be out-of-the-ordinary, here's the project for you. For .15 engines, three channels.



THE 1906
SANTOS-DUMONT 14 bis
 DESIGNED & DRAWN BY DON SPILL
 TRACING BY JOE DEMARCO



Shock-absorbing gear helps to protect those pretty Fulton Hungerford wheels—and it's scale.

in. wing area.

Since no authentic, accurate drawings were available from any source known to me, a research effort was initiated to develop construction drawings. With the kind help of Tom Crouch of the National Air and Space Museum, I was able to assemble enough data to put together a reasonably accurate general arrangement drawing, which is included with this article. The drawing shows two of the many versions of the 14-bis (which was almost continuously modified and repaired during its short life).

The only intentional deviation from true scale in the model is an enlargement of the canard horizontal surface span to help increase longitudinal stability. Otherwise, scale dihedral (a whopping 10°), the crazy scale airfoil, scale control motion, scale shock-absorbing landing gear, etc., are used on the model. Due to the light wing loading of 10 oz./sq. ft., an O.S. Max .15 is adequate power for this large model. Covering is Sig Silray (true scale would be silk) with a low-shrink butyrate dope finish.

The model is certainly an eye-catcher on the ground and spectacular in the air. It is not a beginner's model, however. Neither is it a windy weather airplane. It is at its best on those calm summer evenings at the local flying field—to be enjoyed simply because of its slow and graceful flight.

Construction. A few comments on some of the unusual features will be given, rather than a full construction sequence. The model is built largely of spruce, and for that reason I recommend the use of Titebond or equivalent glue. No other glues, including cyanoacrylates, seem to work as well on spruce. After building the simple fuselage frame, build in the radio control system. Make sure the linkages will give you approximately 1½

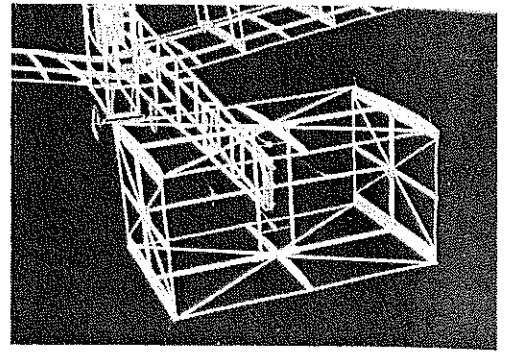
in. of rudder movement, and 1 in. of elevator movement, as measured at the corners of the canard surface trailing edges.

The wing and canard leading and trailing edges are scalloped as shown on the drawing. Notice that they are *not* like wire trailing edges. On the original plane, they were made of small diameter bamboo rods which resulted in a smooth, wavy outline. A strong, simple and accurate way to simulate this (try to beat that!) is to laminate the edges from two pieces of 1/16 x ¼ spruce. After laying out the ribs and spars, put the wet laminated edge in place, and use a nail between each pair of ribs to force the scalloped shape. When dry, it will hold its shape and can be sanded to a half-round section.

Keep all of the structure behind the pilot's wicker basket as light as possible. Conversely, you will notice that the fuselage forward section and the canard surfaces are rather beefy, since some nose weight will be needed to balance the rear engine location. If you want a more scale-looking model, mount the engine in the scale location directly behind the cockpit, and use a drive shaft just as the full-size airplane did.

The pilot's wicker basket in which Santos Dumont stood while flying was made for the model from a small woven flower pot holder. It was cut up, soaked in water, and formed to fit the fuselage.

If you use Silray or silk covering, use low-shrink clear dope, such as Sig Litecoat, to seal the cloth. Otherwise, the rather fragile framework will tend to warp as the dope continues to cure and shrink. Doped silk is so translucent that the



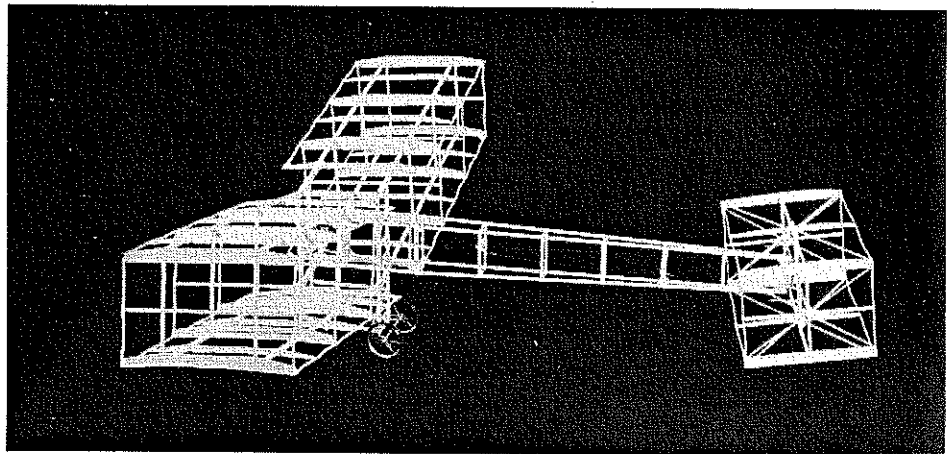
Universal joint in the canard and the control surface wires are hooked up before covering.

radio system can be clearly seen inside the fuselage. A few light coats of antique white dope, made from white with a touch of cream and black added, gives Silray a nice opaque finish. The exposed wood structure should be stained dark brown with very thin brown dope or ink. When dry, a coat of satin clear epoxy or urethane varnish will seal the wood against fuel seepage.

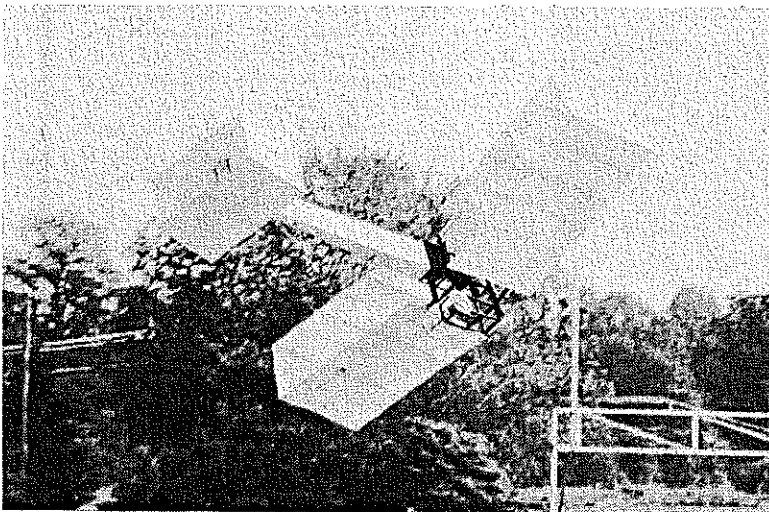
The wings, cabane and landing gear are fastened to the fuselage with 0-80 bolts. Monofilament rigging and Fulton Hungerford wire wheels finish off the model.

Flying. Before flying, make sure that the model balances at the point indicated on the plans. Add ballast as necessary. Make sure that the wing and canard incidence angles are as shown, and that

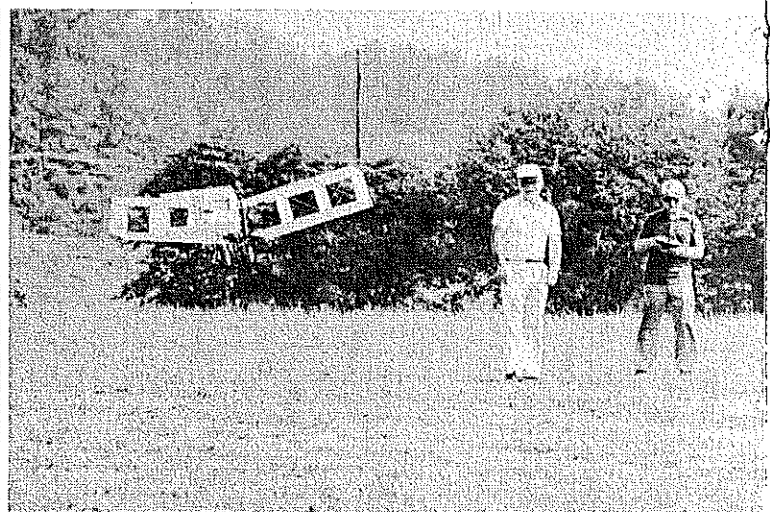
Continued on page 138



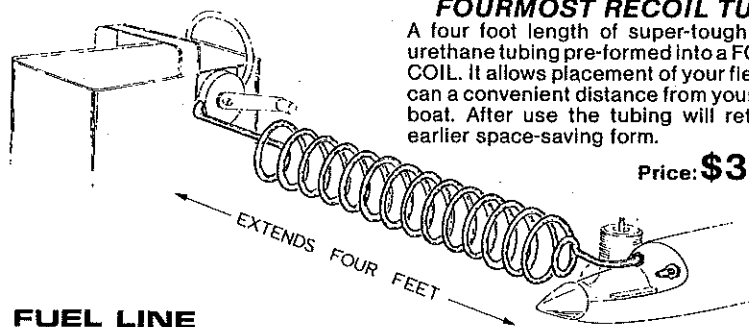
The structure is spruce and balsa—light, strong and efficient. Framework is beefier at the front end, for strength and to help balance out the weight of the engine in the rear.



Any schoolyard provides adequate space for the slow, leisurely flight of the 14-bis. The model turns much better than the prototype did! Note the two tiny wheels attached to the forward skid, to help takeoffs from grass.



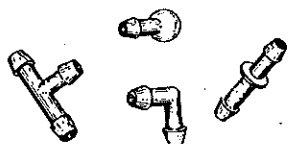
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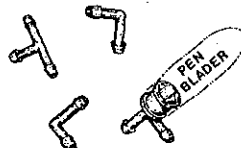
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And of course there are Nakashima cartoons, and photos galore.

Prices are: \$7.50 to NFFS members and non-U.S.A. residents, \$8.50 to others. Postage: Fourth Class, anywhere in the world, any number of copies, \$1.50. Order from: NFFS Plans and Publications, 4858 Moorpark Ave., San Jose, CA 95129.

New products department. The following items have come to my attention.

P-30 Kit offered. Campbell's Custom Kits is now offering a kit for the Souper 30, conforming to the rules for P-30 class—smallest of the Outdoor Rubber-Power competition classes. Kit includes all hardware, 9½-in. plastic prop (required by the rules), pre-cut ribs, tissue, strip-wood, plans, instruction, and rubber. Price, \$10.98. Extra-cost items offered are: spare prop, \$.50; spare rubber motor, \$.35; Jim Crockett CR-102 winding hook, \$1.95; No. 30 blast-proof winding tube and winding wire, \$1.95.

Other items offered by Campbell's include Outdoor Hand-Launch Glider kits, regulation Payload dummy. Campbell's will custom-cut any Free Flight kit or plan not in production. Address: Box 5996, Lake Worth, FL 33461. Phone: (305) 968-1045. Shipping: \$2.00 per order, free for orders of \$25.00 or more.

Bob Meuser, 4200 Gregory St., Oakland, CA 94619.

Flying Near Airports? Be Careful!

Free Flight or Radio Control flying near airports, or in any situation which might involve the possibility of models being in the vicinity of full-scale aircraft operations, must be avoided—or conducted so as to eliminate any dangerous situations. Models should not be flown in the proximity of full-scale aircraft operations unless the flyer has someone else with him for the sole purpose of watching for full-scale aircraft and supervising the flying so as to prevent accident possibilities.

PROTECT YOUR RIGHT TO FLY!

Santos-Dumont 14-bis/Srull

Continued from page 68

no warps have crept into the wings. Using a pusher prop (Tornado makes an 8-6), try the first test flights R.O.G. However, if you fly from a grass or dirt field, the forward skid may provide too much drag for reliable takeoffs; in this case, add a small wheel (½ or ¾ in. will be okay) to the front skid. (If you look closely at the flight photos you will notice a pair of small nose wheels on my model.) Once trimmed, hand-launching will be possible. If you fly from a hard surface runway, the scale skid should be satisfactory.

The 14-bis will take off and fly at an amazingly slow speed. Stalls are so gentle you may fly through one without even noticing; the speed drops slowly as the nose rises, and a straight mushing descent begins. Simply drop the nose a

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little to pick up speed, and you're on your way again. Remember that directional control is better with a little flying speed, so don't slow up too high or far out in the landing approach.

Good luck, enjoy, and have fun!

Santos-Dumont/Crouch

Continued from page 74

enough that he had flown.

The 14-bis was a technological dead end which had no discernible influence on the subsequent development of the airplane. Yet the flight of November 12, 1906 had an enormous impact, for it inspired other experimenters to redouble their efforts to join Santos-Dumont in the air.

The 21 seconds that he spent flying over the field at Bagatelle represented the peak of Santos-

Dumont's career. He remained active in aeronautics through 1910 and developed, among other things, the popular little Demoiselle monoplane that delighted air show crowds in Europe and America. But by December 1910, when the Aero-Club de France unveiled a monument commemorating the events that had occurred at Bagatelle only four years earlier, Santos-Dumont already seemed like a figure from the distant past.

The years after 1910 were bitter ones. A victim of disseminated sclerosis, his health steadily declined. Santos-Dumont's efforts to contribute to the French war effort were unsuccessful. At one point he was even accused of being a German spy. He spent most of the war years in Brazil, where he was hailed a hero.

The adulation of his native land did little to relieve a growing depression, however, for Santos-

Dumont blamed himself for the death and destruction being wrought by the airship and airplane in Europe. The coming of peace brought little relief. He traveled widely, but could not recapture the enthusiasm that had gripped him during the years when he had pioneered the flying machine. The use of aircraft in the civil war in Brazil in 1932 was the final blow. He committed suicide in his home in Brazil on July 23, 1932, three days after his 59th birthday.

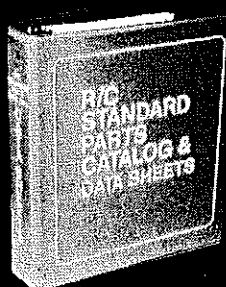
Alberto Santos-Dumont was not, as many have claimed, the father of aviation. He made few technical contributions to aeronautics. But the impact of his personality and the very fact that he had flown were of incalculable importance in inspiring other European pioneers. In that sense, he opened a door to the future. There seems little danger that the value of his contribution will be forgotten.

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