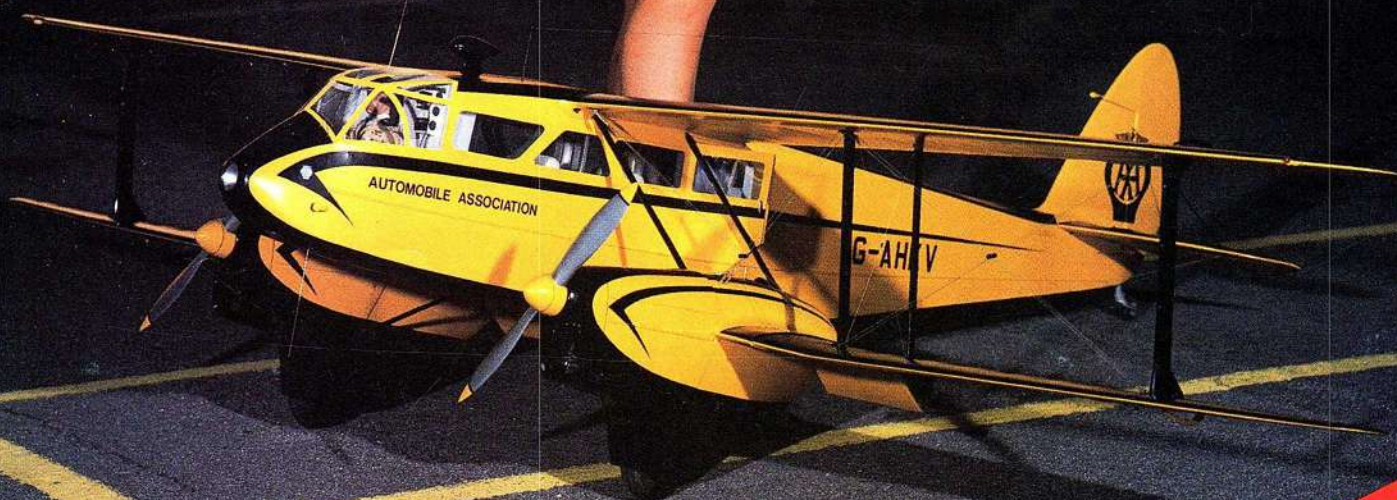


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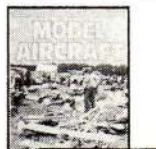
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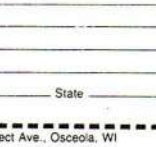
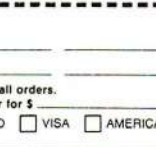
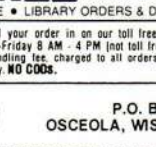
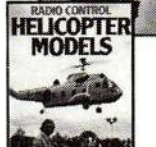
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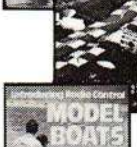
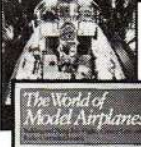
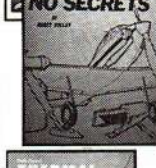
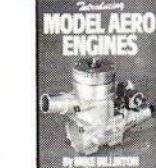
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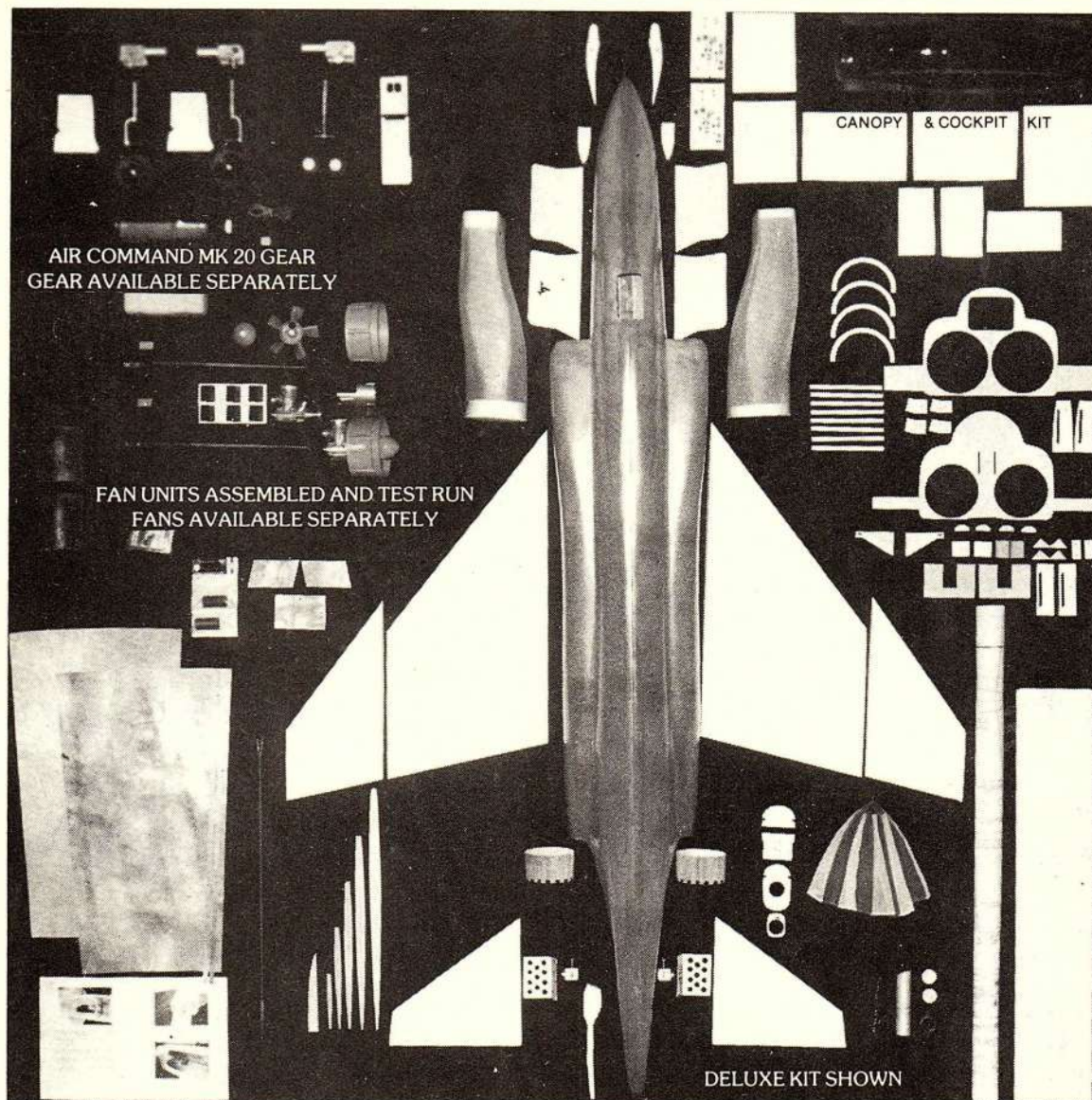
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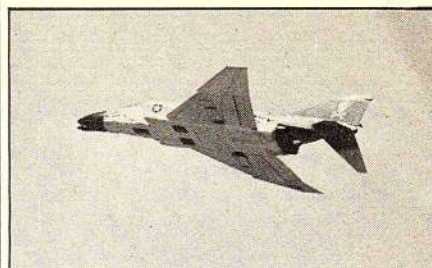
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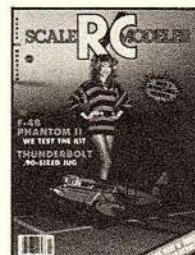
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COVER:

Miss Stacy Toten will soon be appearing in a major motion picture, but we're glad that she's appearing here first with Circus Hobbies' Waco Meteor kit. The full feature article on this model appears in this issue. (Graphic Systems photo, with Bill Wells assisting)

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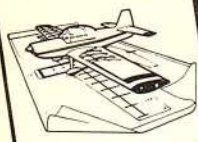
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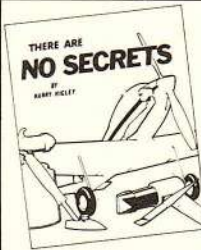
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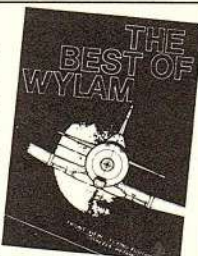


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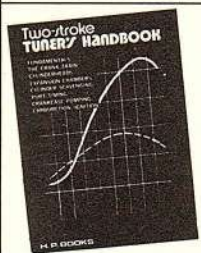
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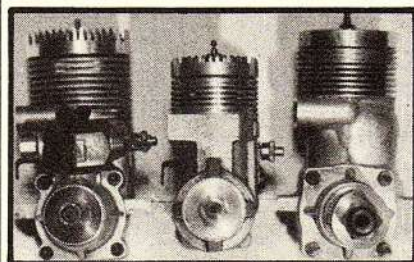
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Luftwaffe Day Fighter Colors

Information Supplied Courtesy Pettit Paints

Hobbypoxy continues its presentation of mixing formulas for authentic scale colors with these German Luftwaffe colors for day fighters in operation from 1940 to 1945.

For the period 1940-1944, Messerschmitt Bf109-F and -G models, and Focke Wulf FW190-As had a factory-applied "splinter" camouflage pattern on the upper surfaces. This used 74 Gray Green and 75 Gray Violet, with the undersurfaces and sides of the fuselage painted 76 Light Blue. On Bf109s the fuselage mottle pattern was done in 02 RLM Gray, 70 Black Green, and 74 Gray Green. On FW190s, the mottle was a combination of 02 RLM Gray and 74 Gray Green. (Formulas for 02 RLM Gray and 70 Black Green were published in the August '83 issue).

In 1944-45, factory finishes switched to a "defensive" camouflage scheme of 82 Dark Green and 75 Gray Violet, with 76 Light Blue on the undersurfaces and fuselage sides. Bf109-G and -K models, and FW190-D aircraft, were finished in this scheme. The mottle on Bf109s was still 02/70/74, while the FW190-D mottle was changed to 82 Dark Green and/or Gray Violet.

It must be noted that field-applied modifications were made to suit local

conditions. We are presenting only factory standard colors. Here are the formulas:

GRAY GREEN—74—

Six Parts H81 Black
Two Parts H70 Gray
One Part H33 Stinson Green
One Part H47 Bright Yellow

GRAY VIOLET 75—

Two Parts H81 Black
One Part H70 Gray
One Part H65 Bright Red
One Part H10 White

LIGHT BLUE 76—

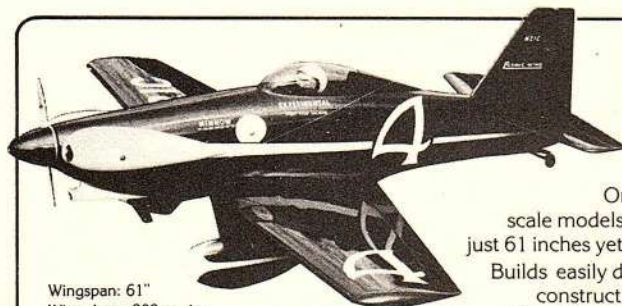
To a Half Pint of H10 White add:
Three Teaspoons H70 Gray
Two Teaspoons H26 Light Blue
Two Teaspoons H81 Black
Two Teaspoons H33 Stinson Green

DARK GREEN 82—

Four Parts H81 Black
Four Parts H33 Stinson Green
Three Parts H65 Bright Red
Two Parts H49 Cub Yellow

(Be sure to mix the above formulas 1:1 with H05 Flat Hardener for an authentic matte finish.)

The reference used for these colors is *The Official Monogram Painting Guide To German Aircraft 1935-1945*, published by Monogram Aviation Publications, 625 Edgebrook Dr., Boylston, Massachusetts 01505.



Wingspan: 61"
Wing Area: 809 sq. in.
Engine: .60-.90"

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Foreword by General Charles E. "Chuck" Yeager

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(Continued on page 73)

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Wt: 9 lb.

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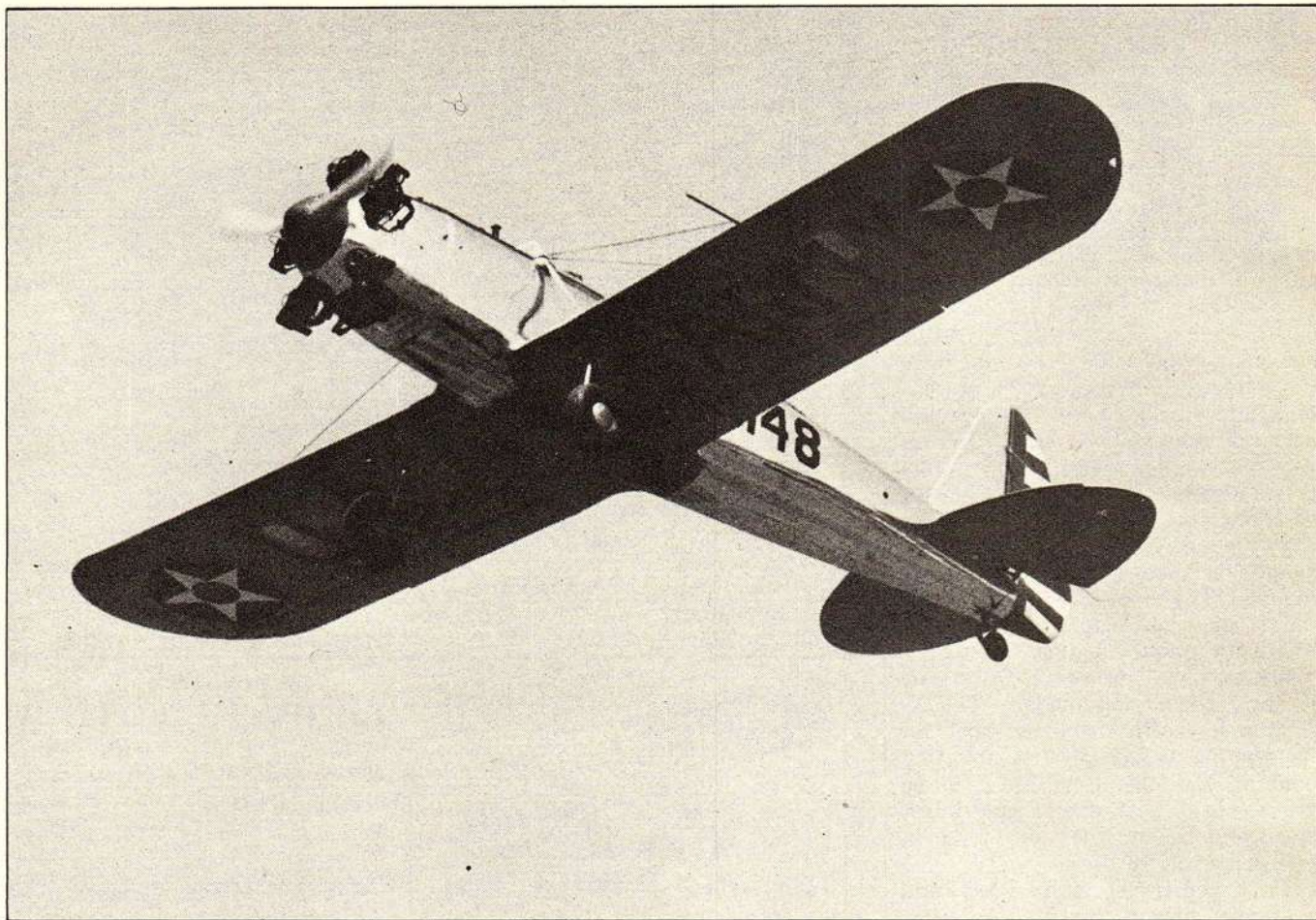
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PRE-WW II

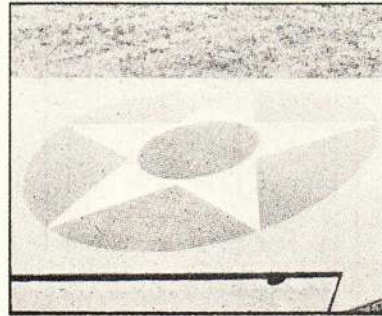
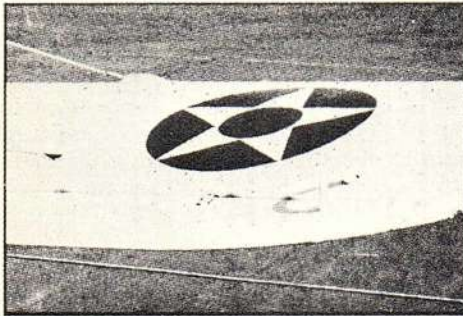
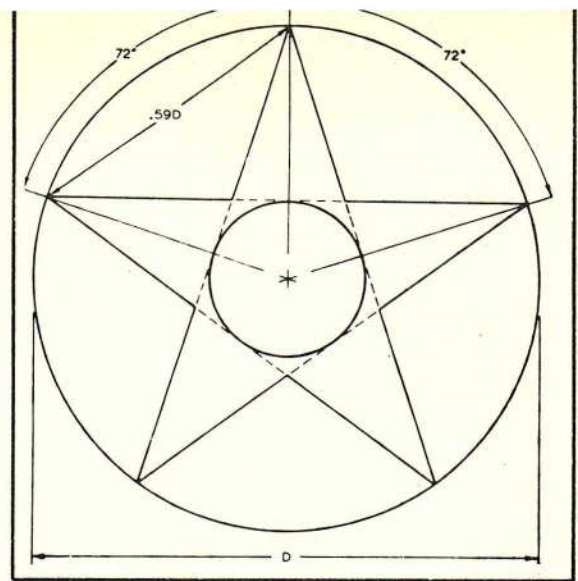


Chuck Fuller's magnificent quarter-scale PT-22 drones overhead. Chuck did his homework, and faithfully copied the markings and insignia of this Army trainer. Full-size aircraft from which the model was built is a restoration.

This article was written as a general introduction to the subject of pre-World War Two U.S. Army aircraft markings. It's amazing how many scale models sport insignia which are historically inaccurate. You simply can't always believe the manufacturer or use the decal sheets as a guide. While this article is rather general in its treatment of the subject, it covers a broad range of aircraft markings, and should supply any modeler with the correct information for his particular airplane.

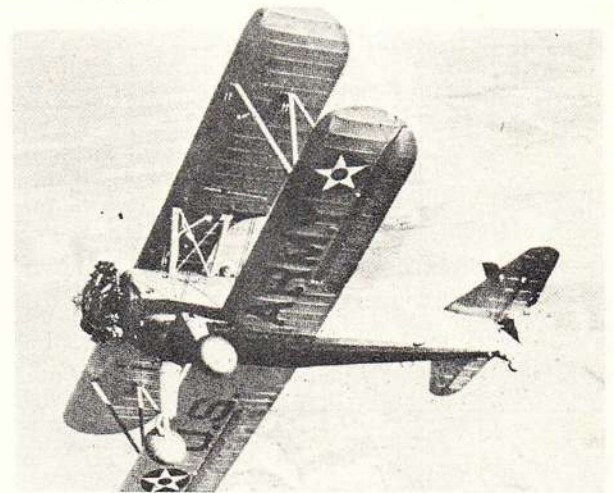
ARMY AIRCRAFT

1 • Drawing shows correct proportions for the star-in-circle marking. Shown are two different methods of locating the five points of the star, by measuring the angular distance between points (72 degrees) or the linear distance (.59 x diameter of large circle). Note that red center circle is **tangent** to lines projected from the sides of the points across the middle of the star.



2 & 3 • Most common error in star application is to make the center circle too large as illustrated on Ryan PT-22 (left) and Fairchild PT-19 wings. Next most common error is wrong size or location for the particular airplane. Proper location for PT-22 star is tangent to aileron spar and centered on the aileron counterweight. (Bowers)

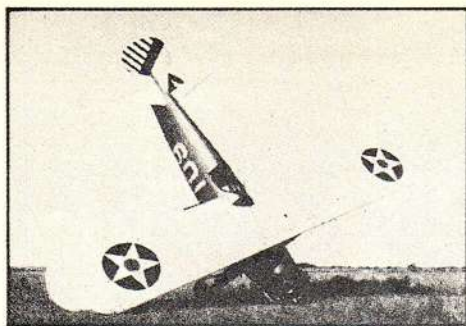
4 • Prewar Army Stearman PT-13 shows U.S. ARMY lettering and lower wing star location just inboard of the third rib from the tip. The 24-inch lettering and 30-inch insignia have same centerlines but the insignia is tangent to the aileron spar. Note dark appearance of yellow wings and lighter appearance of blue fuselage due to orthochromatic film. (Boeing Aircraft)



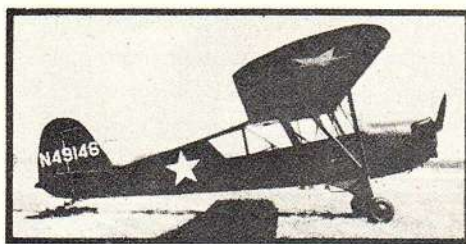
Those pre-1942 aircraft can be tricky if you don't understand the proper markings and insignia system of that period.

By Peter Bowers

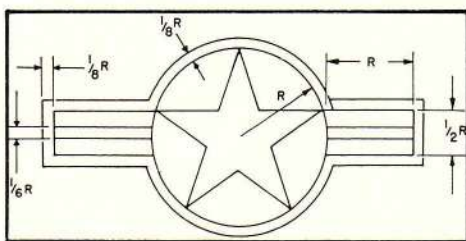
MARKINGS



5 • Good ground views of Stearman upper wing stars are hard to come by unless pilots cooperate like this! Because the top wing has no ailerons, upper wing stars on PT-13/17/18 were 45 inches in diameter compared to 30 inches for lower wing stars. Note how panchromatic film and yellow filter darken the blue fuselage and lighten the yellow wings. (Bamberger)



6 • Red center was eliminated from star marking at end of May, 1942, and this centerless star was used through June, 1943. Camouflaged types, such as this restored Aeronca L-3C, used only one star on each wing and one on each side of fuselage. Uncamouflaged types did not adopt this arrangement until early 1943. (Bowers)



7 • Drawing shows changes to the U. S. National marking after 1942.

The old Prewar-II Army markings are becoming increasingly popular with the owners of military surplus airplanes that date from that colorful period. The fact that some of the later models of these prewar and early WW-II designs weren't built until long after the markings and coloring had been abandoned is a relatively minor technicality. Both the airplanes and the markings are representative of the era, and only in the tightest cases of antique-judging should it be necessary to break a tie by specifically relating the airplane's markings to its nameplate date or by downgrading something like an Ex-Navy Stearman N2S-1 because it is painted like the identical but much more colorful Army BT-17.

In addition to antiques that legitimately qualify for them, the old markings are also finding increasing favor with the owners of homebuilts and stock commercial models that have no military association at all. Military markings in such cases can be considered only as decoration and not part of authentic restoration or reproduction. However, it is not too well known by today's sport flyers that the U.S. Army operated quite a few "Off the Shelf" commercial models in the immediate prewar-II years. (Vol.-1, No.-3 SPORT FLYING "Civilians That Went To War.") Some owners may be pleased to learn that they can paint up such diverse types as a Staggerwing Beech or an Ercoupe as a "legitimate" prewar military type.

Unfortunately, accurate information on the proportions and location of the markings is hard for most of the hobbyists to come by. They know that it's available somewhere, but don't know where to look and don't have the time, especially since the markings are the last thing to go on the plane before it is completed, and everything is usually done in a rush to get it ready for the big fly-in. In such cases the markings are usually worked out from a single photograph, a model airplane plan, or just from the owner's memory of a similar type as he saw it in 1941. Needless to say, the results are sometimes pretty far out.

The owner shouldn't be criticized too harshly for such errors. Actually, few military pilots of the time were historians or detail buffs. To most of them, the basic markings were something like the oil in the engine—essential to the mission but someone else's responsibility. How many WW-II pilots, for example, can cite the three basic changes made in our national insignia during WW-II and their dates of adoption, much less give the correct proportions and locations? The main job of markings, in most pilots' opinions, was to keep their own side from shooting at them.

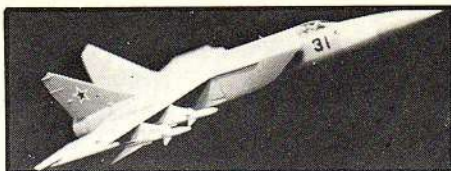
Actually, the markings were and are applied according to exact specifications and deviations are very apparent to the aircraft-detail buffs. The owners do not distort their markings deliberately any more than they would after the flag that they represent. Some of the misapplication results from lack of suitable reference material, but a lot comes from a misunderstanding of the actual construction and evolution of the marking. A little history is therefore in order. This will be presented along with the technical details in the following primary areas: stars, stripes, colors, and lettering.

The famous "Star-in-Circle" marking was adopted May 19, 1917, shortly after the U.S. got into World War I and needed an aircraft marking compatible with those in use by the Allies. The basic marking chosen was a white, five-pointed star, as used on the flag. This was placed against a blue circle that just touched the points, and a red circle was used in the center. It is in the size of the center circle that many model builders, illustrators, and airplane restorers go astray. The inner circle is tangent to a projection of the star points across the center of the star. There is a great tendency to enlarge the center, sometimes to the extent of having it touch the inner corners of the blue field. Don't feel too bad if you've done this—even some airplane manufacturers have, but they are rare examples. This is easy to fix, so if you are really concerned with accuracy rather than mere decoration, have at it.

At first, the star was full-chord on the wings and inboard of the ailerons, but it was gradually moved outboard. One point of the star points forward, parallel to the centerline of the plane. (In recent times, some stars on swept wings are oriented to the sweep of the wing rather than the direction of flight.) By 1926, the stars were made smaller, with size in multiples of five inches from 20 to 60. Since then, they have generally been *tangent* to the aileron spar and located up to one circle diameter inboard from the wingtip. There are so many exceptions, however, that your best size/location guide is a good selection of photos of your kind of plane in markings of the period.

From January, 1918 to August, 1919, the star-in-circle was replaced by a tricolor circle marking with red on the outside, then blue, and a white center. This was done at the request of the Allies, who figured that a white star could easily be mistaken for a white-bordered German cross in the heat of combat. A lot of 1917 planes in the States didn't change markings, while others carried odd mixtures of 1917 and 1918 markings into 1919.

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"THE WINNER"

They weren't painted this way deliberately; it was usually a case of fitting a spare wing with one marking to a plane with the other marking. The star was readopted in 1919 and retained its original form until the end of May, 1942.

There was a minor change of application made in February, 1941, but this won't concern the owners of trainer-type planes. For *camouflaged* planes, both Army and Navy, the star was added to each side of the fuselage, one point vertical, and one was removed from each wing, the upper right and the lower left. This left the wing stars in locations just opposite to the contemporary locations of civil registration numbers. Uncamouflaged types kept both wing stars for a while and didn't adopt the fuselage/unbalanced wing star arrangement until early 1943. Right after Pearl Harbor, the Navy went back to two wing stars and fuselage star for camouflaged types and kept them until 1943.

The red center was removed at the end of May, 1942, because of its similarity to the Japanese "Meatball" marking. It remained in the shoulder patch insignia and other Air Corps emblems, but was never readopted for airplanes. Since this article concerns only the prewar and early WW-II markings, subsequent changes are not presented in detail but are illustrated briefly.

Most of the "stock" trainer types owned by flying sportsmen—Stearman, North American, Fairchild, N3N, etc.—are prewar designs that qualify legitimately for the red-center star marking. A few of the earliest Liaison models did, but most of these were delivered with the later centerless star.

Along with the 1917 star, the U.S. also adopted a three-stripe rudder marking, duplicating that used by England and France. The stripes were equal width, with the red at the trailing edge and blue at the leading edge. In 1918, the order was reversed on U.S. types that carried the circular wing marking. There were some more mixes, of course, like 1918 circles and 1917 tail stripes, but they were not too common. Some French manufacturers delivering planes to the A.E.F. logically assumed that the U.S. tail stripes would be in the same order as the wing circles and delivered some Nieuport 28's and Breguet 14's with the stripes in the order of red, blue and white, starting at the trailing edge. This was soon corrected.

Army and Navy used the same tail stripes to late 1926. At that time, the Army adopted a new design by C. N. Monteith, the Chief Engineer of Boeing. This retained the vertical blue stripe, but substituted the thirteen alternating red and white stripes of the

American flag for the single vertical red and white stripes. Navy use of tail stripes decreased steadily from this time, solid-color tails being used for unit identification. Many trainer and transport types did not use any tail markings at all.

The most common error made when painting the old Army stripes today is to make the vertical blue stripe too narrow. It should be one-third the *maximum chord* of the rudder, just as before, even on sharply tapering surfaces as used on AT-6's. There were a few isolated exceptions, as on Vultee BT-13's and 15's, where the blue stripe tapered with the rudder. A secondary error is to divide the maximum height of the rudder for the 13 stripes. This division should come along the rear face of the blue stripe, which on something like a Fairchild PT-19 can be well below the top of the rudder.

The Army tail stripes were deleted from camouflaged planes with the star relocation of February, 1941, but there were a few exceptions. The stripes were deleted from all Army planes at the end of May, 1942, when the red center of the star was also deleted. There were a few unofficial applications on uncamouflaged types later in WW-II and shortly after, but the distinctive "Army Stripes" vanished officially in May, 1942.

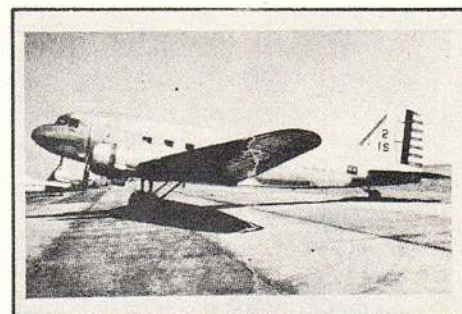
In the tailstripe department, everyone is "Army Happy" these days. Since the Navy seldom used stripes on primary trainers past the early 1930's, the owners of surplus trainers tend to pass up Navy color schemes in favor of Army. Very few seem to realize that the U.S. Coast Guard used a unique striping system of its own from 1934 through 1941, and that this appeared on a variety of ships in the private-owner class, such as Fairchild 24-R, Waco EQC-6, and Stinson SR-5, etc., and even on a few N3N-3's.

COLORS

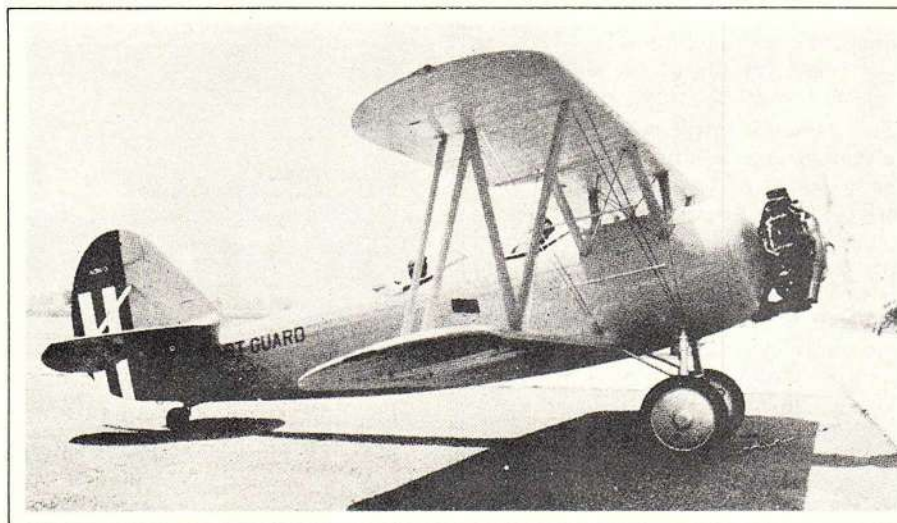
The first U.S. military airplanes, Army and Navy alike, were just "Airplane Color"—clear-doped fabric. In 1918, the Army adopted olive drab (O.D.) top surfaces and cream or clear-doped sides, soon replaced by O.D. all over. This remained standard until early 1927, when wing and tail surfaces were painted chrome yellow (also called orange-yellow) for increased visibility and safety in peacetime. Modern "Cub Yellow" is about the same. Some primary trainers and reserve observation types began substituting a medium shade of grayish-blue for the O.D. in 1928. By 1935, the blue was specified for all painted Army Air Corps planes (there were only a few natural metal finish types at the time), but the changeover was not made quickly. It was on the basis



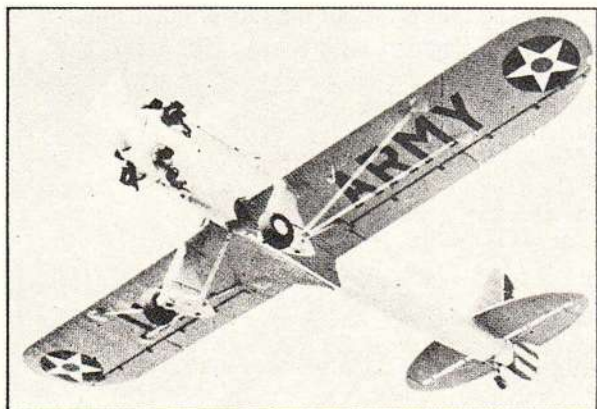
8 • Twin-rudder types like the Beech AT-7 carried stripes on both sides of rudder. This one, photographed in early 1942, carries the Air Corps serial number 41-21098 on the fuselage as 121098 and retains its pre-Pearl Harbor unit markings on the fin. (Bamberger)



9 • This Douglas C-48 was a standard DC-3 drafted from United Air Lines. While most Army planes colored the entire rudder, the Douglas DC-2/3 types and the B-18's kept the striping entirely aft of the rudder hinge line. Compare with BT-13. (Bowers)



10 • The only Naval Aircraft Factory N3N-3's to use tail stripes were four used by the Coast Guard, which applied the unique striping shown from 1934-1941. Coloring of N3N's was yellow all over instead of the standard USCG silver with yellow only on top of upper wing and top of horizontal tail. (Levy)



11 • This Fairchild PT-19A has curved instead of block letters for U. S. ARMY under the wing. Compare insignia location with Ryan PT-21, Stearman PT-13, and restored PT-19. (Bamberger)

of "at next overhaul" for most existing ships with O.D. paint, and some carried it to 1939. No problem with the primary trainers, which were already blue.

Some new tactical types, notably Curtiss P-40's and Douglas A-20's, re-adopted real warpaint in 1940, with O.D. top and sides and gray undersides, but with the standard two wing stars and the tail stripes. Older painted types stayed blue and yellow until over-all silver paint was specified for certain obsolescent tactical types in 1940. Some of these were repainted with O.D. and gray and the new fuselage stars in 1941.

Most of the trainers in production stayed blue and yellow, but exceptions began to appear at the end of the 1930's. The all-metal North American BC-1A (later AT-6) appeared in natural metal with silver-doped fabric surfaces (except rudder) while the all-metal North American BT-14's and Vultee BT-13's and 15's stayed blue and yellow. Another exception was the Ryan PT-16, 20, 21, and 22 series, which had standard chrome yellow wing and tail surfaces but polished metal fuselages. All-metal C-for-Cargo types were natural metal with one notable exception, the Beech C-45 (Model 18), which was blue and yellow.

In the Spring of 1942, over-all silver was specified as the standard coloring for all trainers built after that time. Those already flying in blue and yellow could stay that way and some got clear through the war in their prewar colors. An interesting oddity occurred here. When the tail stripes were deleted, the instructions for the job specified that the rudder would be repainted the same color as the top of the fuselage. Whoever wrote the order must have forgotten that there were still a lot of blue

and yellow ships around. Some mechanics deviated from the order a bit and did the logical thing, painting the rudder the same color as the fin, but quite a few trainers ended up with a blue rudder next to a yellow fin.

Most of the Navy primary trainers were solid yellow throughout WW-II, but Army deviated from the 1942 all-silver pattern in a few cases after the war when some AT-6's, rebuilt as T-6G, became all yellow in the late 1940's. This statement is apparently contradicted by a lot of "T-6's" now flying around in original WW-II yellow paint. These are not U.S. Army AT-6's, but Canadian Harvard II's, mostly built by Noorduyt under license from North American. Since lend-lease funds were used to build these and they differed considerably in detail from the AT-6's, they were given the later U.S. Army designation of AT-16. The U.S. didn't use these, and they carried Canadian or R.A.F. markings.

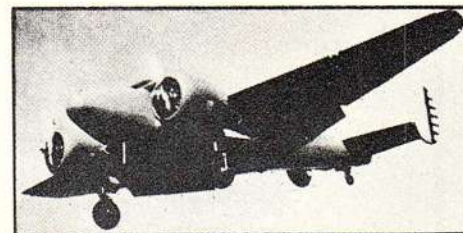
Coast Guard color for the 1934/41 period was all silver with yellow top for wing and horizontal tail. Only the rudder stripes were used for insignia; no wing or fuselage stars were used until the Navy took over the Coast Guard after Pearl Harbor. The Army Liaison types were delivered in O.D. and gray warpaint into 1944, at which time the Piper L-4's and Stinson L-5's started coming through in silver.

Until the late 1920's, the shade of blue used in the insignia varied. From then on, it was a specific shade called *insignia blue*. This is very dark; almost black. A common error today is to use a lighter shade, sometimes the same as used for the fuselage. The other insignia colors are available from standard sources as *insignia red* and *insignia blue*.

Determining airplane colors from black-and-white photos can sometimes

12 • The Coast Guard had distinctive markings of its own and used this style from 1934 through December 1941. Airplane is a Stinson SR-5 designated RQ-1 but improperly marked as QR-1. Note Coast Guard emblem below windshield.

(Bamberger)



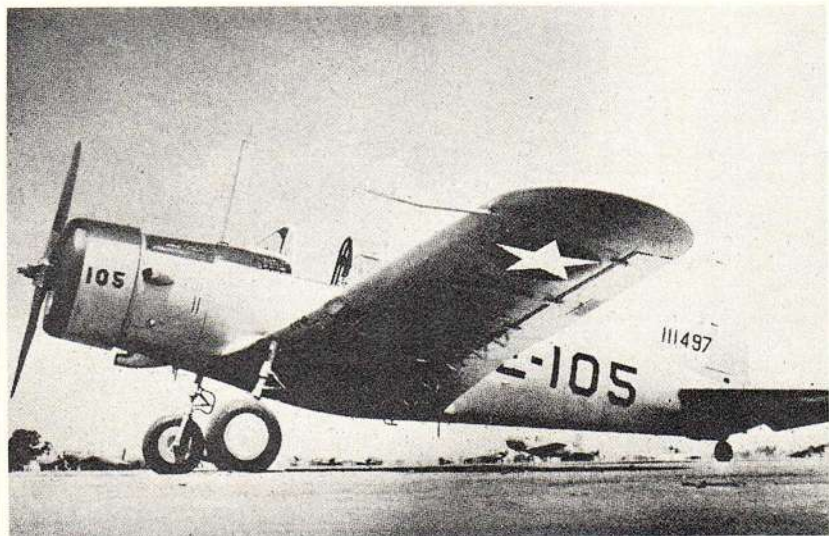
13 • Only all-metal transport type to wear blue and yellow paint scheme was the Beech C-45 of 1940. Similar AT-7's, F-2's, and later C-45's were natural metal. (Bowers)

14 • Ryan PT-16/20/21/22 series deviated from standard blue and yellow coloring of 1939/41 primary trainer by leaving metal fuselage unpainted. Note extreme outboard location of wing insignia on this PT-21. (Bowers)

15 • Stearmans (like this PT-17) and other trainers were delivered with all-silver finish from 1942 on. This one was photographed 9 June 1942, shortly after the tail stripes and red star centers were deleted. Stars were carried on both wings as shown until early 1943; fuselage star was added to most trainers at that time. Note location of Air Corps serial number on fuselage instead of vertical tail.

(Bowers)

16 • U. S. ARMY lettering was supposed to come off airplanes at the same time the tail stripes and star centers were removed, but in many cases the lettering was left on. The serial number of this Vultee BT-13A, 41-11497, appears on the vertical tail as 111497. (Bowers)



T-34

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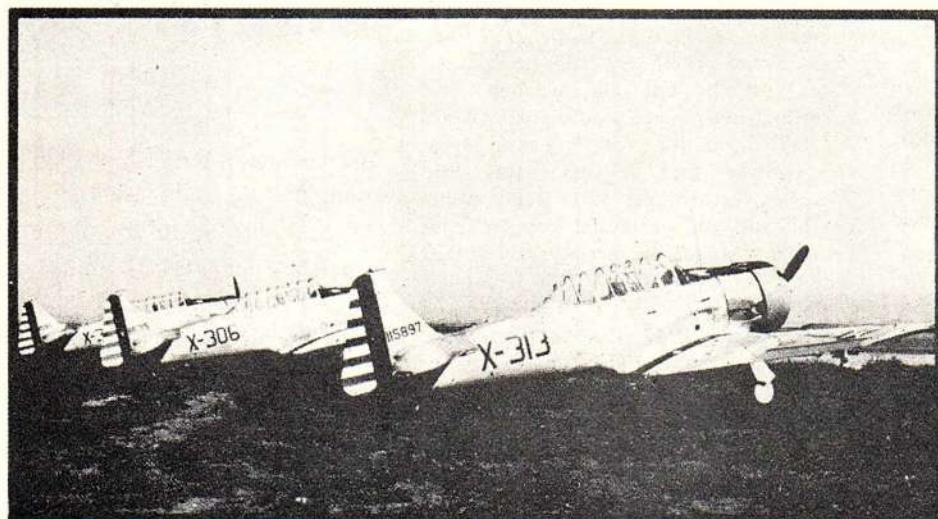
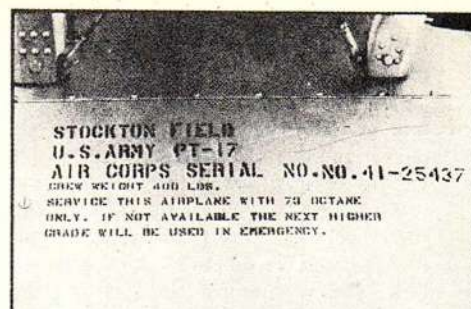
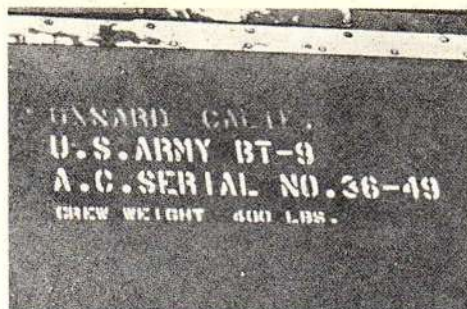
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17 • North American AT-6A's photographed in March, 1942 show undersized serial numbers squeezed onto vertical fins and the standard training numbers used by AT's and BT's on the fuselage. Letter X identifies Luke Field, Arizona. (Bowers)



18 • An Aeronca "Chief" carried Army markings and coloring when tested as a possible Liaison plane, even though it was still company-owned and was never bought by the Army. The manufacturer goofed on this one and used the same shade of blue for the vertical tail stripe as was used for the fuselage. Blue and yellow have nearly the same appearance when photographed on orthochromatic film. (USAF)



be confusing. It depends on the type of film used. Until the late 1930's, most film used was the orthochromatic type. This made blue look light in a print and red look dark. Yellow was also dark, so a blue-fuselage trainer with yellow wings looked in the photo as though the wings were darker than the fuselage. The later panchromatic film just reversed this, darkening the blue and lightening the yellow. The effect was amplified by the use of yellow or orange filters. See examples in the photographs.

LETTERING

The principal lettering on Army planes from 1927 to the end of May, 1942, was the big U.S. ARMY carried on the underside of the wing on mono-planes or the bottom wing of biplanes. This was supposed to be in block figures with the standard 3:2 ratio, the strokes 1/6 the height, but some manufacturers went to rounded letters (see photos). For most trainers, the letters were 24 inches high, in black against yellow, silver, or gray. This lettering was deleted in May, 1942, along with the tail stripes and the red centers of the stars. However, the lettering was simply left on some planes, resulting in improper combinations that were perpetuated in photographs and have since caused some restorers to apply the letters with later period markings.

(Contrary to the implications of later use in many model plans and published markings charts, the Navy deleted the letting U.S. NAVY under the wings in May, 1932, between delivery of the Boeing F4B-3's and the F4B-4's).

Information as to airplane designation, branch of service, Air Corps serial number, etc., was (and is) carried in a "Technical Data Legend" on the left side of the fuselage near the cockpit. This is in one-inch stencil letters, black against silver or O.D., sometimes black and sometimes white against blue. Name of the home field in pre-war and early WW-II types was in yellow and above the legend on blue fuselage types. Some planes carried additional information as to fuel grade, etc., in smaller letters below the legend.

A major error that crops up here is application of the serial number. This is the *Air Corps* serial number, referred to as the S/N by the data buffs. A number like 41-25384 identifies the 259384th plane ordered by the Air Corps in the Fiscal Year of 1941 (July 1, 1940 through June 30, 1941). Several restorers have used the manufacturer's serial number, also called constructor's number or C/N by the data buffs, here.

Serial numbers have nothing to do with delivery date. The contract and delivery dates could be pretty close

on simple trainers already in production or almost simultaneous on "Off-the Shelf" purchases but pretty far apart on some X-jobs that had to be designed as well as built after the contract was signed and the serial number issued. The XB-19, for example, carried a 1937 serial but didn't fly until 1941.

All Army planes carried two nameplates—a manufacturer's plate and an Air Corps plate. On a Stearman, the Air Corps plate would show something like *Air Corps Model PT-17A, A.C. Serial 41-25384*, the acceptance date, and the contract number. The manufacturer's plate would read *Model A75N1, Serial No. 7528859*, and show the contract and delivery dates. For 75-series Stearmans, the serial number began with the model number. The prototype Model 75 carried C/N 75000 and the last, a PT-13D/N2S-5, carried 758808.

In January, 1942, the Air Corps serial went on the vertical tail, preferably in 8-inch figures. Color was black against silver, yellow against blue or O.D. The form was a little different than in the data legend. The serial 41-25384 went on the tail as 125384; the first digit, representing the decade, was left off. No confusion was anticipated with a later 52-25385 because military planes weren't supposed to last over 10 years. When they did, an O-for-Obsolete was prefixed to the tail serial as O-125384. Short numbers, like 41-2, were built up to a minimum of four digits (five after 1949) by adding zeroes, as 1002. This was not done in the data legend.

On those planes still using rudder stripes, the serial was sometimes compressed onto the fin, but was more commonly put on the fuselage. Few restorers bother with this detail today because of the need to carry civil registrations on their planes. In recent years, the civil number has been specified as a minimum of 12 inches high on each side of the fuselage or vertical tail, but now it can be reduced to two inches on the vertical tails of genuine 30-year antiques and reproductions as long as no other numbers preceded by the letter "N" appear on the plane.

From 1940 to the end of the war, most basic and advanced trainers used a system that identified planes as to base, designated by a letter, and the individual plane at the base by a dash number. Often, the number alone was repeated in smaller figures on the side of the engine cowl or accessory section. A lot of restorers have been putting their registration numbers where these field numbers went and everyone seems to be happy. The somewhat similar "Buzz Numbers" didn't come along until after the war, beyond the coverage of this article.

19 20 & 21 • Variations in the application of the military designation and serial number are apparent in these photos. Whoever cut the stencil for the PT-17 goofed, as shown by the extra "No." (Bowers)

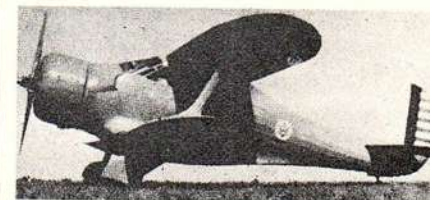


22 • The Fleet YPT-6 of 1930 is one example of a private-owner aircraft type that qualifies for use of prewar U. S. Army markings. YPT-6 was identical to commercial Model 2 except for no-brakes wire wheels and military equipment. (USAF)



23 • A standard Ercoupe was tested by the Army as a radio-controlled target plane under the designation YPQ-13 early in 1942. Another Ercoupe, tested as the YO-55 observation plane, did not carry military markings. (USAF)

24 • Canadian Noorduyn "Norseman" was bought by U. S. Army in 1941 and was delivered in the over-all yellow finish used on Royal Canadian Air Force utility and training planes. Note how light the yellow coloring and the red tail stripes appear when photographed on panchromatic film with an orange filter. Later UC-64A's and B's were delivered to USAAC in olive drab and gray camouflage or natural silver finish. (Noorduyn)



25 • Beechcraft YC-43 (D-175) assigned to U. S. Embassy in London wears pre-war blue and yellow Army colors. (Bowers)

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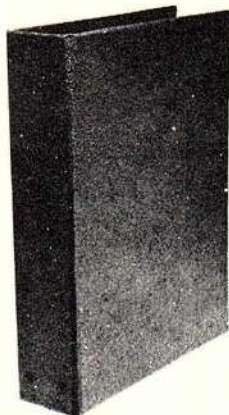
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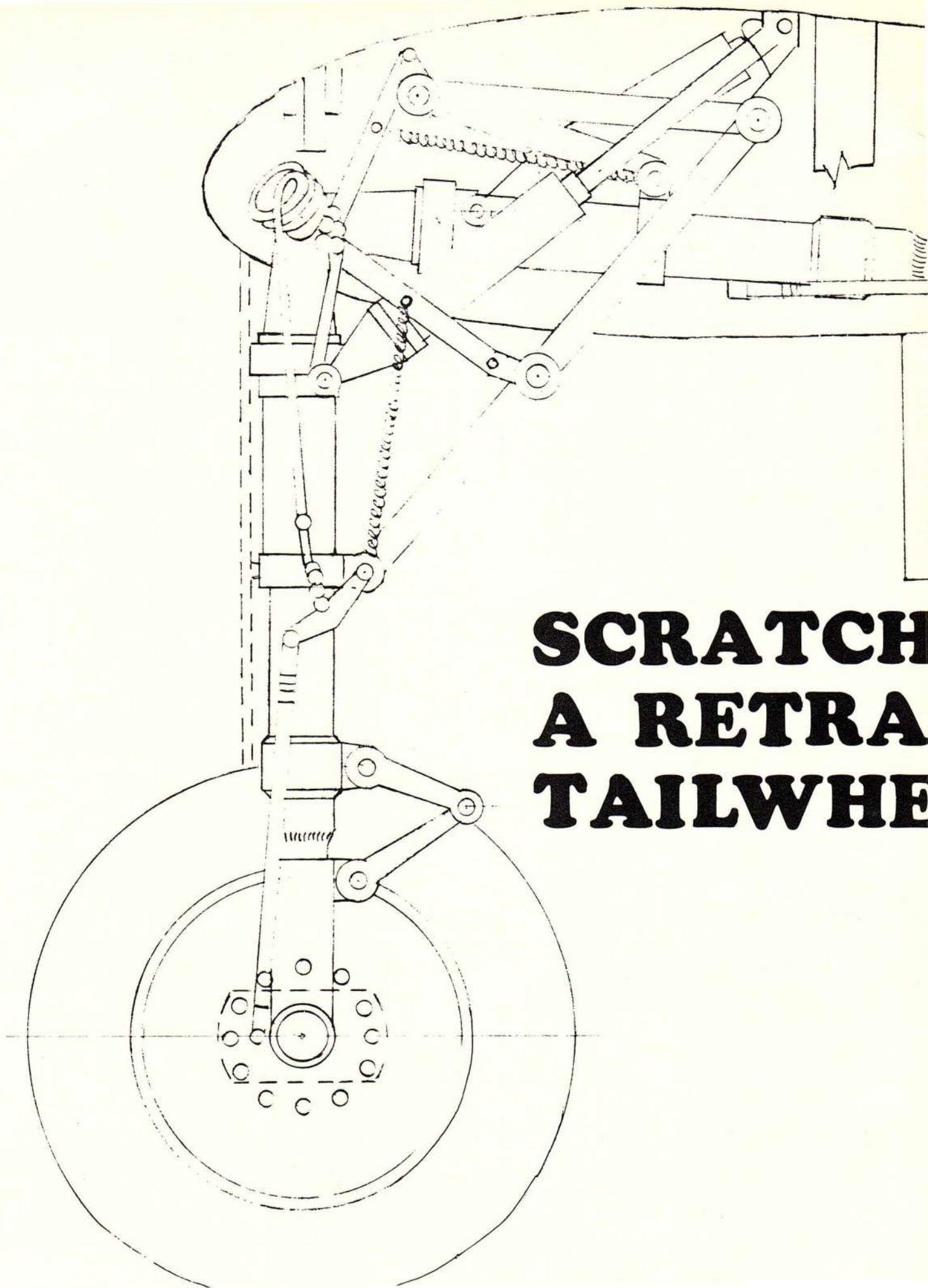
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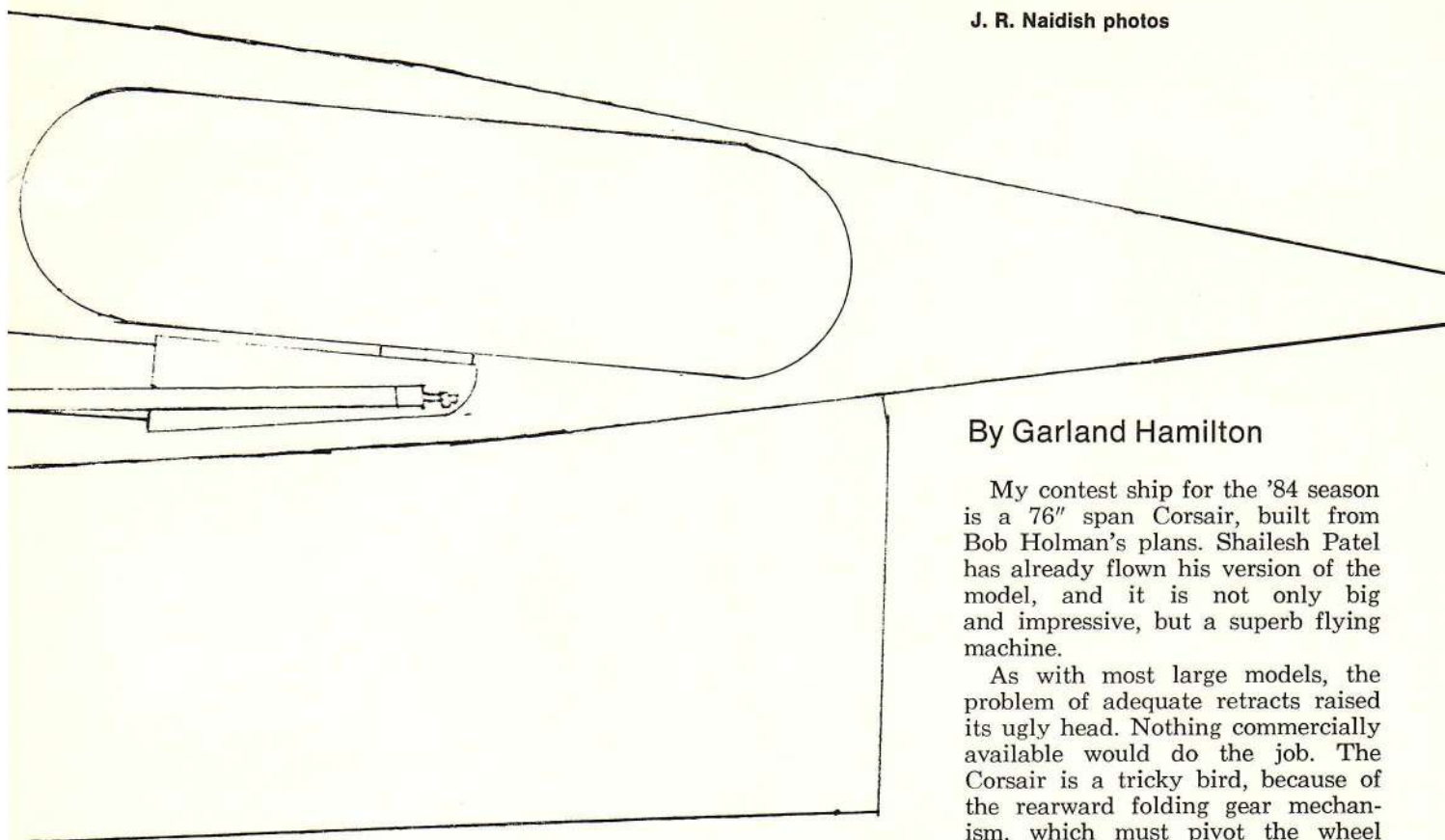
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**SCRATCH
A RETRA
TAILWHE**



By Garland Hamilton

My contest ship for the '84 season is a 76" span Corsair, built from Bob Holman's plans. Shailesh Patel has already flown his version of the model, and it is not only big and impressive, but a superb flying machine.

As with most large models, the problem of adequate retracts raised its ugly head. Nothing commercially available would do the job. The Corsair is a tricky bird, because of the rearward folding gear mechanism, which must pivot the wheel as it swings backward. Sure, there are plenty of "fudged" systems to give this effect, but none of them suited my quest for total scale realism.

As usual, in such situations, necessity becomes the mother of invention, and so I sat down at the drawing board to design and engineer a truly authentic and scale set of retracts. The accompanying sketch of the main gear gives some feel for the intricacy of such a mechanism, but the resulting product is an almost exact replica of the gear inside the wing of the full-size fighter.

I didn't expect to scratchbuild the main gear, nor would I anticipate you doing likewise. You'll be pleased to know that Airways Scale Retracts will sell you a set. They are \$200 with fixed struts, or \$225 for the functional oleos. I definitely advocate the latter, since they make take-offs and landings so much simpler. These retracts have both up and down locks, are pneumatic, and will support models up to 35 pounds. They are very popular here on the West Coast, and they have proven their reliability under contest conditions.

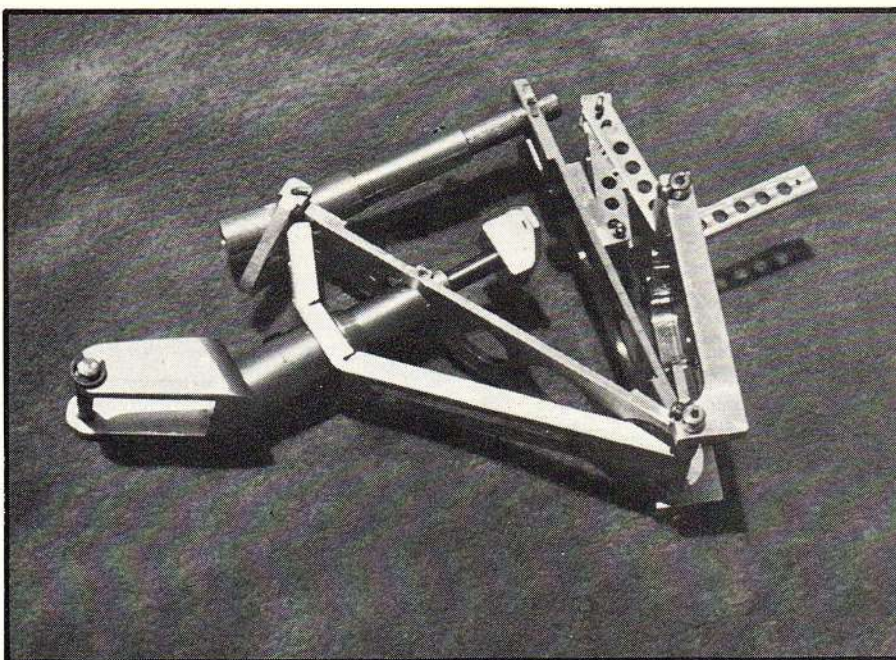
When it came to that complex folding tailwheel, I was really stumped. Every commercial tailwheel I could find was woefully inadequate to the task of working under the loads this model would

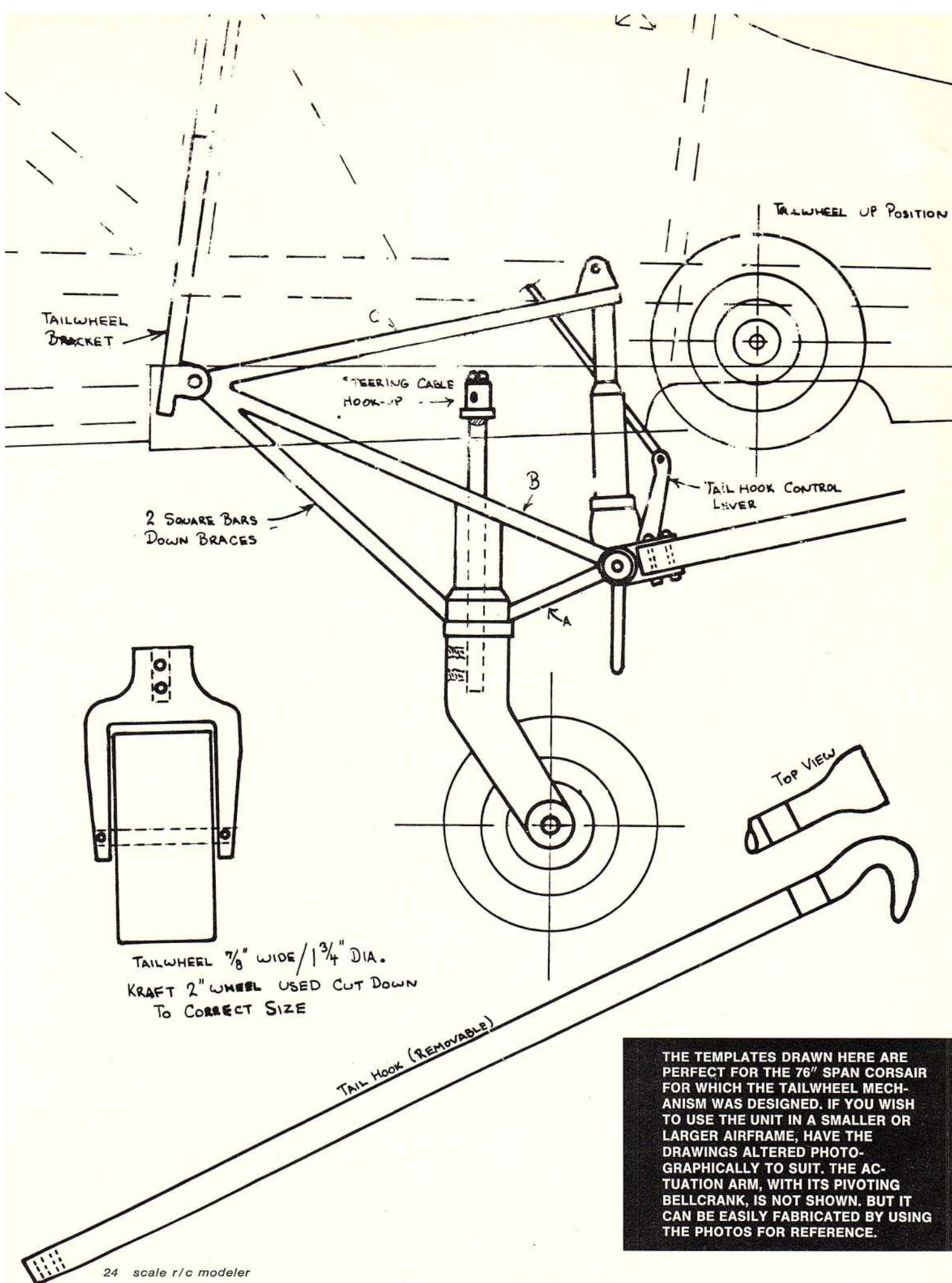
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BUILD STABLE EL

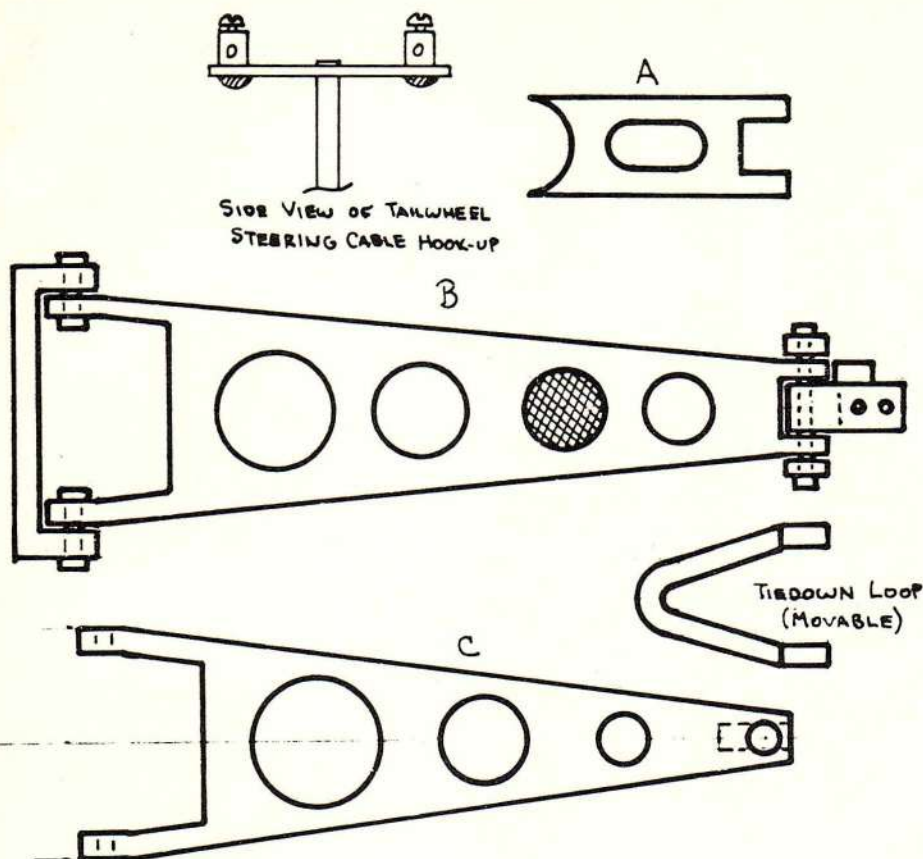
**Full-size templates for
making your own
retractable tailwheel
for .90-sized aircraft.**

The tailwheel assembly in the folded position. Note that the retraction mechanism is a simple scissors at the top of the assembly. Construction is beefy.





THE TEMPLATES DRAWN HERE ARE PERFECT FOR THE 76" SPAN CORSAIR FOR WHICH THE TAILWHEEL MECHANISM WAS DESIGNED. IF YOU WISH TO USE THE UNIT IN A SMALLER OR LARGER AIRFRAME, HAVE THE DRAWINGS ALTERED PHOTOGRAPHICALLY TO SUIT. THE ACTUATION ARM, WITH ITS PIVOTING BELLCRANK, IS NOT SHOWN. BUT IT CAN BE EASILY FABRICATED BY USING THE PHOTOS FOR REFERENCE.



impose. I also wanted to have a functional tail hook, to get points for a simulated carrier arrested landing.

Now, anyone with a little mechanical engineering background and a set of original factory drawings can come up with a workable tailwheel. So, I sat down, figured out all of the angles and pivots, drew up some linkages, and sent them off to Airways Retracts to be machined on a custom order basis. The company will manufacture any unit, to your specs and drawings.

In a short time, I got the finished product. It was beautiful, and worked so slick that it was almost a shame to hide it inside the model. The arrestor hook was removable. The only problem was that the unit weighed *eight ounces*! I had forgotten that all those little arms and levers would add weight. I had undone my own planning!

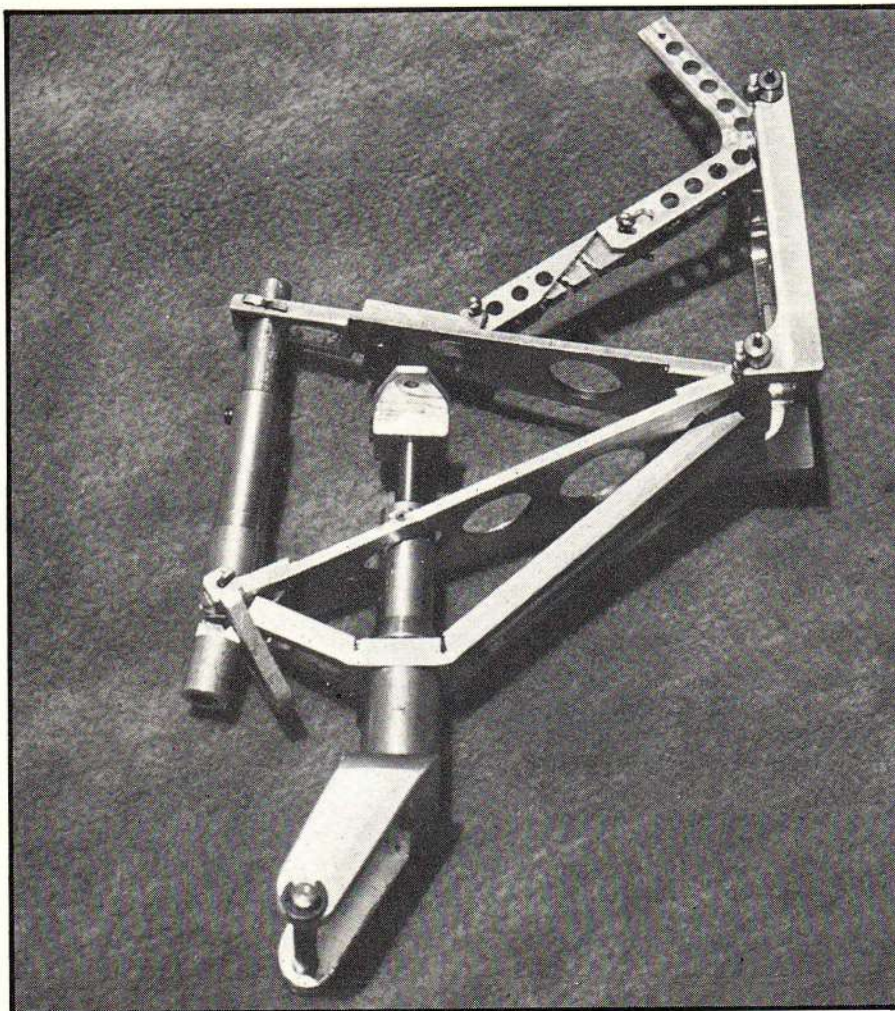
Fortunately, good friend Rich Westlake came to the rescue. He's a professional machinist and model maker, and he volunteered to put my tailwheel unit on a strict weight reducing diet. The resulting product is seen in the photos. The extensive lightening holes reduced the weight by half, and a four-ounce tailwheel unit is certainly acceptable. Even with that Swiss cheese look, the unit is still plenty strong.

The drawings provided here are 100 percent to size, so that you can use them as templates for making your own gear. Use aircraft-grade aluminum for all parts, and all pivot pins should be steel. If you prefer not to do it yourself, Airways Retracts will make up a unit for you, on a special order basis. The price is \$225.00. For more information, or to order either the mains or tailwheel assembly, contact: Airways Scale Retracts, 5778 Sky Meadow, Riverside, CA 92509. Phone (714) 788-5556 (eves.).

Of course, the tailwheel assembly can be used in almost any aircraft which had an aft-folding mechanism. While I have yet to put the design through the rigors of contest flying, I am comfortable that it will take all of the abuse you can give it.

Once you have installed a unit like this in your model, you'll never go back to a flimsy commercial tailwheel again. □

When the tailwheel is down, the lock is achieved by the scissor arm being straight. Profusion of lightening holes is necessary to get weight to a reasonable level.



SEVENTH ANNUAL Q.S.A.A. FLY-IN

**Seven is always lucky in Las Vegas,
and the Seventh Annual Quarter-Scale
Fly-In turned out to be a winner.**

J. R. Naidish photos

Staff Report

It was somewhat amazing. As we landed in Las Vegas and jumped into our rental car, it dawned on us that this was the seventh year we had gone through these same actions. The Quarter Scale Association of America was having its big annual gathering of eagles for the seventh time. Naturally, when you arrive in Las Vegas to celebrate *anything* that has a *seven* associated with it, you know that luck has to be on your side (our later experience at the tables proved that such superstitions are definitely unfounded!).

To say that the past seven years have been a raging success for the Q.S.A.A. would be an understatement. There were some rocky times during the first couple of years, but

the Fly-In has been the keystone which kept it all together. The event was a winner from the inception. Modelers who love oversized aircraft flocked to this mecca of the big birds from the start. Each year, the crowds grew, until they became almost unmanageable a couple of years ago. Quarter-scale had become so popular that the Fly-In had to actually limit entrants. This year, if you weren't among the lucky 200 who signed up first, you were plain out of luck.

Even with 200 aircraft, and a three-day event (static display is Thursday, with flying the remainder of the weekend), there was barely enough time for everyone to get a flight. Flight times were limited to 15 minutes, just to make sure that there was no frequency hogging. In

the past, there had been problems with a fellow taking his transmitter, and spending ten minutes just trying to get a balky engine going. With fifteen minutes of total available transmitter time, you would have to surrender the clip even if you never got airborne during the allotted time.

While the Fly-In still pulls entrants from all over the world, and it's not unusual to see names on the roster from France and West Germany, the majority of the entrants were definitely from the western part of the U.S. There were a few participants from Michigan, Florida, etc., but most every name was from California, Nevada, and Arizona, with strong attendance from Utah and Montana. This is to be expected, since transporting these monster models any great distance is a major undertaking.

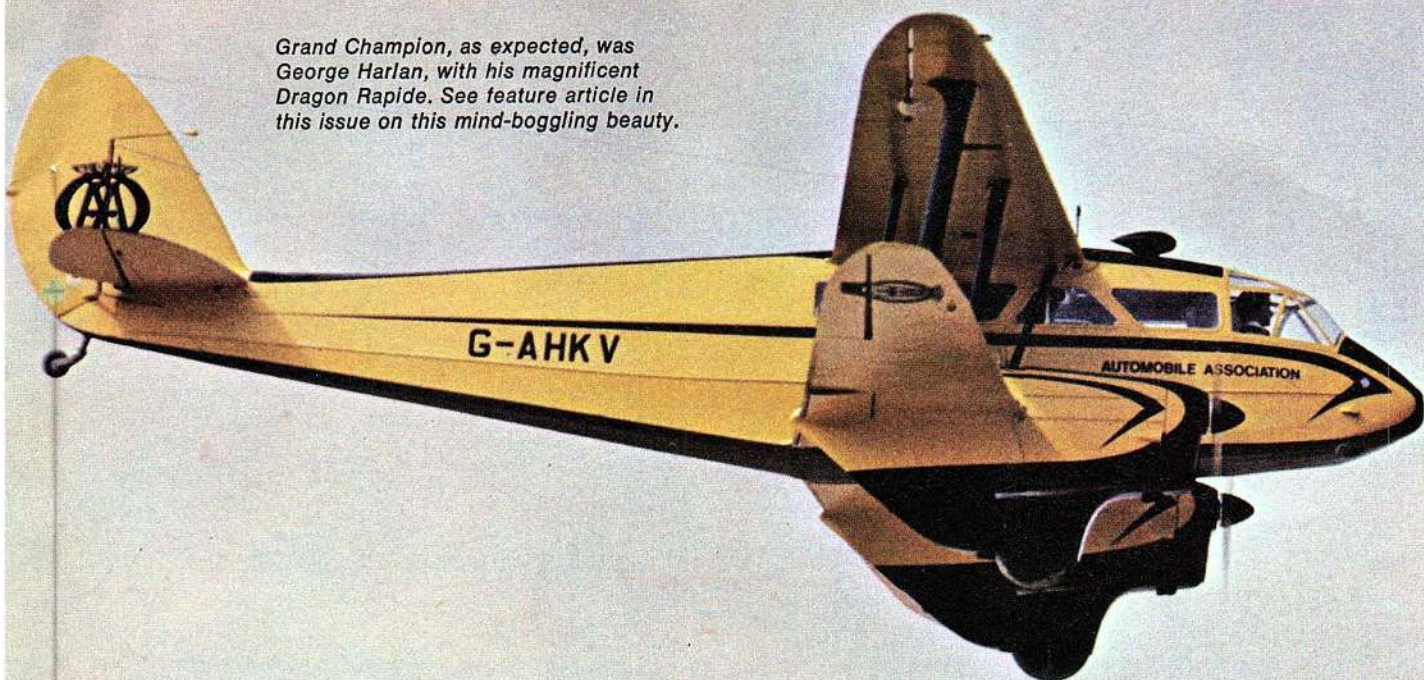
That's not to say that this is becoming a regional meet. Walking through the crowds, it was amazing to encounter old friends from all



Jorg Vogelsang's Siemens-Schuckert
was no small airplane. Span is over 108"!

Jorg has his models custom made by his
own personal full-time engineer/builder!

Grand Champion, as expected, was George Harlan, with his magnificent Dragon Rapide. See feature article in this issue on this mind-boggling beauty.



We didn't catch the name of the builder of this immaculate Pitts. Some custom paint job!



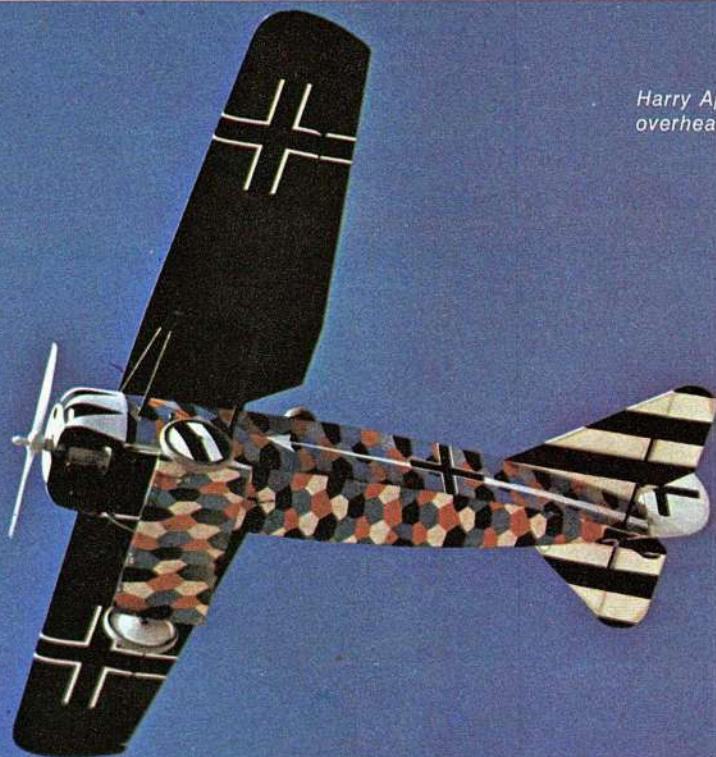
West Germany's Jorg Vogelsang captured best WW I with this overpowered Siemens-Schuckert D-IV. Model flies on a 35-20 prop!



Dick Enos again won Best Finish, and it looks as if the paint came out of the same cans he used to win the trophy last year!



Harry Apoian's Fokker D-VIII chugs overhead.



Bob Munn brought this unique El Diablo aerobatic design. Flew really well.



over the country. They all admitted that they didn't bring a plane because they didn't want the hassles, but that they did want to come back and watch the flying, and to see fellow quarter-scalers.

The Fly-In is held out on the dry lake bed, just down the road from Boulder Dam. This year, we had an opportunity to take a helicopter junket into the Grand Canyon. If you want an afternoon that will blow your socks off, try buzzing through this wonder of nature in a helicopter. Imagine coming over the crest of the canyon, clearing the edge by feet, then falling straight down precipitously 4,000 feet to the canyon floor in a matter of seconds . . . it's an experience to be remembered. Seeing the dam from the air was awe-inspiring, with Lake Mead taking your breath away (it's the largest man-made lake in the world).

The flying site isn't quite so picturesque. Dust, dust and more dust just about sums it up. There must have been 10,000 motor vehicles in the parking area, and this constant vehicular traffic kept a cloud of hazy dust hovering in the area. Apply a little sun tan lotion to keep from getting char-broiled in the desert sun, and you become a walking tac rag. Of course, everyone is having so much fun that you never notice it, until you get back to the hotel and get mistaken for a salty old prospector.

Ordinarily, you'd say that one would have to be nuts to endure such discomfort, but these people love big airplanes so much that never is heard a discouraging word. There were no dust storms this year, which was a blessing. The blue desert sky was full of models all of the time. If you wanted to see action, this was the place to be.

Before we get into the highlights of the most exciting planes at the Fly-In, there are a few observations worth noting. We feel it's indicative of a growing trend in the giant-scale movement that it has become an "everyman's" hobby. By that we mean that today nearly everyone has found the enjoyment of large aircraft. Until a year or two ago, the Q.S.A.A. meet was dominated by a high percentage of scratchbuilt (or highly modified kit) aircraft. Size was a relative factor, with many really monstrous projects to be seen. There was a definite emphasis on originality, as might be expected from an aspect of the hobby which was in an evolutionary stage.

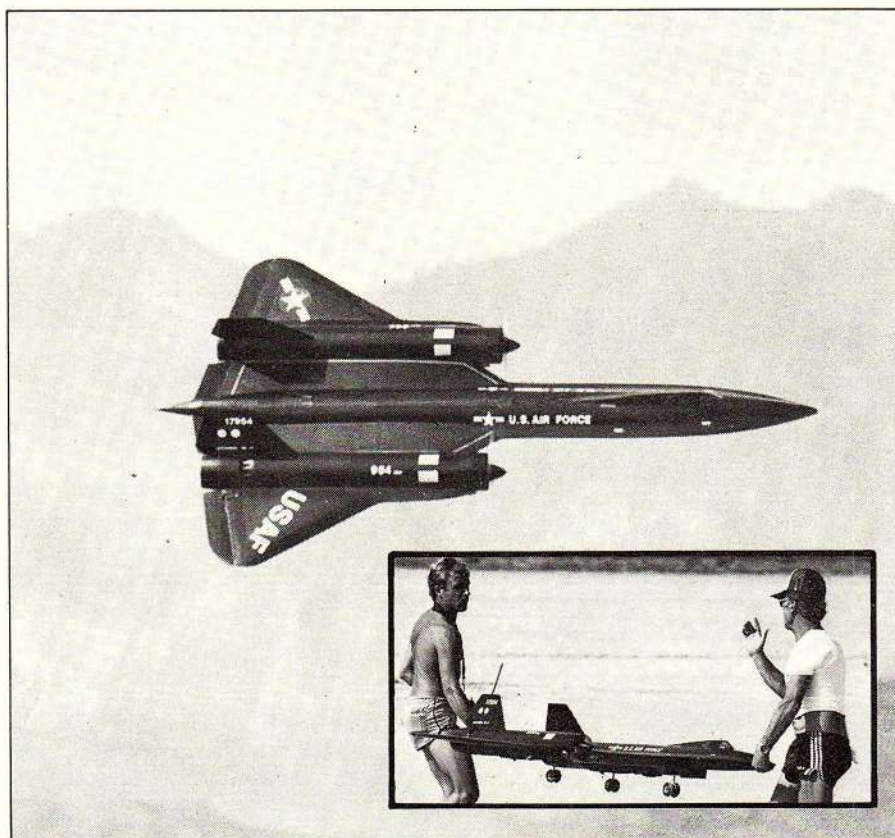
Today, we were aghast to find so much "me-too-ness" that a certain degree of boredom was evident. We

were acutely aware of this right from the start of flying. We were at our usual position on the flight line, with telephoto lens poised to capture the action. As each plane came within shooting range, we fired off a burst with the motordrive, and a mental note to get the aircraft's I.D. number for later identification. Halfway through the first roll of film, we realized that it wasn't the same two CAP-21s and J-3 Cubs we were photographing, but that *all* of the planes in the air were either CAPs or Cubs!

Don't be surprised if you find a lot of captions with this article which

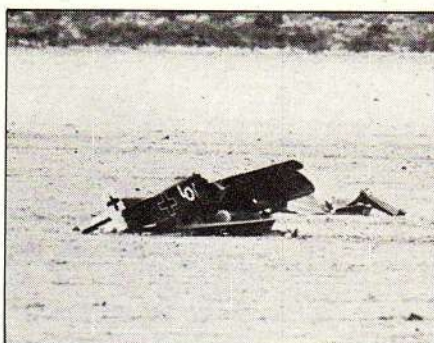
say "builder unknown!" It was as if a plague of look-alike aircraft had descended on the area. Everytime we turned around, there was either a CAP-21, CAP-20, Laser 200, Cub, or Citabria. Later, we had a chance to check the registration sheets, and discovered that some 60 aircraft (almost a third of the field) were from these five types. There were no less

The West German team did a superb job again this year, flying a huge 747. After some initial gear problems, the gargantuan model flew very well. There are 18 wheels, and five sets of retracts!



The West German contingent also flew this exciting SR-71. Props were used, instead of fans, but the plane was still a thrill to watch.

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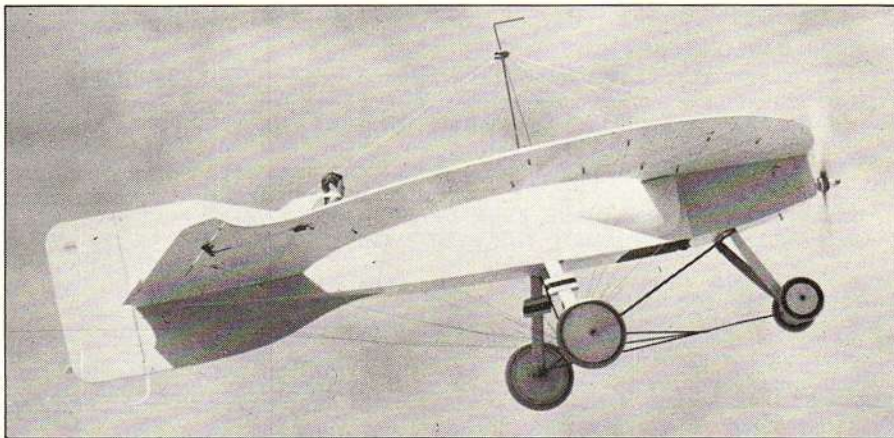
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than 11 CAP-21s, seven CAP-20s, and a dozen Lasers. We combined J-3s with the clipped-wing Cubs and came up with a staggering 18 entries! The Citabrias and Decathalons were tallied together, and we got a figure of twelve.

Such statistics indicate several things. Giant scale has received recognition by the average weekend modeler. Naturally, he's going to tackle the relatively safe projects, like Cubs and Citabrias. The second trend is that the engines of today have been perfected to give lots of brute power, while simultaneously the Circus/Circus event has sparked the development of very aerobatic machines like the Lasers and CAPs. We saw a lot of Pattern flying during the weekend, very thinly disguised as "giant-scale." Some of the aircraft sported paint schemes which made no pretense of simulating a full-size counterpart.

Many may welcome the influx of the Pattern fliers into the giant-scale scene, but we candidly think that it's giving up a little of the basic philosophy of quarter-scale (putting the emphasis on the word *scale* to denote aircraft type, and not merely size). We love aerobatics as much

(Continued on page 63)



Strangest project at the Fly-In was Don Westergren's Le Richards #3. This

1914 design flew amazingly well, and showed remarkable stability.

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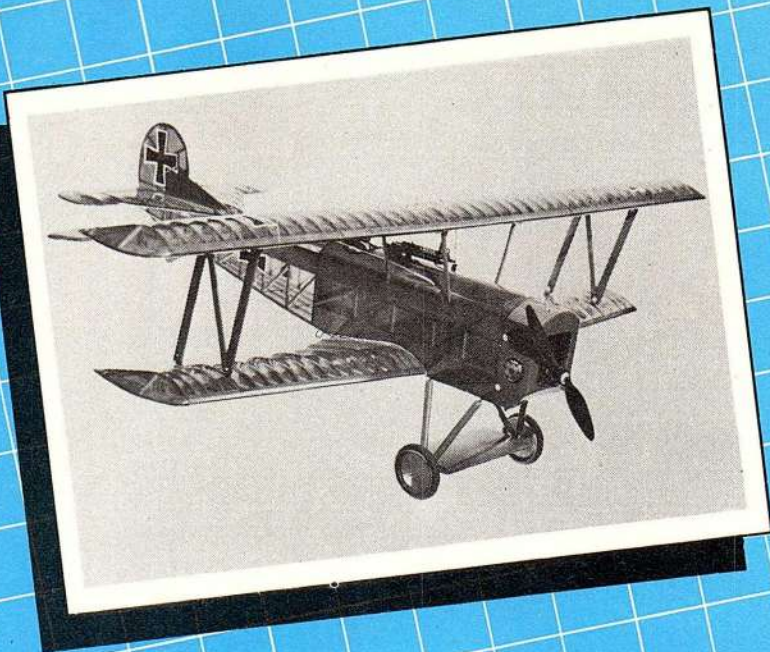
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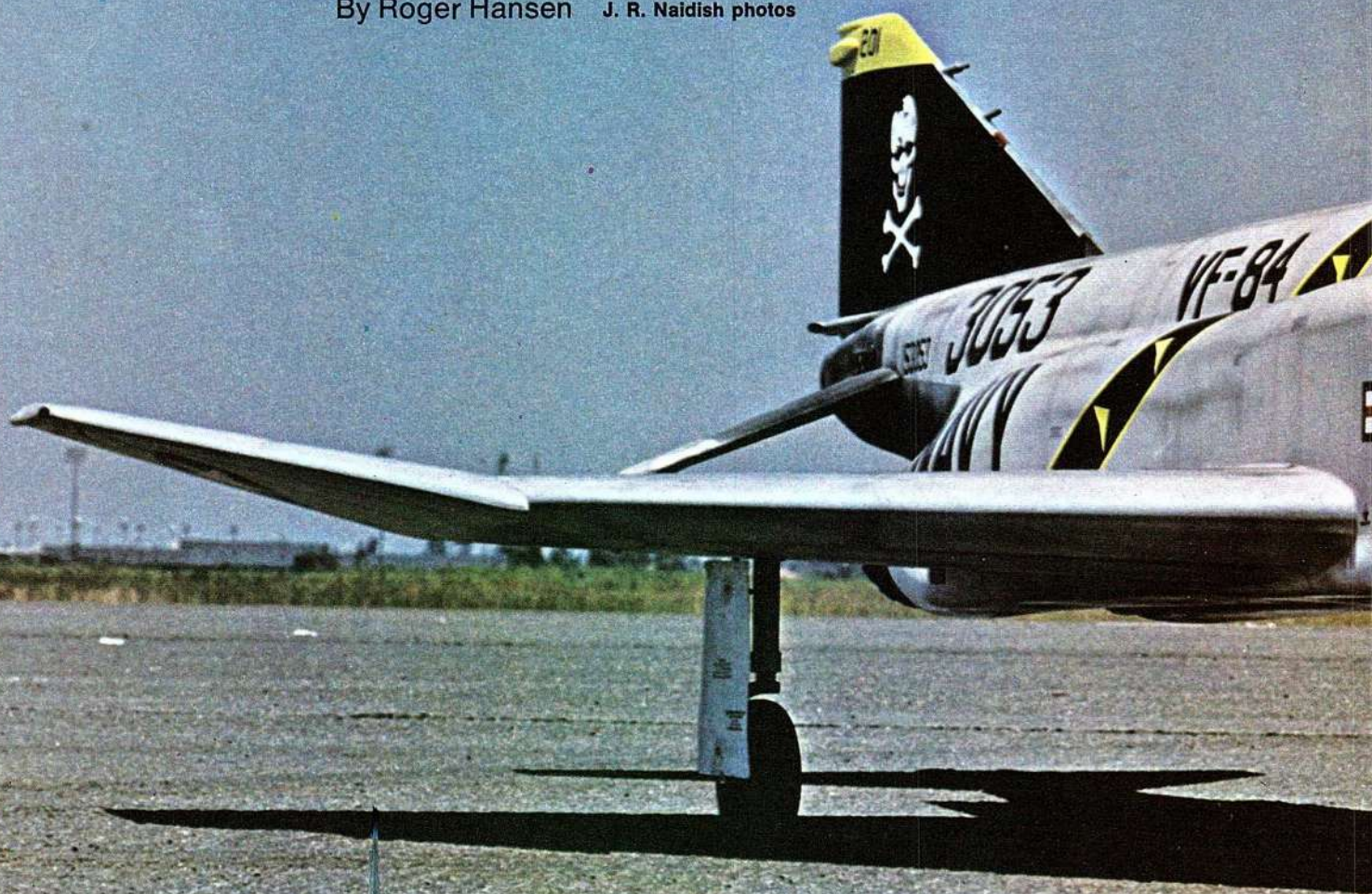


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Building the Big Phantom Jet

A modeler gives his impressions of the world's biggest (and most expensive) kit, the Jet Model Products F-4B Phantom II. This is the jet which swept the Masters and Nats.

By Roger Hansen J. R. Naldish photos



No one can deny that the most exciting model to have ever been put into kit form is Tom Cook's huge F-4B Phantom II. Not only is it exciting because Tom has twice won the Masters with it, as well as last year's Nats, but also because it is one of the largest (and most expensive) kits ever produced. I happened to have had the experience of being one of the first modelers to build and fly the Phantom, since I had one of the very early semi-kits Tom made. Because of this, the Editor approached me to write a "consumer's critique" of the kit.

It must be kept in mind that my jet was built from an almost prototypical semi-kit, and that today's kit is radically different from the bare basics I had to work with back then. I have just received one of the new kits, and so I can speak with some authority about it. The very fact that I was so impressed with the Phantom that I wanted to build a second one is perhaps one of the best endorsements I can give it.

The next best endorsement I can give the plane is that it enabled me to qualify for the Masters. That's not an easy thing to do, no matter

what plane you are using. But, to do it with a twin ducted fan model would seem to stack the reliability factor against you. As it turns out, except for a few minor difficulties, this has proven to be a very predictable aircraft.

The Phantom kit is one of the largest things you will ever get sent to you. The fuse is over seven feet long, and it looks like a delivery from a mortuary when it arrives at your door. The model is surprisingly basic, in its general construction, being nothing more than a big fiberglass and foam project. It goes to-





gether much like a Pattern ship. The big differences are that there is a lot of scale detail and "garbage" to apply, and the weight factor must be very stringently controlled. Any ducted fan model must be kept as light as humanly possible. Performance is a direct function of thrust-to-weight, so any added ounces definitely show up in the air.

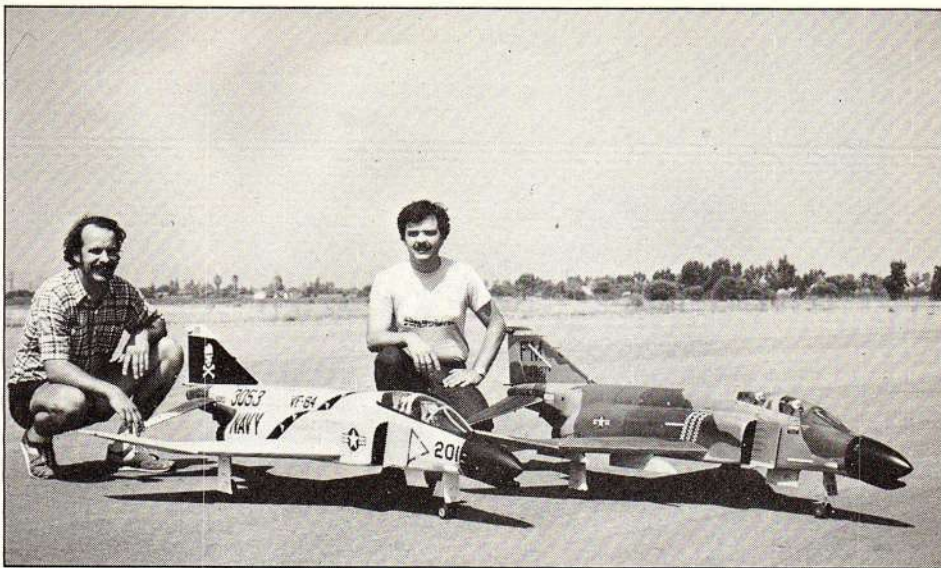
You won't find many kits with the quality of parts found in the F-4B. The fuse has no pin holes, and all of the machined parts are immaculate. Tom makes each kit by hand, and quality control is stringent. Even the retracts have been especially designed and engineered for this model, and the engines are run-in and tested before they are shipped. Even at the unusually high price Tom gets for each kit, I can't see how he makes any money, with all of the hand labor and time that goes into it.

Since the model pictured here was done from the old semi-kit, I spent an inordinate amount of time making my own formers, gear struts, elevator tabs, chute parts, etc., so I have a good feel for how much time Tom must put into this project. Some of the comments I will make about the product reflect my own personal preferences for ways of doing things. The only real criticism of the kit that I have is that the huge fiberglass fuse, because of its sheer size, has a tendency to crack the gell-coat if a hard landing is made. Of course, there is no practical way to rectify this, but it helps to be aware of it.

Getting into the kit, Tom has the modeler make the fan access hatch from wood. Being lazy with the sandpaper, I carefully cut the fiberglass, reinforced it with some stiffeners, and used it. The glass hatch is probably a little lighter than wood.

The instruction book which comes with the Phantom is most impressive. My original semi-kit had none of this, but the latest version has full-size plans as well. The instructions and plans are so good that any experienced modeler will have no trouble. If you do encounter a question, Tom is just a phone call away, and I have found him most helpful whenever I needed some assistance.

One of the first things to do, before you start any assembly, is to lay out all the components of your radio and retract system on the plans. Figure out where all of the wires and air hoses will go, and route the appropriate clearance holes in the parts before assembly. Ducted fan airplanes, even when they are this large, are mostly an open tube



The author (left) poses with the second-time Masters Champion Tom Cook. Roger flew his jet in the Masters, proving that this isn't just another "one-man" airplane.



Grabbing for sky in true jet fashion, the F-4 wound up flying a phenomenally heavy 25 pounds, yet it still performed well.

through the middle of the fuselage, so servos and other components must be hidden wherever possible.

A small change that I made was to install my receiver aft of former B-2. I ran a length of Ny-Rod inside the vertical fin and along the fuse top. The receiver antenna is accommodated in this, keeping it clear of wires and control runs.

The foam wing cores are rather basic. I opted for epoxy resin to bond the skins, instead of contact adhesive. I used a Monokote heat gun to warm the resin beforehand, then squeegeed

it on in a very thin film. This will give a light structure, and add a bit of strength to the wings. All sheeted surfaces (wings, stabs, fin and rudder) are later glassed, using the traditional 3/4-ounce cloth and polyester resin. Automotive primer/surfacer was applied, then color coats of Superpoxy. Even more weight could probably be saved by using auto acrylics for the color coats, and sealing it all with clear epoxy.

One flaw in the original kit was that formers B-1 and B-2 were laminated 1/8-inch balsa and 1/64-inch ply. From my personal experience, the stresses placed on these formers requires more strength. Both formers are mostly open in the middle, to accommodate the fan (at B-1) and the



The F-4B is just a large glass-and-foam kit, comparable to any Pattern ship, according to the author. The fuse is over seven feet long, and comes in one piece!

exhaust duct (B-2). Any high-G maneuver, or a hard landing, will transmit the stresses of the wings into these formers, causing them to flex or even crack. When B-1 flexes, it can distort the fan housing. The impeller blades then rub, causing engine overloading or even a burn-out.

I had an engine fail on takeoff. As the aircraft lost altitude, the pilot ran out of ideas, and a downwind landing resulted. The aircraft bounced, pushing the landing gear up through the wing. I later discovered that former B-1 had cracked. I'm pretty sure that the engine died because of the cracked former, with the excessive friction of the fan finally causing engine failure. I would suggest adding more plywood, or even using Magnalite carbon fiber for these formers.

The Phantom requires a lot of servos. There's one for each aileron, one for each flap, one for rudder and elevator, another for nose gear steering, throttle and optional ones for drogue chute ejection and func-

tional canopies which swing open. I definitely advocate using either one heavy-duty servo for the elevators, or two servos in tandem.

The selection of the radio receiver location is up to the builder . . . remember to plan this all in advance. Tom puts his receiver way up front, using eight-inch choked servo leads. I opted to put the receiver behind B-2, thus eliminating most of the long wires. The only long lead I have is for the nose gear servo, as well as a long run for the battery pack. (NOTE: Always upgrade the wire size to the battery pack when lengthening the run. Go to 20 or even 18 gauge to avoid any current loss. Most radios use too marginal a size battery wire in the first place.)

I had worked on the Phantom for about seven months to get it to the glassing stages prior to painting. Remember that this is from a semi-kit which gave me little more than a fuse, foam cores and some drawings. One night, I heard a loud bang from the shop. I looked around, but didn't see anything amiss. The next day, as I sat down to work on the Phantom, I saw that a flap was gone, and there was a hole torn through the trailing edge of the wing. There were cracks in the side of the fuse, too.

I looked around and found a piece of the garage door spring. The spring had exploded, and the piece hit my model with the impact of a cannon. Out came the cyanoacrylate, micro-balloons and epoxy!

It seemed like an eternity to get the model back together again. But at last, the Phantom was painted and ready for some flying. With the Giezendanner retracts, less fuel, the F-4B weighed 19.25 pounds.

One of the new experiences you get with a plane like this is learning the proper care and folding of a parachute. I experimented for hours, trying to get the 'chute folded just right so that it would easily eject, and yet open quickly. Wrapped too tightly, it didn't work, and too loose a wrap would hang it up inside the tube. Finally, I hit upon the perfect fold but, just to be sure, I used liberal amounts of baby powder to reduce friction.

A friend, Roger Douglass, had his van dubbed the "Official Phantom Transport Vehicle." The Phantom goes only when his van goes. As Pat Ventola mentioned in Part I of his two-part article on the Phantom (August and October '83 issues), this is one airplane which definitely does not fit in any compact car.



ed unearthly. Unlike most twins, you must adjust the engines one at a time. When they are both screaming, you can't tell which one is off. I'm not one for using a tachometer, but it probably wouldn't be a bad tool to use if you aren't experienced to the proper sound of a dialed-in K&B 7.5. As anyone who has had any ducted fan experience will attest, the K&B 7.5 is a bear to get a smooth transition with. The Perry carb seems to be the source of this poor middle range. Tom Cook has done his homework, and he personally modifies each engine, not only fitting an O.S. carb, but also doing some other minor tweaking which makes the engines more reliable. Tom test runs each engine, so that you can be sure they will work fine.

With the needle valve set, I taxied the big Phantom down the runway. You can't imagine the sheer thrill of seeing this big model roll gracefully along the ground. It kind of staggers you the first time you see it moving under its own power. Once downwind a good piece, I turned the jet around into the wind and poured the coals to it. The secret of a successful ducted fan takeoff is to let the model accelerate as long as possible, and never try to force it off. The Phantom would go barreling past, but it almost seemed as if it was dragging an anchor, and not quite getting up to rotation speed.

I tried several times to get the model to go full bore, but always it got to a certain speed and just wouldn't go faster. Finally, I figured out that the tires were rubbing against the struts, acting like brakes. I borrowed a pair of smaller tires from an Aeromaster, refueled, and tried again. Just to show how dedicated Tom is to this project, he is even molding his own custom tires for the kit, so that maximum takeoff performance will be guaranteed!

This time the tires didn't bind and, at about 450 feet down the runway, the Phantom lifted. As soon as I could see light under the wings, I knew that the flight would be flawless. All that was needed was a click of left trim and a click of up trim. Getting the Phantom to rotate on takeoff requires full up elevator, then back to neutral as it climbs out. The full-size airplane requires the same extreme control inputs.

I took the big jet up to about a thousand feet, just in case there was any trouble. The gear should be retracted as quickly as possible after takeoff, since the drag is really severe. To my pleasant surprise, the Phantom was very responsive. The roll rate is exceptional, as it is with most ducted fan planes. There is plenty of power, and you can feel the model get on a definite "step" when the thrust is right. Too little power and the plane seems to mush listlessly through the sky.

The first landing found me coming in on the hot side, since I was unfamiliar with the model and didn't want to risk a tip stall. When the gear is lowered, there's a distinct nose down pitch, created by the drag of the undercarriage. A slight up trim easily rectifies this.

After my nerves settled, I refueled and changed the plugs. I make it a habit of changing the plugs often. At 22,000 rpm, don't expect them to last for more than a flight or two. It's ridiculous to risk several thousand dollars worth of airplane just for a \$2 glo-plug.

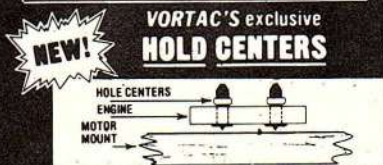
The next two flights were sheer joy. The Phantom was a real pleasure to fly. The maneuvers were breathtaking, and the sight and sound of a low pass puts your heart in your throat every time. Boy, was I going to show them how it's done at the upcoming Masters qualifier that weekend.

We decided to make the first flight at Camp Pendleton Marine Base, with its 6,000 foot runway. It took us about an hour to get there, during which time I consumed a large bottle of Pepto-Bismol to calm my stomach.

When we arrived, the first thing I did was to range check the radio with the engine running. This is a wise precaution with any model, but is especially important with the high-resonance environment of a ducted fan. Those two screaming fans sound-

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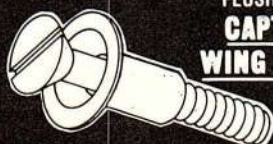
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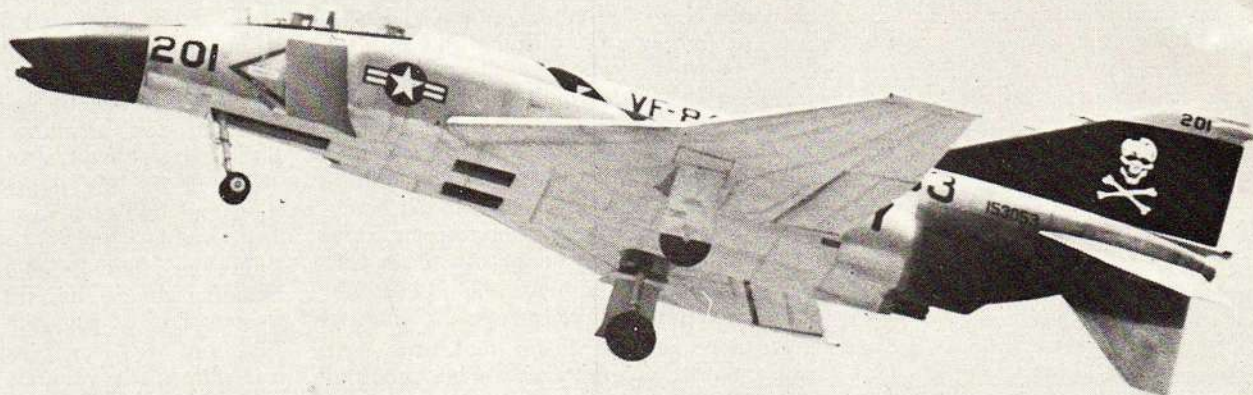
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On the last flight of the contest, the nose gear did not lock down, as is evident in this photo. Tom Cook makes a set of gear which work well not only in the Phantom, but in any large model. We hasten to add that Tom's retracts were not used in this project.

I decided to do one more flight, then head back. As expected, that was the typical one flight too many. As previously mentioned, the former B-2 must have cracked on a landing, and the fan overloaded, causing the engine to die on takeoff. Instead of going straight ahead, I got the plane

turned downwind and had to land it hot and fast. The plane bounced and tore the left gear up through the wing.

Don't be fooled into a false sense of security by thinking that two fans are safer than one. The F-4 will only extend its glide with one engine out . . . it will definitely not maintain altitude. Just like a single-fanned aircraft, you don't want a flame out.

Boy, was I depressed! Here it was, four days before the Western Scale Nats and the plane was in need of repair . . . again! Once more, out

came the bottle of cyanoacrylate, microballoons, epoxy . . . and the Pepto-Bismol. I burned the oil till 1 a.m. every night, finishing the repairs the night before the contest.

Roger brought out the OPTV (Official Phantom Transport Vehicle) at 9 p.m. and we loaded everything we could think of, including a portable generator, and headed for Los Angeles the next morning.

My situation for being competitive in the contest didn't look good. I had only four flights on the Phan-

(Continued on page 70)

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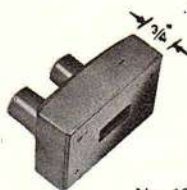
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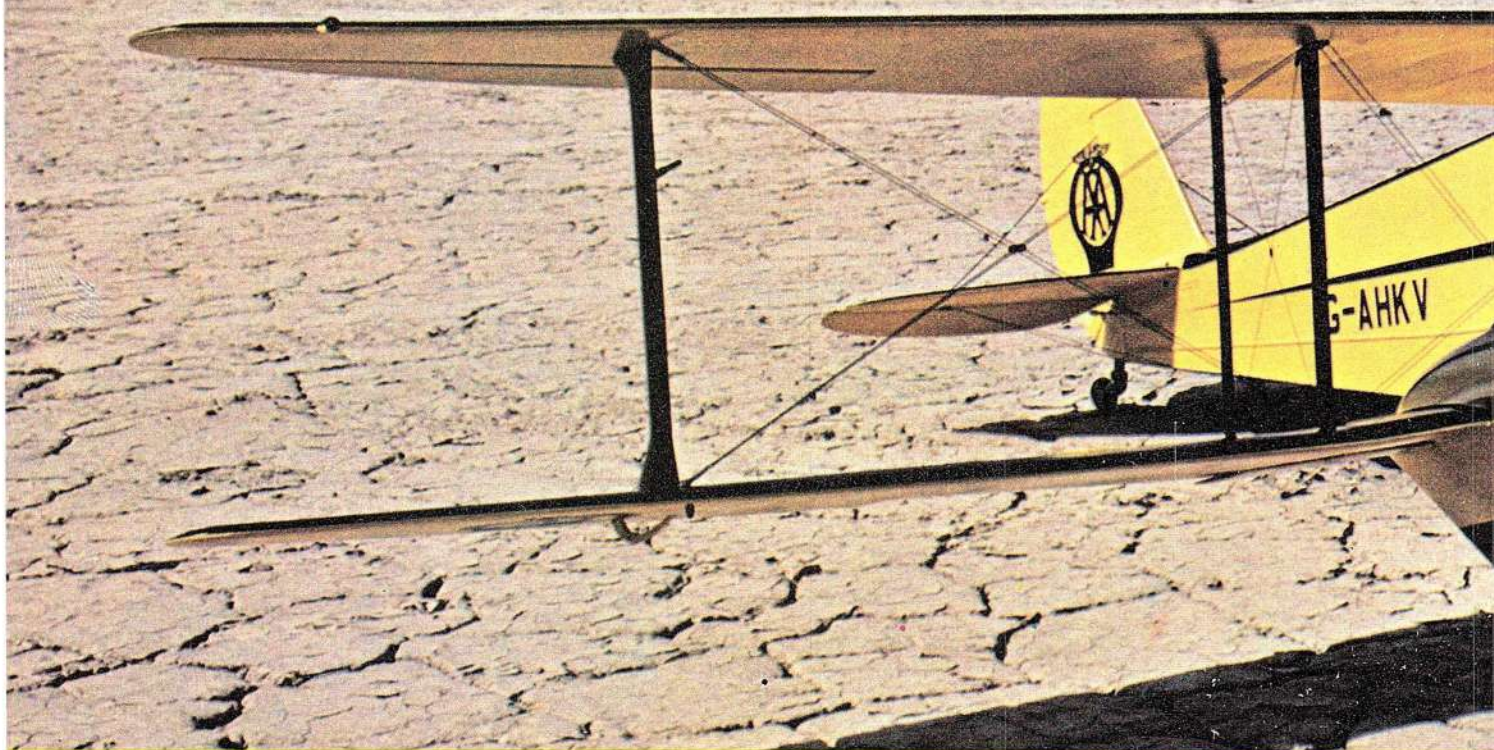


Dragon Magic

(Part I)

Winner of the Q.S.A.A.'s coveted "Best of Show" award, this deHavilland D.H.89a Dragon Rapide is perhaps one of the most classical of all biplanes. By George Harlan

J. R. Naidish photos

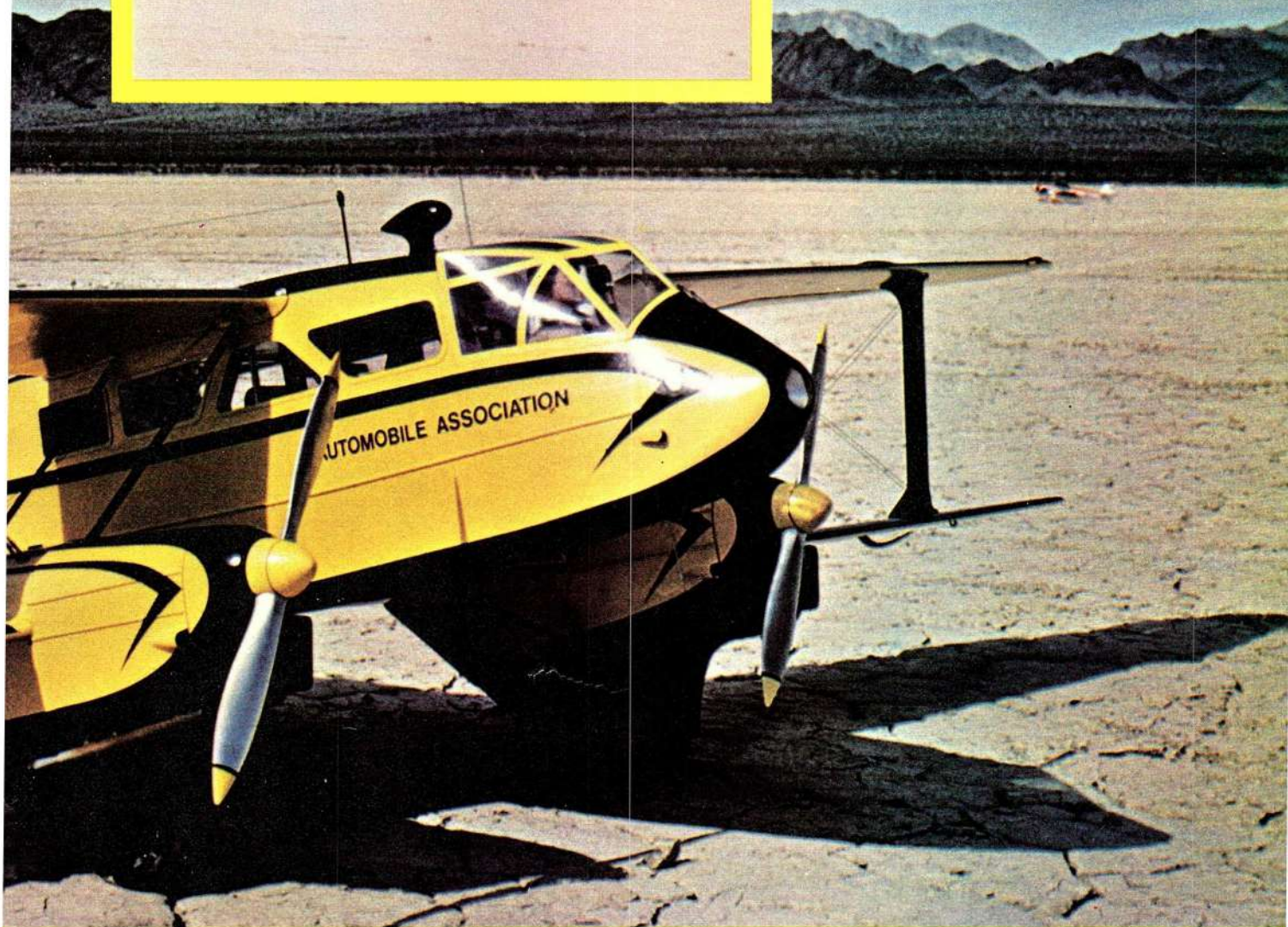


Conjure up the magic such aircraft names as *Beech Staggerwing*, *DC-3*, *Fleet Biplane* and *Great Lakes* evoke, and you are quickly mesmerized. But, the Merlin of all those magical names is the "*Magic Dragon*," the de Havilland D.H.89a Dragon Rapide. If you want bewitching beauty, just glance at the tapered wings of this classically sculptured aircraft. This Dragon evokes love, respect, even admiration from all who have ever set eyes on her.

This 1934 design was the outcome of three previous attempts to provide commercial operators with economically feasible modes of transporting cargo. The first generation was the D.H.83 Fox Moth, which appeared in 1932. Next came the twin-engined D.H.84 Dragon which took wing in late 1932. Then came the D.H.86, which looked like a

four-engined Rapide. The success of this transport brought about the smaller twin-engined 89 Rapide. Powered by two 200 hp Gypsy Major engines, it had an 84-foot span and could carry 6-8 passengers.

The elegant twin was a huge success, and served in commercial passenger and transport service all over the world. The Rapide was also built under license in Canada. These Dragons had enlarged dorsal fins, so that they were more laterally



stable when fitted with floats. The Dragon was right at home in the frigid North, becoming a favorite of bush pilots on both floats and skis. The biplane had exceptional STOL characteristics, could carry tremendous loads on those thin wings, and was as rugged as any fit Dragon should be.

When war reared its ugly head, the Dragon served its time. She was stripped of many of her frills, then given the inglorious name of Dom-

mie. Yeoman duties of training bomber crews and navigators was her lot, with some occasional squadron hack duties thrown in. Not much magical in all of that!

After the war, Rapides found their way into many unusual circumstances. G-AHKV was used for sky writing by Sky Neon Aviation, Ltd., from 1954-56. The lower wing was fitted with neon tubes, and the Dragon spread a different type of flame through the sky. This particu-

lar plane drifted through several owners, to eventually find itself at a permanent home with the Automobile Association in 1963.

Affectionately referred to as the "Old Lady," G-AHKV was given a yellow and black paint job, fitted with a very lavish interior, and used for personnel transport and traffic observation. Her low operating cost and ability to "keep going when the rest had stopped" kept the fancy biplane in service for many years.



* * *

After returning from the annual Q.S.A.A. Fly-In last year, I began searching for a project which would take the coveted "Best of Show" award the following year. I spotted the R. C. Sweitzer ad for the Rapide plans, and it took only one look at this big biplane to convince me. I called Bob Sweitzer and discussed the plans, availability of components (he has glass cowl, canopy, nose light, etc., available), and the all-important scale documentation. At the time, Bob had his own Dragon under construction, so he was very willing to offer any assistance.

The real clincher is that Bob mentioned the Automobile Association's yellow and black Rapide as easily documentable. I'm a sucker for yellow models, so the decision was made on the spot. Bob supplied a photo pack of the Dragon. I also contacted Aircrafts in Detail (P.O. Box 2516, Van Nuys, CA 91404-2516) and received a profusion of detail photos of the Dragon.

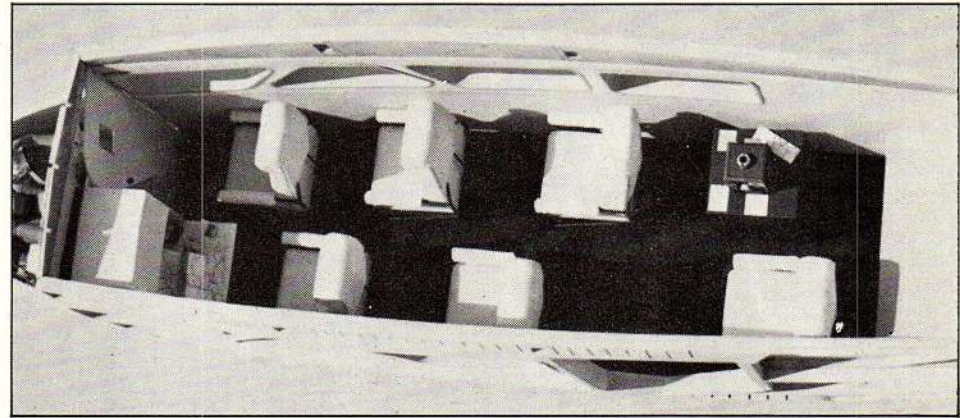
No one making a serious effort at documenting an aircraft can get all he wants that easily. I was still missing critical data on the aircraft's interior. My model was going to be a flyable museum-scale machine, so I needed to account for every fitting and fixture. On a long shot, I penned a nice letter to the Automobile Association, whose address I got from an English friend at my office. I sent some photos and sketches, with areas indicated where the details were vague. I asked if there were any old-timers around who might remember the aircraft and who could answer my questions.

Ten days later, to my shock and surprise, I received a two-page letter, plus photos, photocopies, and even paint chips. Bill Lewis, the A.A.'s Exhibition Officer, was once the pilot of the Dragon, and he gave me all of the information I needed. I wrote back soliciting even more details, and Mr. Lewis promptly set everything to right.

I got the plans from Bob Sweitzer. I made a reduced-size set, which I could use for quick reference and to pencil in notes and details. Bob's plans are so tremendous (four sheets measuring 3x9 feet) that even handling them in the workshop is a major undertaking. The Dragon model measures 96 inches in span, and is two inches-to-the-foot. I made Xerox copies of all of the parts, so that I wouldn't have to butcher the plans. We have a wax machine at work.



Getting airborne, the Rapide is an amazingly easy model to fly, primarily because of its light weight (only 16 pounds).



The cabin interior is a marvel of craftsmanship, with full cloth-covered seats, map table, carpeting, cloth-covered walls (in two colors), etc. Module concept simplifies construction.

Artists use this to adhere paste-up copy to art boards, so I ran my plans parts sheet through this machine, and they were perfect for simply brushing in place on the balsa as a template. The wax doesn't get on the wood, so it's a clean way to make templates.

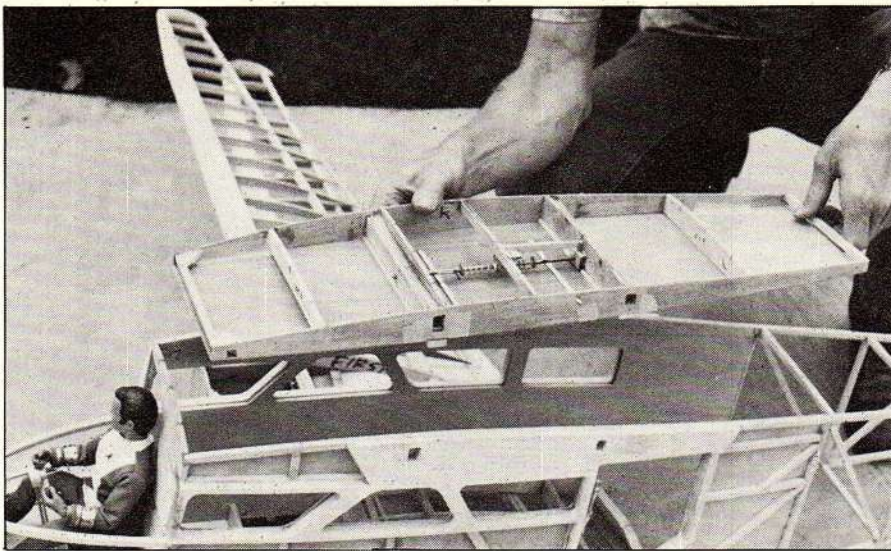
I made the required journey to the hobby shop, and spent some time selecting my wood. The bill came to \$100, and I suspect that I added a lot more to that before the project was finished. I kept a daily work record of my time on this project, and I came up with 35-40 hours to merely cut out all of the parts, and to final sand them. To keep all of this organized, I separated all of the parts into large manila envelopes, and hung them on my building room wall. This proved a very handy way to keep things organized.

I always like to start with the rudder, just to get the old fingers

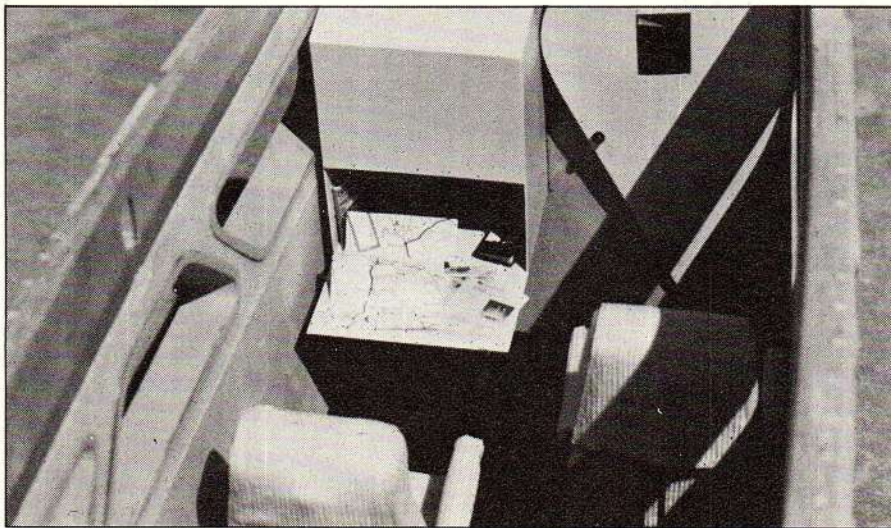
warmed up. I then move onto the more complex parts, such as the stab, then the fuse. Hating wings (a universal trait shared by all modelers), I leave them till last.

The Dragon's fuse was going to be a complex undertaking. A complete cabin interior was planned, not only of the cockpit, but the passenger area would be fully decked out. The Automobile Association plane had been reupholstered, with cabin walls which were light gray above a chrome molding strip, and dark gray below. Seats were light gray, as was the cabin ceiling, while the floor was black carpet. There were four dome lights in the passenger cabin, as well as leather ceiling hand grips. There were also two manually adjustable air vents at the leading and trailing edge wing positions. The front left corner housed a fire extinguisher. A box on the cockpit bulkhead served as liquor cabinet, which the Automobile Association converted into a map table (after all, a liquor bar aboard a plane flown by the "A.A."!).

Since the plane was used for road reconnaissance, the right rear seat



To get access to the cabin interior module, the wing center is a hatch, which locks in place with the wing attachment rods.

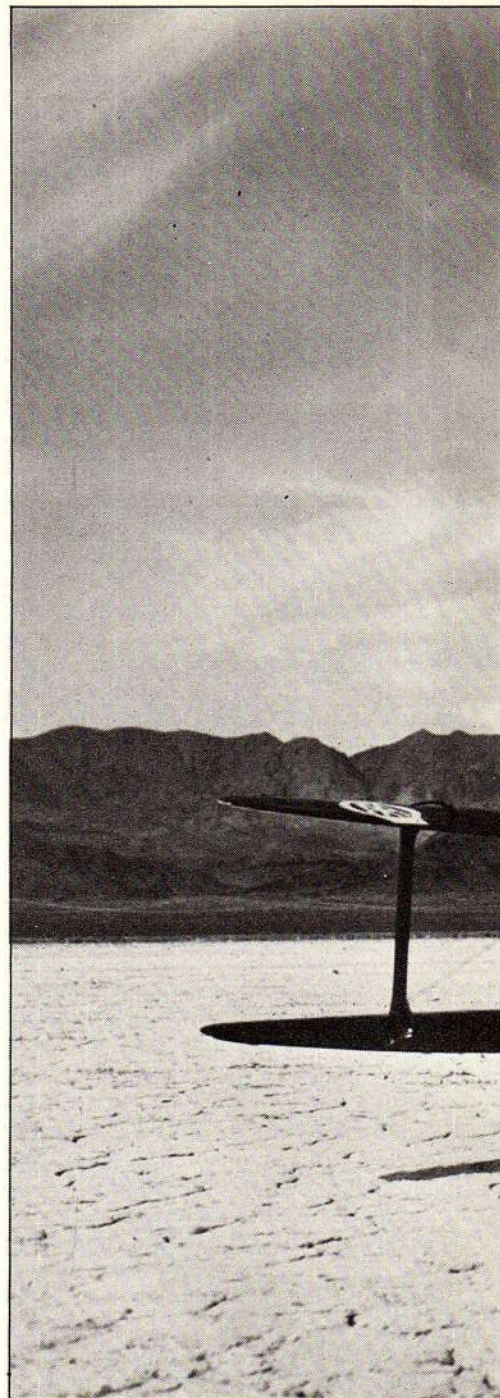


The miniature map on the map table, as well as miniaturized magazines, add a feeling of total authenticity. Cockpit access door is also operational.



"Beam me up, Scotty!" might be what this pilot would say, since he is a reworked Star Trek Captain Kirk doll from Mattel.

46 scale r/c modeler



The proud builder and his championship-class model. Note that George even built a miniature fuel tanker and step ladder!

had been removed, and an RAF camera was mounted on a rectangular platform. The cockpit was relatively "stock," except for updated gauges, etc. There was a window which had been cut into the cabin bulkhead door to provide light for night flying.

All of this minute detail had to be built into the model. It was sort of like fabricating a doll house inside the model. The best way to do it was to make the cabin a module, which could be lowered into the fuselage. The roof section was notched to fit over the crossmembers, then the



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That high-aspect wing is the most pleasing element of this classic biplane. Functional rigging wires and sturdy spars are essential.

remainder of the fuse was completed per the plans.

The pilot was a Mattel doll of Star Trek's Captain Kirk (with his sideburns shaved off). He was just right, at 12 inches high. My wife, Carolyn, patterned the uniform from written details supplied by Bill Lewis, and from some old Automobile Association photos.

Old friend Ed Morgan came to the rescue when it came time for the instrument panel. His R/C International Specialties instruments and panel were just perfect, and I added some Tatone instruments. I made the seats from the wooden dowels found on cotton swabs, while the seats were cut from foam, to which fabric was glued using 3M spray adhesive. I extended the legs of the seats through the floor, so that they could simply be pulled out when necessary. I finished the entire interior, then masked it off to avoid

contamination while the remainder of the fuse was fabricated.

Just prior to covering the fuse, the cabin ceiling was glued in place, and all of the servo leads and electrical wires were routed behind the cabin walls. This may not seem important, but there are over 15 feet of electrical wiring in this model, to work the nav lights, functional glow plug backup batteries, etc. An EMS 1200 mah battery pack was used to power the radio.

The fuse was covered with Hobby

(Continued on page 79)

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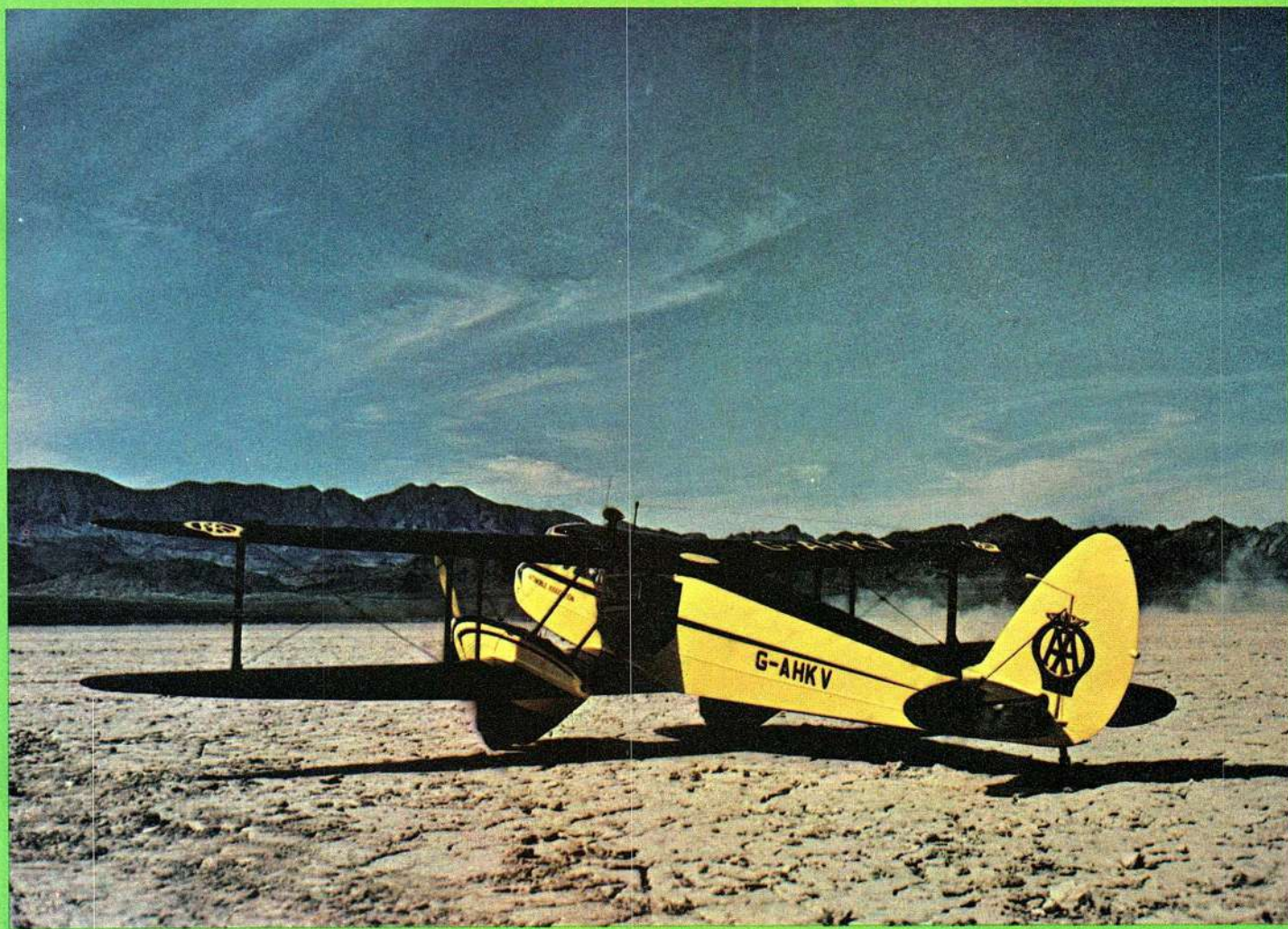
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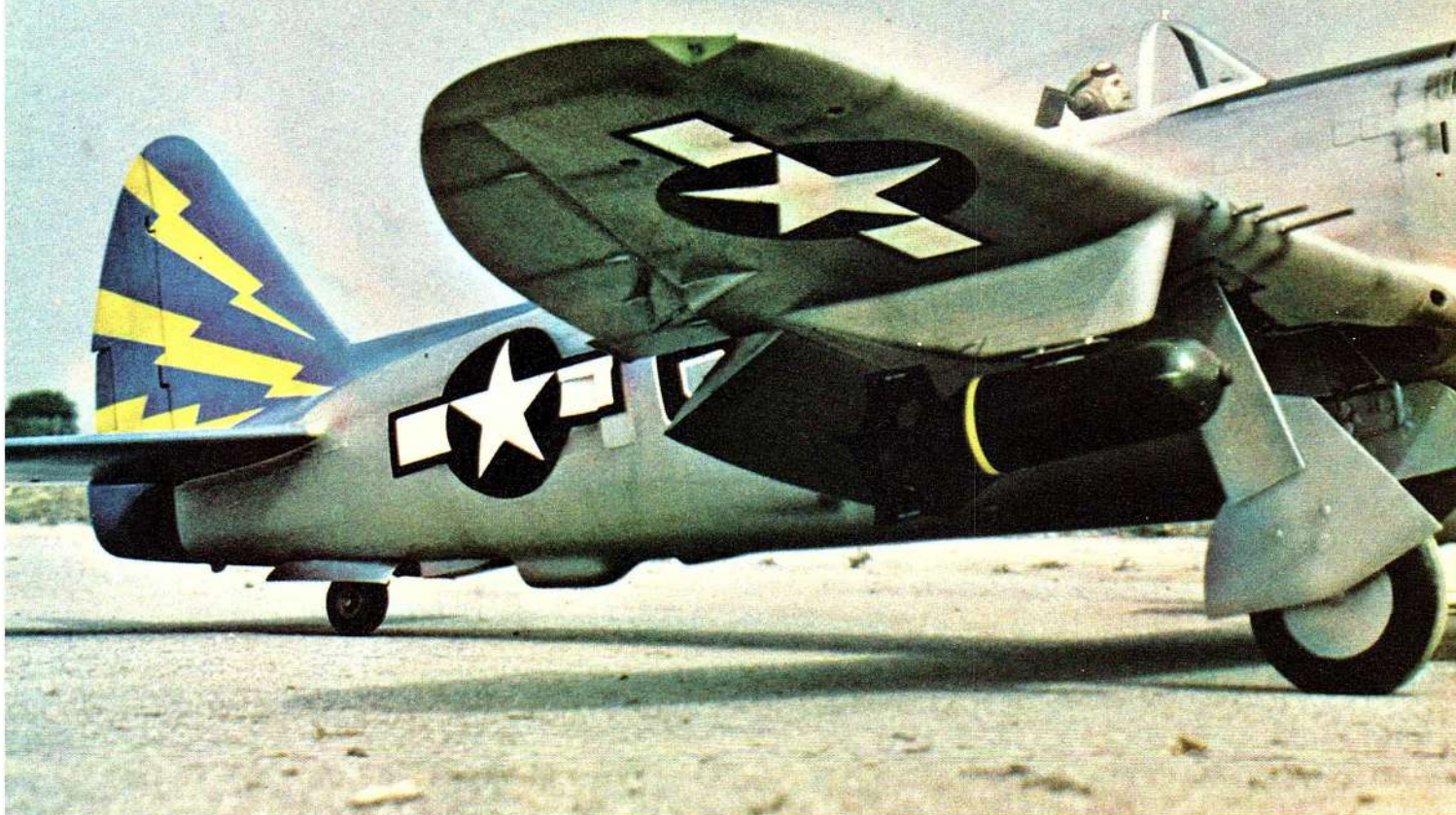
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BIG AND SASSY **THUNDERBOLT**



An 80" span Jug that has not only impressive size, but also thoroughbred performance. It proved that by taking third place at the Nats.

By Bert Baker, President Scale-Flight

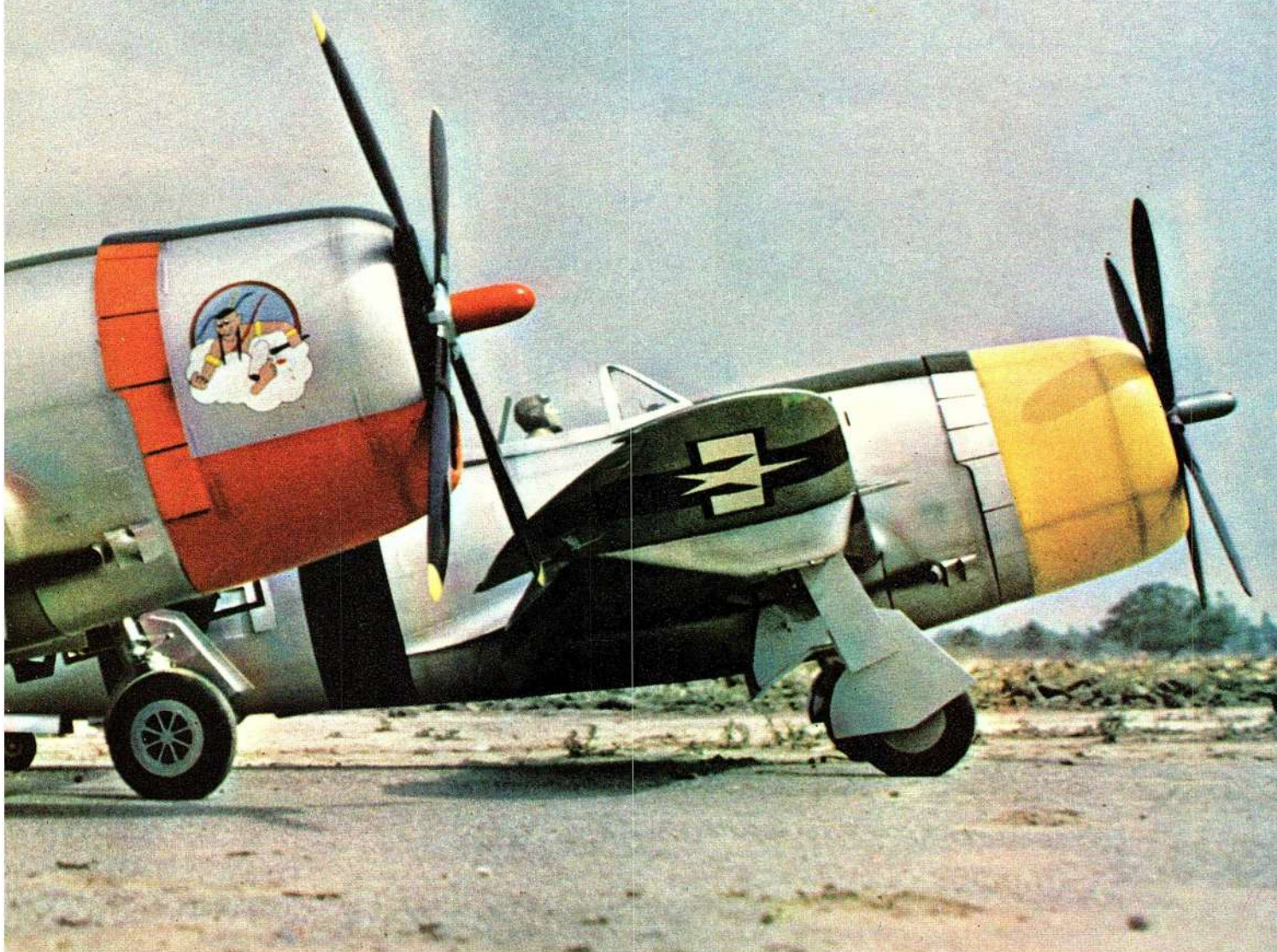
Of all the WWII military fighters, there are but a handful which can be labeled as truly memorable classic machines. No one will dispute the top honors going to the P-51 Mustang. It was the fighting-man's fighter, with looks and lines which exemplified speed and agility, I have yet to meet a modeler who doesn't love the Mustang . . . it's everyone's ideal.

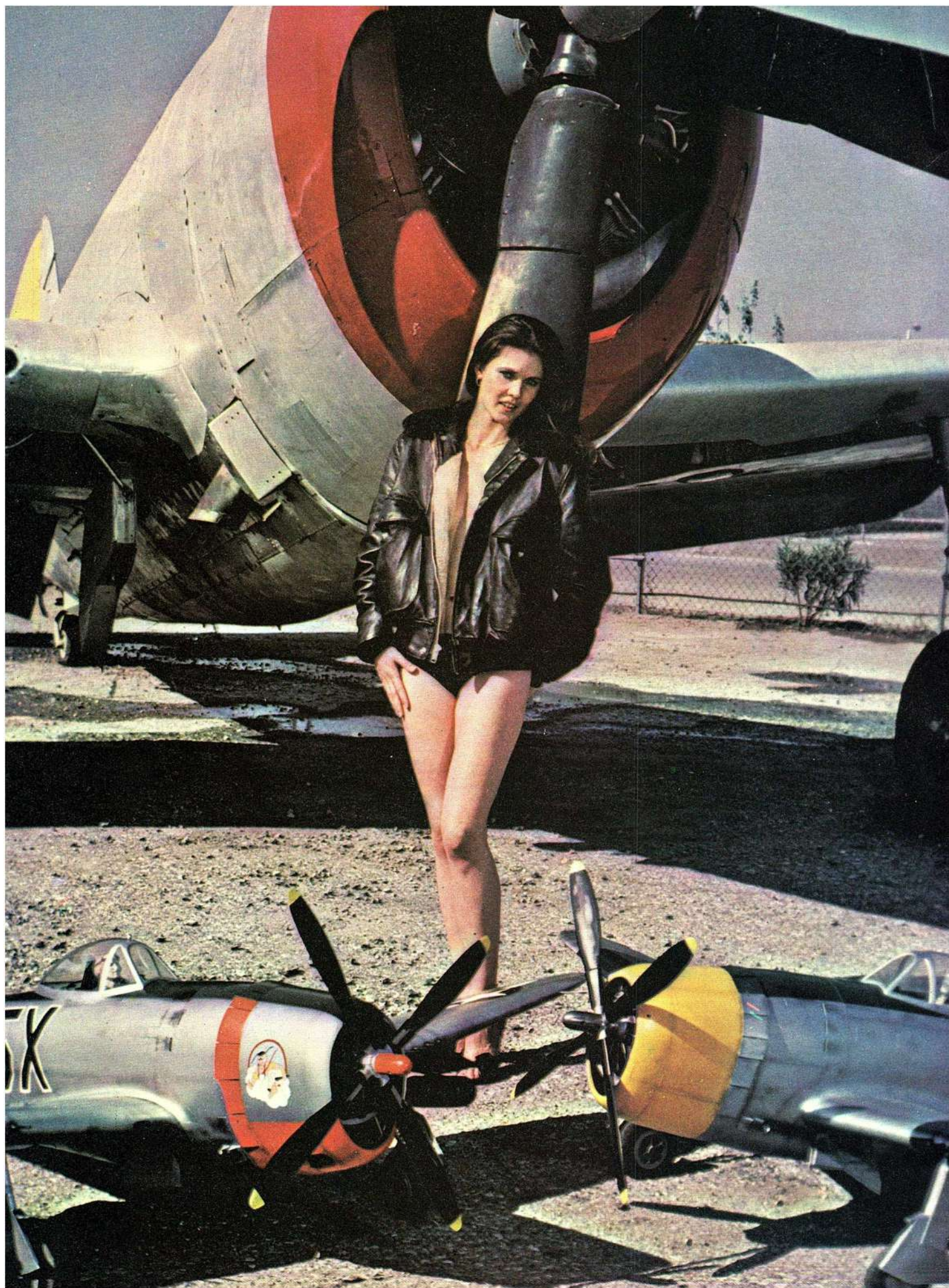
But, when it comes to choosing second place, the field is wide open. Many would opt for the graceful elegance of the twin-tailed Devil, i.e., P-38 Lightning. What about the Curtiss P-40? There are lots of heads nodding agreement on that one, I'm sure. Make no mistake, the venerable Corsair would certainly get its fair share of votes. But, I like to think that if you got all the

scale buffs into a stadium, and showed them the massiveness of the Republic P-47 Thunderbolt, the applause meter would quickly tell the tale. Everyone has a weak spot in their heart for this bulky, ungainly piece of armament.

The "Jug" (what a terribly uncomplimentary term of endearment!) was one of the real heroes of the war. It was big and powerful, and could take abuse like no other airframe. Heavily loaded, pilots at first distrusted this seemingly overbuilt piece of hardware. But, after a few skirmishes, they quickly came to respect the P-47's brutish behavior.

J. R. Naidish photos





Shane Cramer, who helped designer Bert Baker build the first prototypes, poses with his machine. That's Bert's Jug in the background. They took first and second in their class at the MACs Show.



There's nothing wrong with being the second most popular fighter. Going under that assumption, I set out to design a large version of the Jug. At the time, the .90 engines were just starting to come on the scene. O.S. and Webra both had offerings in this large size, and there was talk of more to follow. Mick Reeves, from England, had proven the merits of a large airframe, with his 80-inch span Hurricane which won the British Nats in '79. The model flew on a .60. Dave Platt's Bf 109 was soon to follow, as well as his Spitfire, designed around .90 powerplants. Vito Tomeo began cranking out plans for his magnificent Sea Fury and Tempest, again based on these larger engines.

The idea of a big model, not so large as to be burdensome to transport, yet small enough to fly well on a .90, appealed to me. For contest work, it seemed logical to take advantage of the better aerodynamics and power loading available by engineering a model in the 80-inch span range. The model is just large enough that the traditional building materials and practices of the .60-size can be preserved, with foam wings and glass fuses being one of my prime prerequisites (I like models that build fast, and glass and foam not only add speed to construction, but they save weight and ensure an accurate model).



The big Jug has a commanding presence in the air. Takeoffs and landings are among the smoothest ever witnessed.

Since I had some practical experience in designing semi-large airframes, with my giant-scale Cherokee (*Giant Scale Models* special issue of 1979) being a very successful kit, I wasn't too concerned about running into any problems with the P-47. I had also built and flown the prototype of what is now the third kit in the Scale-Flight line, an 80-inch span A6M5 Zero, which was featured in the February '81 issue of *Scale R/C Modeler* (at that time, the company was known as Ellco Plastics, and the 96-inch span Airacobra was not even a distant dream). The idea of modeling a

Thunderbolt enthused me, because it was one of my personal all-time favorite aircraft, and I had access to a full-size one at nearby Chino airport.

The more modelers I talked to about the project, the more fired up I became. Every member of the entire Scale Squadron wanted one, it seemed. Their enthusiasm fueled my fires even more. Shane Cramer volunteered to assist in the development of the scale r/c modeler 53

Suzanna Kotnik is surrounded by Jugs. The biggest one in the photo is from the "Wings of Fame" museum at historic Chino airport, in California.

mental stages, and so we embarked on building a pair of Jugs (take the puns where they fall!).

I had learned my lesson with the Zero. You just can't take a .60-sized model and enlarge it. Something gets lost in the translation. With the Zeke, I made the prototype exact scale, except that I thought I'd play it safe by using the airfoil from a popular .60-sized P-51 design. The results were rather disappointing. As a 1/5-scale model, it was a failure, because the airfoil had the proper coordinates for a smaller airplane. The Reynolds Numbers, wing loading, drag coefficients, etc., all changed when the airfoil was enlarged. These larger machines need their own specific engineering to fly well. Once I corrected the wing on the Zero, I had a fantastic flying machine.

I would not make the same mistake on the Thunderbolt. I had added 10 mph to the top speed of the Zero by correcting the airfoil. I plotted the section for the Jug using my experiences with previous large models, and the results were worth the extra effort.

Shane and I worked frantically on the first prototypes. If you have never designed a model from scratch, it is one heck of an involved and slow process. Parts must be drawn, strength-to-weight ratios calculated (or guesstimated), molds made, parts redone, landing gear designed and fabricated, documentation checked and rechecked, etc. It seems to take forever to accomplish the smallest phase of construction. For example, the stabs took weeks, because



Another picture-perfect takeoff.

we had to verify scale outline through research, establish proper construction techniques, do rough drawings, assemble a mock-up, making templates of parts as we went, then final cutting and assembling. Sometimes this whole process can be fun, but often it is sheer drudgery and work.

We had our goal set for the MACS Show, which was only four months off. That may sound like a long time, but we were pressed right down to the last minute to finish the models. As it turned out, Shane's plane took Best of Military at the show, and

my P-47 came in second in the same class. With that kind of recognition on our first showing, I knew we had a winner . . . if only the planes would fly half as good as they looked.

The original prototypes were all balsa and ply, of course. Once I had finalized the correct shape of the fuselage, we pulled a mold from it, to be used for the fiberglass fuses in the kit. Originally, this article would have had to rely on second-hand information for the construction phase of the kit, since I



Shane's Thunderbolt was repaired several times, and finally wound up weighing 25 pounds, but it still flies well on a .90.



The Scale-Flight kit is a fiberglass and foam, which really speeds construction.

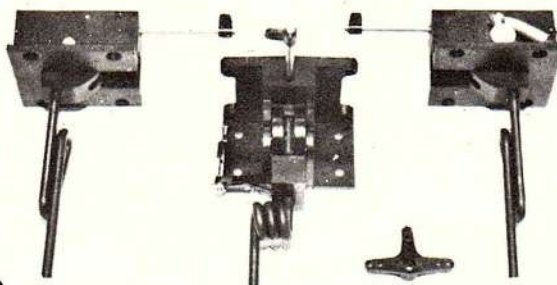
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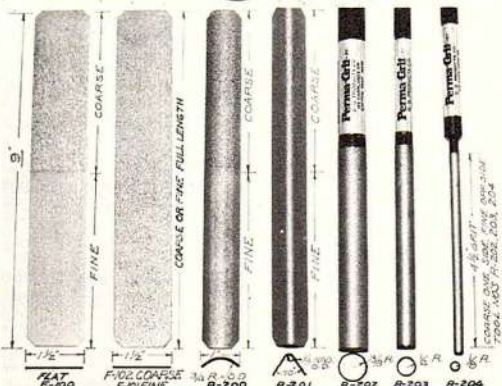
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Intended for subjects having dihedral in the region of retract mounting, and an offset gear leg. All parts are aircraft grade materials. The mechanism is pneumatically operated by internal air cylinder.

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had personally never built one of the fiberglass versions. My original all-wood prototype, which tipped the scales at 18½ pounds, was still flying until a week before the Masters finals. On one of the last practice flights before the big meet, my radio went sour and the plane was lost.

The prototype had served me well. I qualified for the Masters with it (as did Shane with his). I also won third at the Nats, which was a nice feather in my cap. I hated to lose that model, for it was flying so well. But, on the brighter side, it did give me an opportunity to build one of my own kits! That's not to say that I don't R&D the kits beyond the prototype stages. Typically, a handful of local modelers build the initial kits. They are far better critics of my work than I am, and they don't hesitate to call a spade a spade.

I'm happy to say that I actually enjoyed working with the kit. After two weeks of evenings, I had the model standing on the gear and half glassed. I'm not an especially fast builder, so I consider this feat a real plus factor for the kit. To date, I have had no complaints about parts fit or poor quality materials, so I can only assume that everyone who has purchased the kit is pleased.

The kit includes not only a fiberglass fuse (if you want the Razor-back version, add an extra \$20 for the turtledeck option and canopy). I supply foam cores for all flying surfaces, and include all the sheeting. The cowl is glass, and the canopy is included. If you want a spinner nut, it can be ordered as an option. The kit sells for \$225.00, and I pay the shipping if payment is sent with the order. Scale-Flight, 15712 Graham, #1, Huntington Beach, CA 92649.

I designed the Jug around a set of Airways retracts. You can order these directly from them: 5778 Sky Meadow, Riverside, CA 92509. Price is \$175 for the solid strut version, or \$200 for a set with functional oleos.

The Thunderbolt is technically 1/6-scale. That 80-inch wing has 1,200 sq. in. of area. I projected a finished weight of 16-17 pounds, which makes for a very nice wing loading. Shane's original prototype, after some repairs, etc., weighs 25 pounds. Shane abandoned the original O.S. .90 he had for power, and opted for a Quadra. I must admit that, at that excessive weight, I can see little difference between the performance of the two engines. Frankly, I'm amazed that Shane's machine can even get airborne at the weight, yet it hauls through the maneuvers very well.



WESTERN M SCALO

By R. C. Sweitzer

The Red Baron lives! Ervin Solberg really gets into the WW I spirit. Would you buy a used triplane from this man?!

One of the very first giant-scale fly-ins was held at Morgan Hill, just south of San Jose, California, many years ago. The event has prospered, and is now referred to as the "Western Mecca." Not only does the name indicate the deep roots of the meet, but it also harkens the aviation atmosphere of this unique flying facility. Morgan Hill isn't just a flying field, its also the Wheels and Wings Museum, and the Flying Lady

Photos by the author



MAMMOTH MECCA

One of the oldest giant-scale fly-ins still has its luster. With a museum and a super restaurant on site, it's no wonder that the meet is always packed.

restaurant. More on both of these unique experiences later.

The Hill County Fliers did it again this year, gathering some 54 entries . . . not too shabby for an out-of-the-way spot. The reasons for the large attendances are obvious after you've been there for a few minutes. The flying field is nicely mown grass, with a covered lanai along the edge of the runway where the spectators can stretch out on a grassy knoll and enjoy the fun. The club runs a well-organized, no-hassles meet, with a lot of emphasis on just celebrating the joys of flying big models.

Modelers think nothing of making the almost 10-hour drive from southern California, because they know it will be a weekend worth remembering.

C.D. Bob Morse, who runs a contest just about as well as he draws those giant-scale plans, i.e., great, gave a call on Saturday morning: "Let's get some planes into the air!" The fly-in was on, even though there was a definite threat of rain (something Californians are starting to get used to these days). But, it was as if Mother Nature knew that everyone there was out to have a grand time, and she didn't want to be the party pooper. The gray sky turned to sunshine, and soon the sky was filled with the drone (roar!) of big-throated engines.

Forrest Edwards was one who had made the long drive from the Los Angeles area, and he was anxious to

fire up his scratchbuilt five-cylinder radial, and get that big Fleet biplane into the air. Granger Williams, who drove even farther, fired up the Tartan Twin in his Proctor Nieuport 28C and joined the fun. Harry Apoian, never one to be bashful about flying, go this trusty Fokker D-VIII airborne. Soon, the sky was an action-packed playground for these mammoths.

Ron Karwacky has a JN-4D that is so old, and has so many flights on it, that even he has lost count. He fitted flags to the outer wing struts, strapped a lady wing walker to the top of the Jenny, and let fly. The Enya .90 four-cycle sounded so realistic, and the model flies like the barnstormer it's supposed to be. Talk about excitement! On Sunday, the wing walker shed all of her clothes, in mid-flight! Who says that this hobby doesn't have spice!?

One of the truly magnificent models at the meet was C. H. Richards' 1/3-scale Piper PA-18. This big, red and white beauty was powered by a 60cc Kawasaki. The internal construction was identical to the full-size, with built-up ribs, shock absorbing main gear, and a full scale interior. The plane flew just as good as it looked, too.

If there was a dominant model type at the field, it had to be the J-3 Cub. They seemed to be wherever you looked. We also noticed plenty of Pitts Specials (both Byron and Pilot kits), Fly Babies (both biplane and single-winged types), and a cou-

ple of P-51s (Nosen and Byron).

There is an infield area, just adjacent to the knoll where the spectators sit. This oval area is roped off, and the models are put on display. Some 20-30 additional models, which were not registered for the meet, were exhibited there. The talk of the show was Bob Morse's huge Douglas A1H Skyraider. This 120-inch span Navy bird is powered by a 3.15 Kawasaki, and it weighs 35 pounds. Operational flaps, and functional rotating retracts are part of this super presentation. Chuck Fuller had not only his classic Ryan PT-22, but also his immaculate AT-6 Texan.

Saturday was a picture-perfect day of modeling. Countless flights were logged. You could go up any time your frequency was clear, and the air was always buzzing with aircraft.

Sunday is even more popular. I don't know where all of the spectators came from, since the facility is located at least 30 miles from any major city, but they were packed solid all day. The modelers didn't



Would you call this a close one? Dog fighting is taken seriously at Morgan Hill, as Harry Apoian and Dave Johnson illustrate.



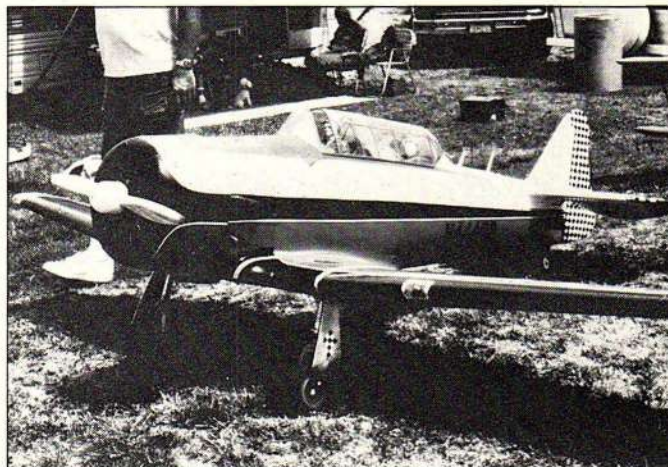
disappoint them. Harry Apoian decided to try some aerial combat . . . his Fokker D-VIII would take on both Dave Johnson's and Granger Williams' Nieuport 28s. Harry vowed to fight to the finish, and his Fokker has a cute electronic sound generator, which emanates simulated machine gun noises.

Harry "rat-tat-tatted" away, but the Allies were just too much for the Hun. Reinforcements were desperately needed, and Ervin Solberg's Fokker Dr.I triplane was rallied into the fray. Solberg, fully dressed in Prussian officer's uniform, complete to spiked helmet, pressed the battle, and soon forced everyone (including Harry) from the sky. "Curse you, Red Baron!"

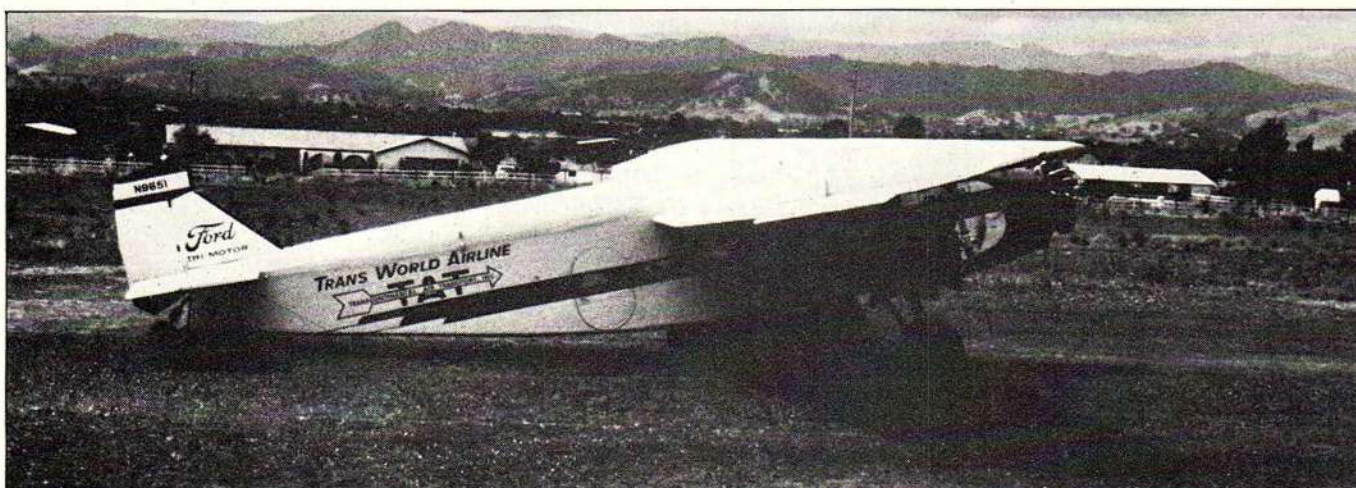
Larry Granger, the "other" half of the Williams Brothers team, retrieves Granger's Nieuport 28C after another successful flight.



Harry Apoian tinkers with his Fokker, which has a loudspeaker and simulated electronic machine gun sounds.



Chuck Fuller's oversized T-6 was one of the most colorful planes at the show. Flies superbly.



One of the big treats of the show was witnessing the takeoff of this rare Ford trimotor, which is hangared in the adjacent museum.

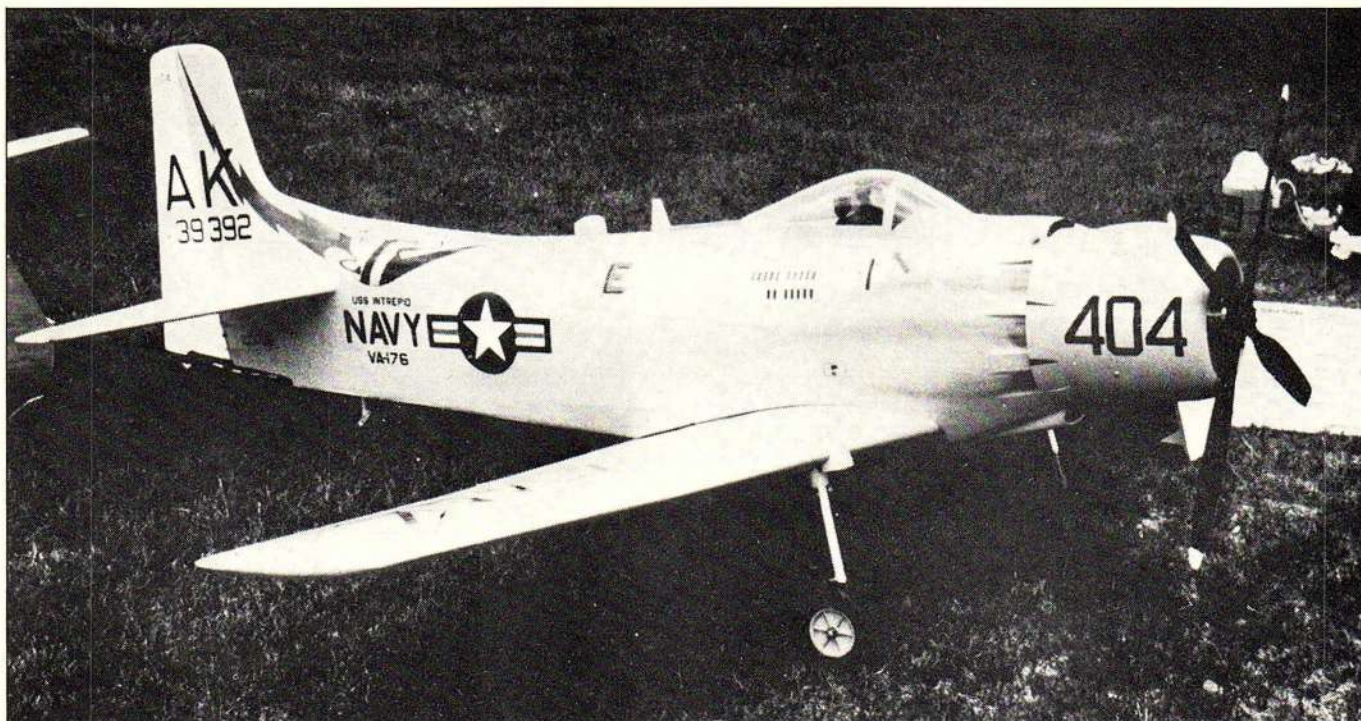
Later that day, a rare treat was in store for all present. Just off the edge of the runway, the famous Wheels and Wings Museum is located. The Ford Trimotor, which is housed there, was to be ferried to an airshow. All got to watch as the plane was moved out, the big radials fired up, and the huge aircraft took off from the same runway used by the models. It was airborne in about the same distance the models took, and easily cleared the trees of the adjacent golf course. What a visual delight!

The museum is a must stop for any modeler. Inside the huge hangar are every conceivable type of aircraft, including a P-51, Hellcat, Aeronca C-3, Nieuport 11, Stinson Gull Wing, Fleet biplane, American Eagle, and a very rare Stearman Hammond, just to name a few. These are interspersed with rare automobiles and all sorts of relics of an era gone by.

A short drive to the top of the hill, and the Flying Lady restaurant brings the modeler another rare treat. The restaurant features a moving track around the perimeter of

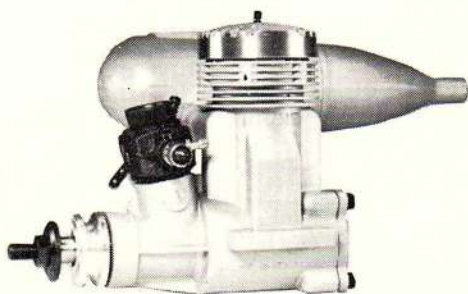
the huge room, on which are mounted some 65 scale models. There are also some seven full-size aircraft suspended from the ceiling! You really feel foolish, dribbling your dinner down your chin as you watch the airplanes above!

One can see why this annual giant-scale get-together is so popular. Not only is there plenty of model flying, but the lore of full-size aviation is everywhere you look. No wonder they refer to it as the Western Mecca!



Bob Morse, of Mammoth Scale Plans fame, brought the prototype of his new Skyraider.

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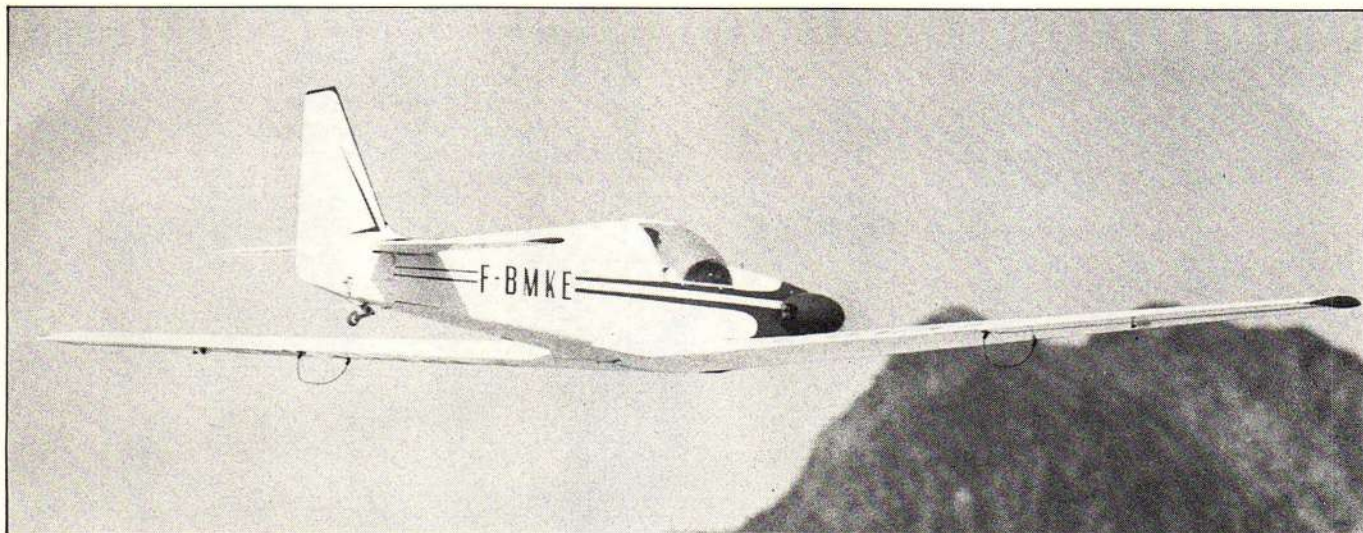
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Mustapha Hadjub brought this large Fournier RF-4 from France. A sheer delight in the air.



as the next guy, and as an old Pattern flier, we were frankly itching to try some of the rockets we saw pirouetting through the air. But, we kind of missed the old flavor of this meet, with unusual and daring machines which broadened the horizons of big modeling.

We're not knocking the Cubs which putt-putt around the sky (some of the Citabrias and Decathalons had more aerobic potential than the Lasers!), but let's keep in mind that fly-ins notoriously attract the "low key" models, while all-out competitions tend to pull the hot-shots. There's a certain risk factor in having a "non-event" such as a fly-in, because there is no control over the type of planes which will show up. I don't think that any of us want to spend three days watching J-3s and CAPs do their respective thing. That will quickly lead to boredom, and the next thing you know, we'll be having the high-performance ma-

chines doing Limbo to break the monotony, and the Cubs will have rubber donuts strapped to their wings, with which to hit a target on the ground. Oh, spare us from a weekend of such frivolity!

That's not to say that the fly-in lacked originality. As expected, the West German contingent brought some mind-boggling aircraft. The Boeing 747 (298 cm. span) flew with four O.S. .60s and had five sets of retracts, which folded up 18 wheels on the undercarriage! With functional flaps, the plane was so impressive that it defied imagination. Just seeing this behemoth fly made the entire trip worthwhile. As if that weren't enough, they also brought a 95" span Lockheed SR-71 Blackbird. Powered by two props (no ducted fans), the big model was very impressive, and the functional drogue chute made it even more realistic.

We, must candidly admit having

mixed emotions about one of the most spectacular models. West Germany's Jorg Vogelsang has always come to Vegas with impressive projects. Last year, it was an impressive scratchbuilt radial engine. This year, his project was a 108" span Siemens-Schuckert D.IV. A rather docile WWI biplane, but not the way Jorg had it set up. The engine was a custom-built 8 c.i. gear-driven engine, swinging a 35-20 prop! Did you ever see a WWI biplane almost VTO, do climbing snap rolls, then a Lomcevav? Billowing some of the best smoke ever seen (with an engine that large, what else is new?!), the model made the Lasers look sick. Yes, a rather spectacular project, but was it in the true spirit of quarter-scale modeling?

Such unusual projects again reinforce the point we were making earlier. There's a certain element of underlying boredom and sameness that seems to be encroaching on the big airplane movement. Once a modeler has a good engine and a perfected airframe, the sheer thrill of seeing a big airplane fly successfully quickly diminishes. Modelers love to push the limits . . . explore the horizons. When properly channeled, such creative energies can be rewarding to oneself and the entire modeling community. But, when thrill and spectacle are achieved for their own sake, we run the risk of turning our fly-ins into circus acts. It has happened with racing, where a few guys start out with some slow

Quickies, but find themselves in a short time seeking faster speeds. It happened in Pattern, until the event nearly strangled itself (of course, the latest movement is the giant-sized Pattern ship). Is there some writing on the wall for us to heed?

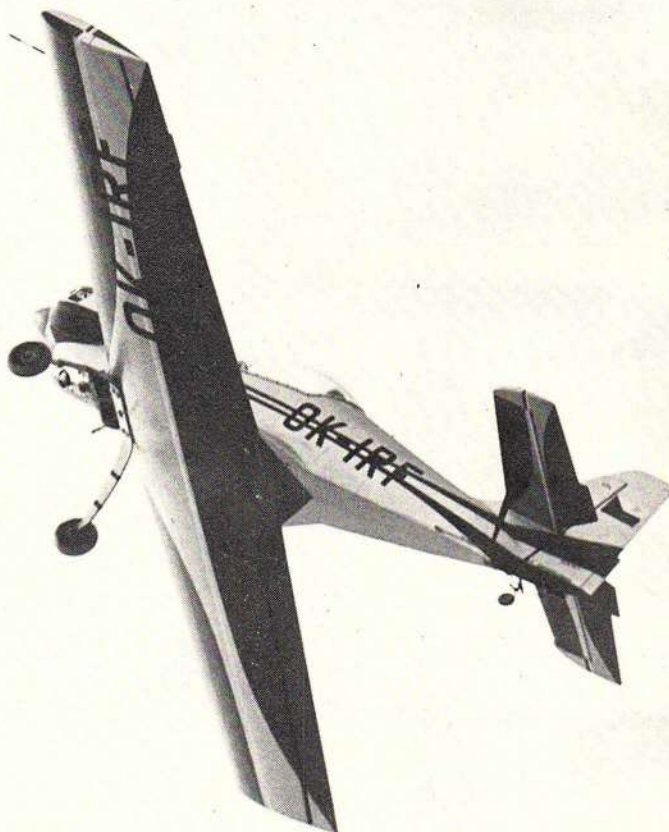
Is it just coincidence that this year's list of trophy winners is almost a carbon copy of last year's? If course, there will always be the "experts" like George Harlan, whose Dragon Rapide was unbeatable in any event. Dick Enos has perfected his finishing techniques to the point where it's going to take more than an Earl Schibe to unthron him. The Dave News (Best Civilian), Chuck Fullers (Best Stand-Off), Darryl Clines (Best Military) and Forrest Edwards (Best Mechanical Achievement) certainly deserve their recognition, but we think that any such achievement awards must not become the sole domain of any individual. When that happens, everyone seems to stop trying, and atrophy—instead of growth—is the consequence.

When we add up all of these signs, the picture we see is not a comforting one. Lack of originality and competitive spirit, new developments which don't necessarily promote the advancement of the event, and a "sameness" which could easily turn to boredom . . . all of these don't add up to a quarter-scale scene which will be totally fulfilling.

We were very surprised to see the almost total lack of progress with WW II military aircraft. Three or four P-51s (only one of which, to our knowledge even attempted a flight), and Chuck Fuller's impressive AT-6 just about describes the field. With all of the development in engines, it is somewhat of an anomaly that fighter aircraft have not progressed. One or two years ago, when we didn't have enough

1. Don Martin's B-17 was autographed by everyone at the meet. What a memento of this occasion. 2. From Canada, George Plesky brought this very clean Zlin. 3. One of several Pitts at the meet. Didn't get the builder's name. 4. Robert Sloan's DGA-4 flew very well on an O.S. .60. 5. Don Schaper's Cessna 150 was fabricated of aluminum, and had 3,000 rivets!

2



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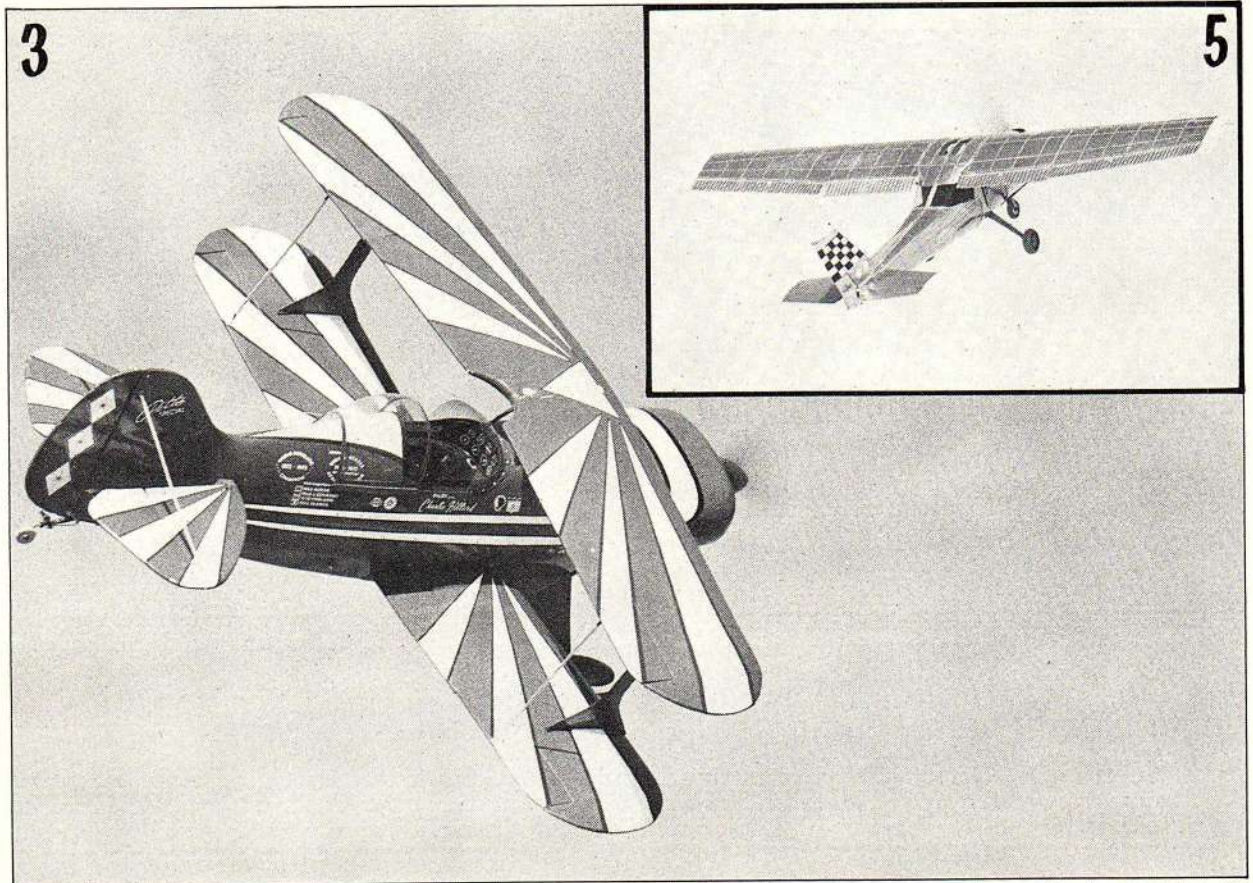
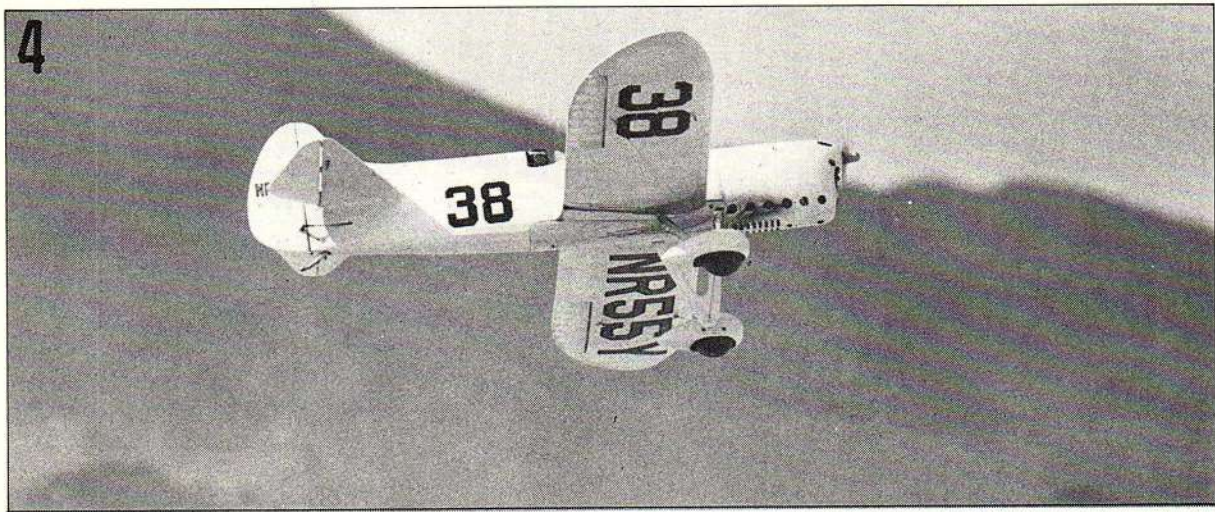
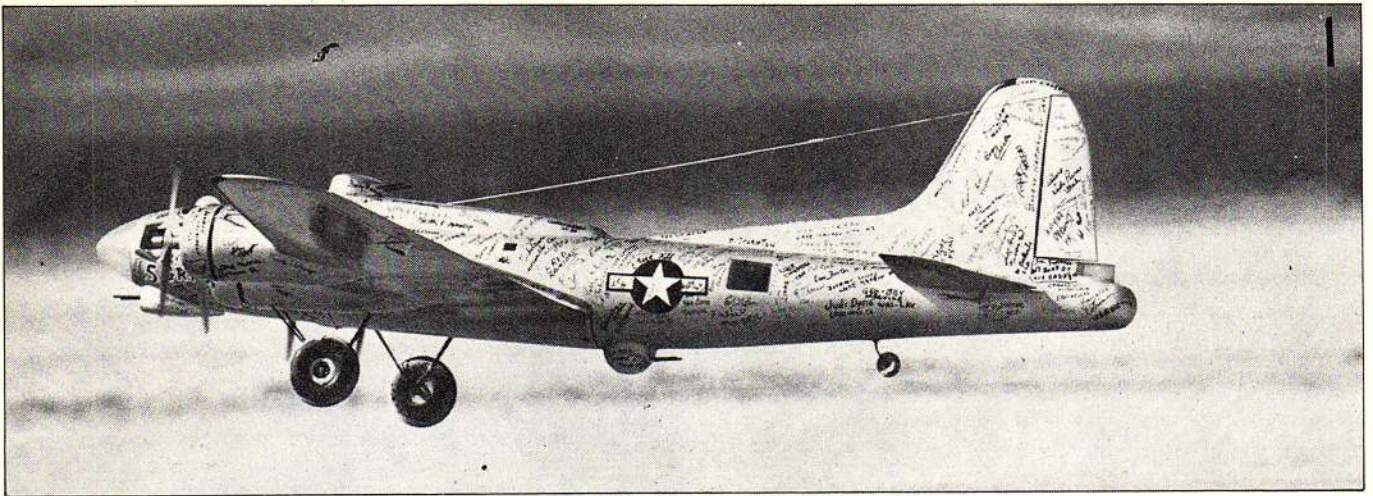
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power to get 20 pound airplanes in the air, there were all sorts of military planes to be found. Now, with powerplants which can turn tremendous rpms, there are no big fighters to be found.

Lest this entire report seem a negative commentary on the state of the hobby as seen at this fly-in, let us remind everyone that the only *raison d'être* for this weekend in the desert is to have fun and fly big airplanes. That was done with all of the enthusiasm and fervor the pilots and spectators could muster. The Q.S.A.A. did their usual superb job of organizing and running the event.

There were some magnificent projects on hand, such as Fred Catania's Curtiss Robin, Mel Barber's Sikorsky S39C flying boat from South Africa, Dwight Cathcart's 103" span Focke Wulf FW 190, Joe Zimmerman's Gee Bee R-1 (75" span), and Brian Curry's Best of Scale Der Jager biplane. These were just a few of the unique and well-executed machines to be seen. In a field of 200 airplanes, it is easy to overlook some of the prime quality work which tends to get lost in the crowd. If this were a contest, instead of a fun-fly, the 30 or so prime airplanes would be all that one would see. But, in an open forum like this, the gems tend to get a bit diffused. We hope that we'll see more of them in the future.



Chuck Fuller's big AT-6 flew very well. A very good project.



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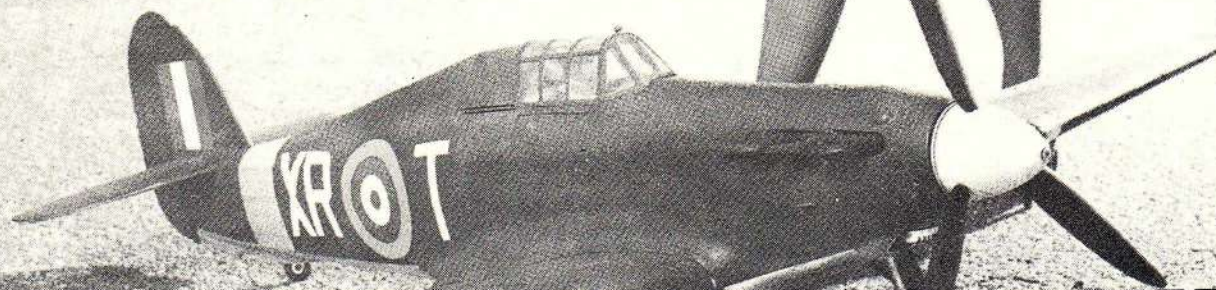
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Mel Barber, from South Africa, brought an impressive Sikorsky S39C. The Technopower radial just couldn't get the 126" span model airborne.



Actually, only the magazine people like ourselves even care about the quality of the models. If 200 J-3 Cubs showed up and everyone had a great time, the purpose of the fun-fly would be fulfilled. We magazine types are always looking for the unique, the exceptional, because that's what makes news. Our perspective of such events is different than the average modeler who shows up and just wants to talk models and burn some fuel (or gasoline) during the weekend.

But, no matter what perspective is taken, there is one statistic which deserves everyone's attention. At the most accurate count we could get,

there were at least 26 crashes during the three days of flying. That's over a ten percent fatality rate, which we consider excessive. Not only is the figure amazing, but having watched most of them happen, the apparent reasons behind them were more appalling. There was little (if any) radio interference. They were all pilot error!

No, we don't mean that some two dozen pilots pulled up elevator when they should have given down elevator. We consider pilot error everything from failure to check the direction of the ailerons, to not having flown the airplane sufficiently before the meet to guarantee its airworthi-

ness. Today's super-gadget radios make it too easy for a flier to use one transmitter to handle two planes, often forgetting that he's left the switches in the wrong positions.

Sure, a certain percentage of the radios are going to malfunction on any given weekend. However, a radio which goes sour in a giant-scale airframe is a different animal. There are all sorts of safety equipment, with redundant systems, battery failure indicators, etc. available, yet we saw very little use of these precautionary gadgets. The point was brought home by Bob Siegelkoff. Bob has a whole fleet of models, and he was one of the first to install

(Continued on page 72)

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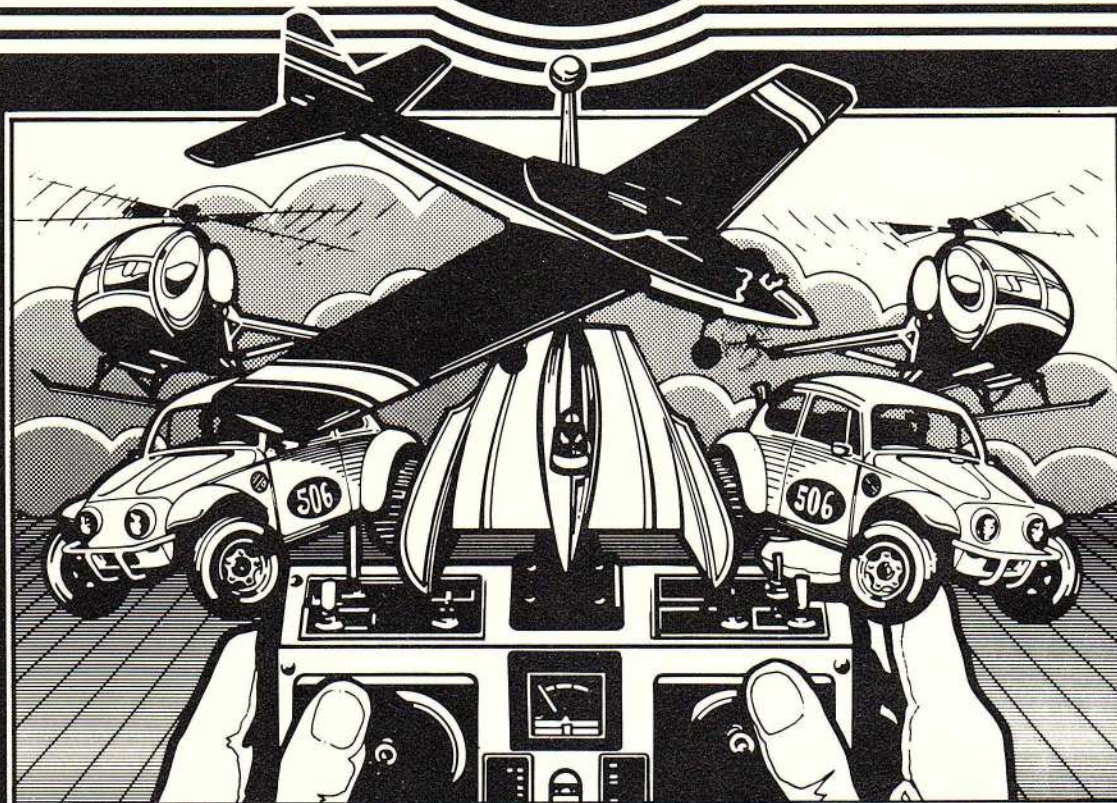
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Big Phantom Jet

(Continued from page 41)

tom, which wasn't really enough to give me a solid feel for the flight characteristics. But, I was hot to get a qualifying position for the Masters, and I had spent a year building the plane. There was nothing to do but go for broke.

It took only one flight to put my mind at ease. The repairs had been successful, and the model was still in trim. I used the first flight to feel out the plane and, by the time I landed it, I was definitely feeling secure. The Phantom grooved beautifully, and pulled through the maneuvers with no strain at all. On landing, you can pull the nose up until the jet is almost hovering, and the lateral stability will still be there. You need not worry about punching a gear up through the wing, for the Phantom can really be floated onto the runway.

What really impressed me was my ability to be consistent with the plane right from the first flight. Some scale models never fly the same way twice, or they seem to be constantly out of trim. The Phantom is one of the most predictable and dependable models I have owned. It always be-

haves the same, and it will do each maneuver the same way time after time. That's very important for contest work.

After five flights, I had fourth place sewed up. One more good flight would push me into second place. Not wanting to rest on my laurels, I tweaked the engines a bit too much, trying to get a little edge. As I got airborne, one of the engines went over-lean. I should have just landed the plane, but my competitive urges forced me to continue the flight.

I managed to complete seven of my maneuver sequences without any major problems. I was going into a Split-S when the sour engine really got worse, and I barely pulled out, with about ten feet of altitude. All I had left was to get the plane on the ground. On the downwind approach, the engine finally gave up. I lowered the gear and flaps, and had to make a quick dash for the runway. It looked as if I was going to luck out, when a gust of wind (it was blowing at about 20-25 mph) suddenly just lifted the 20-pound Phantom straight up, then smashed it down onto the runway. The F-4 hit on its left gear,

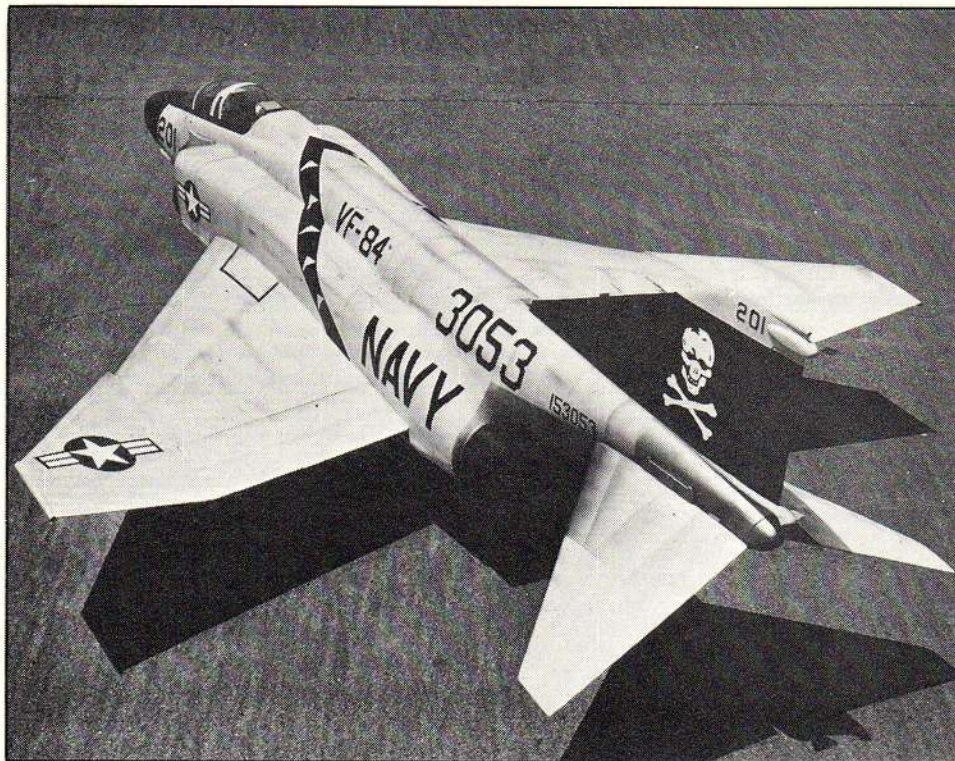
and the wing snapped off. The model then flipped over, shearing off the other wing. The canopy, vertical fin and other areas were also extensively damaged.

What a dilemma. I was qualified for the Masters, but I had no plane to fly. I'd never have enough time to build a new one, so I decided to drag out the cyanocrylate, microballoons, epoxy and Pepto-Bismol once more for a rebuild. I got the model flyable with a month to spare, and was able to put some solid stick time on it. To my surprise, the very heavy plane flew just as well as before. Even though the maneuvers were still good, I felt that improving the thrust would be a definite asset for the Masters. I primarily wanted more speed, to add to the flight realism points.

Dave Rheame, who happens to be a local Rossi distributor, was willing to put together two hand-fit Rossis for me. At the time, there was no Rossi mount for the Turb-Ax fans, so I handed my good buddy Lynn Darland a 10-pound block of aluminum, and he custom made two engine mounts. I had a Jet Hangar A-4 kicking around, and I decided to use this as a test bed for the new powerplants. Right from the start, the excessive power of the Rossis literally blew the fans apart! When everything held together, the thrust was phenomenal, but getting the fans to stay in one piece for more than five minutes was impossible. I had set the tuned pipe to restrict the top end at 26,000 rpm (the Rossi is capable of far more than that), but I blew a big hole in the top of the model on one flight, and another out of the bottom, as the impeller blades let go.

I wisely decided to stick to the K&B 7.5s for the Masters, but I was still doing bench tests with the Rossis. I talked to Larry Wolfe at Jet Hangar, and he suggested coming to the contest early, so that he could help me get the fan problem straightened out. As it turned out, Larry and I worked right through the contest trying to get the Rossi/Turb-Ax combination to succeed.

You can imagine what a pleasure it was to finally meet Tom Cook, after so many long phone calls. Right off the bat Friday morning, my engines started to act up. Tom offered me the use of his fuel and plugs. Tom had brought three gallons of fuel all the way from Missouri, so his generous offer ran the risk of finding himself short of fuel. I don't know of too many competitors who would be so helpful.



Subtle weathering and panel line accents enhance the looks of the Phantom. Superpoxy finish.

70 scale r/c modeler

The engines were behaving nicely, and I got three solid flights on Saturday. Between flights, Larry, Tom and I would go out behind the parked cars and run Rossis in a test stand, trying to get a set of blades to stay together. Finally, late Saturday, we got a set of fans which ran for ten minutes without a failure.

I mulled over the dilemma all night, and decided on Sunday morning to go for broke with the Rossis. I missed my first round making the engine switch. I was very nervous for the second round. Would the engines blow up? The Phantom weighted 24 pounds after the rebuilds, which gave it a very bad glide ratio if an engine did go out.

As the Phantom rotated, I could feel the difference in thrust. The speed increased by at least 15 mph, and the maneuvers were really superb. I posted my best flight score of the contest with that engine run.

I would have had an even better last flight, but I neglected to install the linkage correctly on the nose gear, and it folded on landing. With Tom's Air Command retracts, this is not a problem with the current kits. I would recommend these retracts not only for the Phantom, but for any model. They are beefy enough for a 20-pound airplane, and will work in any scale airframe.

Of course, Tom went on to win the Masters, for the second time. My static score was very low, due to poor documentation, but the flight scores were so good that I moved from 40th to 13th place, just on the strength of my flying!

Even though the Rossis gave me such sterling performance, I would

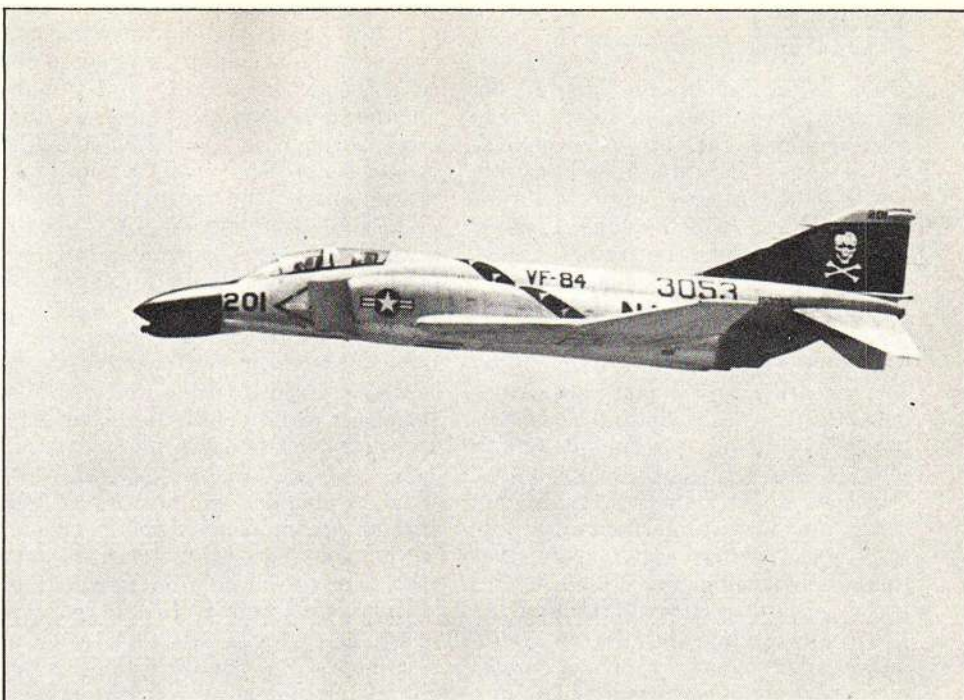
On the step and hauling, the author managed to get two Rossis to drive the Turb-Ax fans. Exhilarating, but problematic and dangerous. See the text for details.

still advocate the K&B 7.5s which Tom includes. Tom has those engines running so well that there is virtually 100 percent reliability. The Rossi mod is still too radical (and dangerous) to consider.

In the final analysis, I am more than pleased with the Phantom. Tom has evolved the kit into one of the finest products on the market today. As I progress through building ship No. 2, the differences from the original semi-kit are just staggering. I'll be the first to admit that the kit is

rather expensive, setting you back \$1,100 for the deluxe kit (add \$250 for the Air Command retracts). But, having worked with the old semi-kit and having had to make all the parts myself, the cost is worth it. For those who want to go my original route, the semi-kit is still available (with improved plans and instruction manual) for \$330. You can also order just a Turb-Ax fan with one of Tom's modified K&B 7.5s for use in any jet for \$250. The deluxe kit includes two of these, of course.

If you want more information on this big jet, write directly to Tom: Jet Model Products, 304 Silvertop, Raymore, MO 64083. Phone (816) 331-0356. □



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FLY-IN (Continued from page 68)

dual radio systems in all of his models. Two receivers and battery packs, and a back-up servo on elevator. He did this to all of his models, except one very beautiful Akro. Guess which plane crashed just weeks before the fly-in?

Because of the expansive desert flying site, we get the feeling that many modelers are willing to take the first flight on a new model at the meet, even though the rules specifically state that the models must have flown previously. Safety checks are stringently carried out, but how do you check a radio that fails the first time the pilot hits the retract switch after takeoff? Perhaps some pilots get lulled into a false sense of security, thinking that their slow-flying Cub is no threat, since it's so lazy. Such a model couldn't possibly need much preventive maintenance, could it? As it turns out, a majority of the demolition which occurred was from these types of assumedly low-risk models.

You could plot an interesting chart in this hobby. One axis would be aircraft complexity, and the other coordinate would be time or effort

spent in maintenance. From our experience, the guys who have racers, complex multi-engine aircraft, helicopters, etc. are usually pretty high on the maintenance scale. At the other extreme is the sailplane flier, the weekend "Ugly Stik" group and, unfortunately, the giant-scale modeler. Such overgeneralizations don't always hold true, of course, but the speed and overall performance of the model tends to engender a certain attitude about its safety and maintenance needs in the owner.

We've been there ourselves. We lavished weekly attention our big Pitts, because it was complex and had high-performance capabilities. This 17-pounder got priority of our limited maintenance time over our sailplanes. The Pitts crashed one day, due to stupid pilot error. The sailplane crashed, also due to pilot error. The error in the latter case was not monitoring the condition of the radio and detecting a battery pack which was failing. The 17 pound biplane did nothing more than splatter debris over the runway, but the three-pound glider knocked someone unconscious! We quickly realized that *slowness* and *safety* are not synonymous.

Let's not see this correlation hap-

pen in giant-scale. Is the fact that these big airplanes are more commonly accepted lulling us into a false sense of security? Today, we don't even bat an eye at a 20 pound airplane. We also seem to think nothing of test hopping a model in front of a large crowd. If we continue to think that our slow and lazy big models are invulnerable to accidents, then it wouldn't be surprising to find the organizers of a meet like the Q.S.A.A. Fly-In requiring some minimal radio safety equipment.

So much for the soap box lecture, but it's just a little difficult to say that a good time was had by all when over 10 percent of the planes went home in baskets!

Let's wrap up this report on a positive note. In its seventh year, the Q.S.A.A. Fly-In was one of the best run, and most enjoyable of meets. The affiliate chapters really pitched in to make the show a success, and even the weather cooperated this year. The banquet was a huge success, and it has become one of the "must-attend" social functions of modeling. Anything to do with a seven is a winner in Las Vegas, and the seventh annual Fly-In was no exception. □

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Book Notes

(Continued from page 9)

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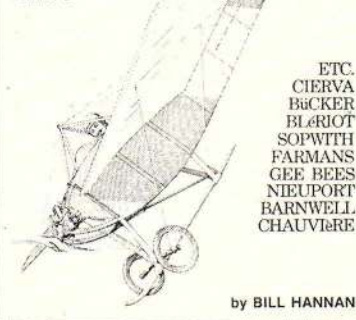
* * *

Old friend Bill Hannan has just published another book. Since Bill is a peanut scaler, his *Scrapbook of Scale 3-Views* is definitely slanted toward small, rubber-powered models. But, most of the three-views, of which there are 13, could be used for any size model. He's got some unique stuff, too, such as Farman Avionette, Gee Bee Ascender, Barnwell Monoplane, Bleriot canard, etc. Surprisingly, because these are all large-winged, rather slow aircraft, they uniquely qualify for giant-scale (from one extreme to another!).

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The bulk of the book is articles on peanut scale, so make sure that you want those 13 three-views enough to order the book. Priced at \$8.95 (plus \$1.00 postage), the book can be ordered from: W. C. Hannan Graphics, P.O. Box A, Escondido, CA 92025.

* * *



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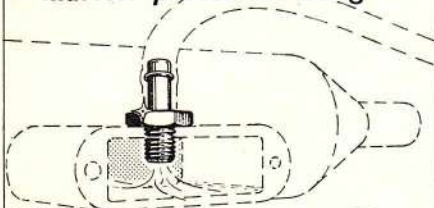
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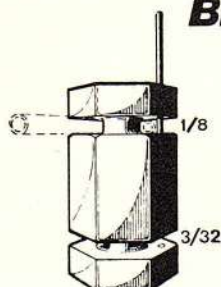


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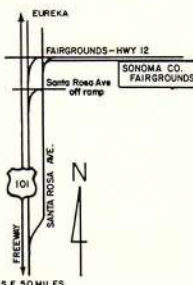
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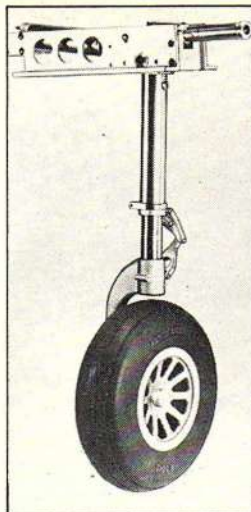
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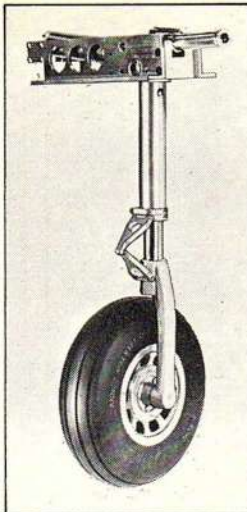
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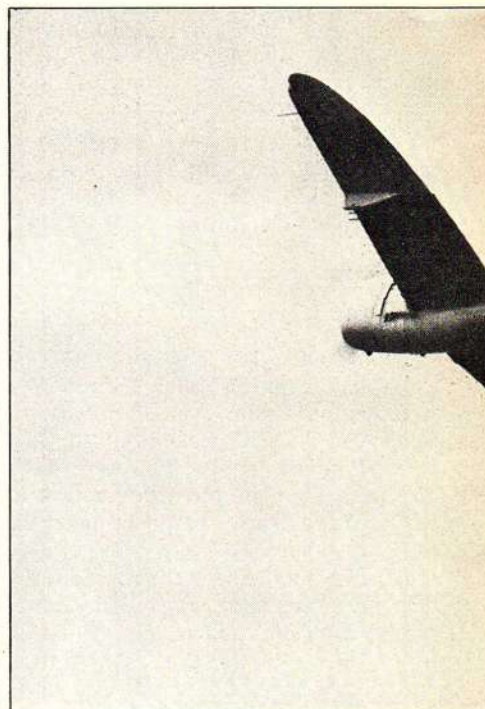
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THUNDERBOLT

(Continued from page 56)



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Right from the start, we could tell that the Webra .90 was much more powerful than the O.S. The Webra will fly the P-47 very well, especially if you keep the weight below 18 pounds. I switched to a Rossi some months back, and I was most impressed with this workhorse. The price on the Rossi .90 makes it one of the best buys on the market, and it has so much brute power that it makes a new plane out of the Jug. I am in the process of engineering an installation which will allow me to use a tuned pipe on the Rossi, running the pipe through the fuse and dumping the exhaust out of the oil cooler duct. The Rossi, with a Tatone or other muffler, simply loses too much power. The tuned pipe is the only way to go.

I am also very impressed with the Webra Bully, and several modelers are in the process of installing these in their Thunderbolts. This engine can swing massive props at very respectable rpms. My next Jug will sport a Moki 1.5 under the cowl. Any and all of these engines fit easily beneath the massive cowl of the P-47. Remember, no matter which



engine you select for power, there's no substitute for building light. These large airplanes are deceptive, since a little extra glue here, and a little extra primer and paint there can add up to extra pounds before you know it.

I should also mention that using high-performance engines like the Webra or Rossi will necessitate an enormous fuel-carrying capacity. I run two 16-ounce tanks in series to feed the thirsty Rossi. Anything less will not be enough to fly a complete contest flight. It seems that, at the weight I'm flying the Jug, a Zinger 14-6 prop gives the best performance. You can use this as an initial reference point, but please experiment with props to get the best combination for your engine and gross weight.

So far, the Thunderbolts have been coming in easily at 17 pounds. The epoxy/glass fuse goes a long way toward economizing on weight. The foam cores are, in my opinion, lighter than a built-up wing, providing that you don't use an excessive amount of core bonding cement. These contact cements work very well in thin films, so there's no gain in strength by really slapping it on. Another area to watch is the resin coats. Squeegee off as much excess as you can. The cloth gives support to the structure, and excess resin is nothing but dead



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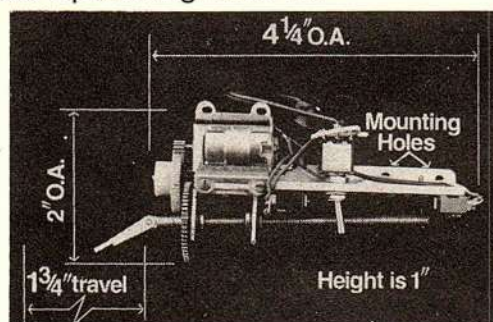
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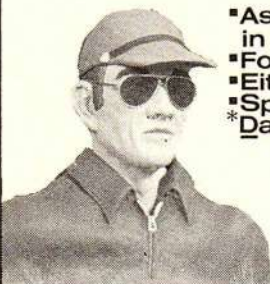
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weight. Be especially conscious of this on the empennage.

While Shane's prototype was somewhat awesome, at 25 pounds, my original ship came in at 18½. I must note that both models, because of some rather poor planning, came out so tail heavy that they required over 1½ pounds of lead each, just to get the C.G. at the 24 percent mark. So, I had actually constructed a 17-pound model, and what a shame it was to have to ruin it with nose ballast.

Since I was the creator of these big beasts, it was my lot to take the first test hop. Since the Webra .90 was brand new, I fired it up (it ran on the second flip!). I gave it full throttle right out of the box, and the engine held a good top end, with no tendency to sag. I figured that it was not necessary to put any break-in time on the engine, since it sounded nice and loose. I backed off the needle a few clicks, taxied out, and figured that I'd run the first tankful doing high speed taxies.

I let the lumbering Jug wobble down to the end of the runway, turned the nose into the wind, and gave it about 1/3 power. The engine was responding beautifully, and the Thunderbolt quickly picked up speed, until it was moving at a fast trot. The tail kept wanting to come off, and I was using elevator to keep the tail wheel glued to the runway.

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I applied a little more juice, and the Jug felt so comfortable and well behaved that I yielded to temptation as the plane passed in front of me . . . I firewalled it! Within a few yards, the P-47 was climbing like the proverbial homesick angel. The controls felt solid, and everything was perfectly in trim. I made some low passes, then pulled up the gear. The change in the performance of the model as it transitioned to the "clean" configuration was staggering. The speed increased markedly, and the control response became much lighter and quicker. This aircraft should definitely not be flown with fixed gear. You'll never get any performance out of it with the wheels down.

I took the Jug up to a hundred feet and did a roll. The ailerons were fast, yet not overly sensitive. I was surprised that some down trim was needed as the plane went through the inverted portion. The big Zero doesn't require any down trim at all. I'll never understand why that is, since the incidences are the same on both airplanes. I can only assume that it's because of the different airfoils.

I decided to not push the new plane too far. It's always wise to make the first flight a quick test hop, just long enough to let things start to vibrate loose, but not long enough to let them fall off! The first land-

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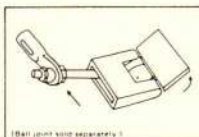
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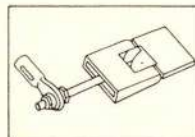
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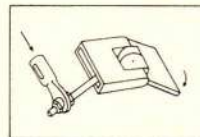
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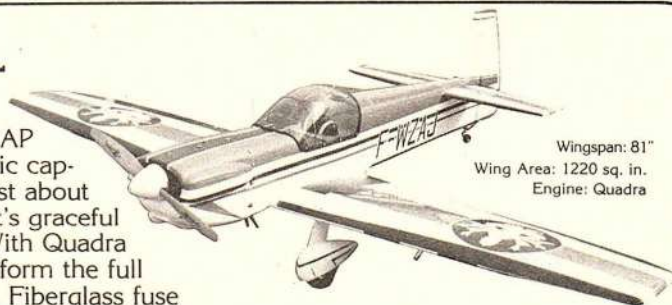
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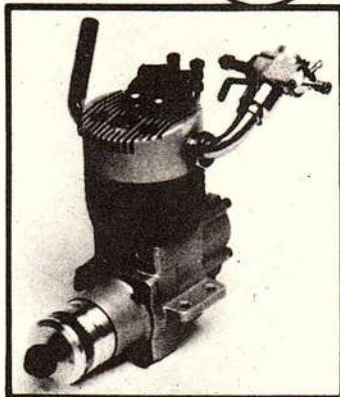
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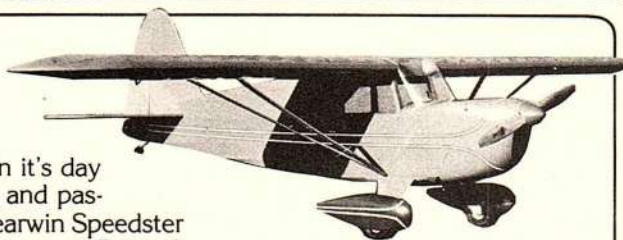
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ing was a disaster. I kept the power on all through the final, until I was safely over the runway. This was a mistake, since the Jug doesn't slow down easily. I had to do a go-around.

On the second approach, I bled off power on the base leg, and let the P-47 come in nice and slow. The sink rate is good and there's no tendency for the model to fall off on a wing. The model greased on in one of the best two-wheel landings I've made, and I even had to use up elevator to force the tail down.

Shane was all fueled, and quite itchy to get his plane in the air. His flight showed the same solid stability and good maneuverability, but it was pretty obvious that the O.S. .90 just wasn't the gutsy engine needed for a model of this size. Shane was all smiles after the landing, and I think that we both realized at that point that we had championship-class models which could get us a spot in the Masters competition.

I was more daring on the next flight, with some loops and a Cuban-8. The Webræ showed no lack of power, and the Jug responded like a true thoroughbred. I flew the model in this configuration for some time, but I was always a little unhappy about not being able to fly really large, open loops, without having to dive into them. I had a chance to pick up a Rossi at a good price and I grabbed it. That was one of the best investments I have ever made. My only regret was that I had to stifle the performance by running a power-robbing muffler, instead of a good tuned pipe.

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Of the kits I have designed, the Jug is my personal favorite. Not only is it big, but it's "sassy," and that's one attribute you just don't find in many large scale models.

Dragon Magic

(Continued from page 49)

Shack's Solartex. This is an excellent covering material, except that it will loosen around compound curves when exposed to lacquer solvents. I can't vouch for what happens if you use epoxy or polyurethane solvents, but my model was done with acrylic lacquer primers and paints. These give a lightweight finish, and they are easy to work with.

While I was plugging away at all of the intricate detail of the fuse, I would take a break and work on the wing structure. The plans were followed to the letter, except for the installation of the navigation lights in the top panels. The top wing is removable, so it was a minor dilemma to figure a convenient way to run the wires and connectors for the working lights. A trip to Radio Shack yielded two mini-phone jacks. These were carefully aligned, one side in the fuse, and the matching plug in the wing. When the wing is installed, these mate to form a totally concealed electrical contact.

One little hint in constructing the bottom wing. Build it in one piece, then cut it into the four parts required. If you try to do it in four individual pieces, it's much harder to maintain accurate alignment.

Keep in mind that the functional flaps (they really work well) are of the split variety, and that the mechanism goes through the engine nacelles. I would advise building the flaps in one piece, then cutting away the unnecessary wood. Also, the flaps must be installed and the linkages



Nick and his P-40 "Warhawk"

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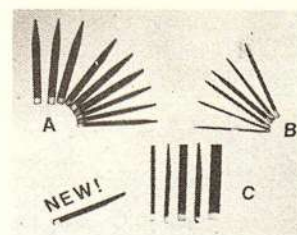
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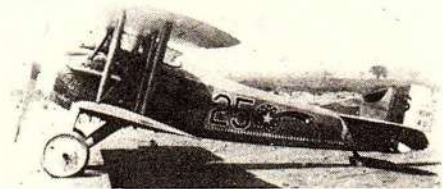
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functional before the machine can be completed. This required some careful masking during the painting stages, but resulted in a better finish, since there are some very inaccessible spots.

The wing spars should be very firm spruce. The thin wing is quite fragile, and strong spars are a must. Weight is not critical on this model, and my Dragon came in at a very light 16 pounds. It flies like a featherweight, so don't get panicky about trying to build on the skimpy side. I was so concerned about the thin wings that I made the top wing spars from solid oak. This may seem like overkill, but I couldn't see any harm in it. This seems to be an ideal place to use some of the new carbon fiber spars and composite construction available from places like Bob Violett models.

Even with all of these extraordinary measures to beef up the spars, I still was not comfortable with the finished wing. I took the time to fabricate functional flying wires for the Rapide. These added so much rigidity and integrity to the wing structures that I would highly endorse this procedure to anyone building the model. It's not hard to do, and it greatly improves the aesthetic of the model, as well.

* * *

There are many other hints which I'd like to share with you, and which will be covered in Part II of this article in the June issue. I will also give my observations on the flight performance of this huge biplane. Of course, no one is surprised to read that the plane did manage to win "Best of Show" at the Q.S.A.A. Fly-In. I was very honored to receive the award, especially since there were many other planes of comparable quality to mine.

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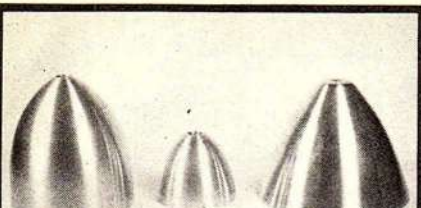
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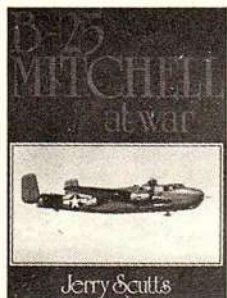
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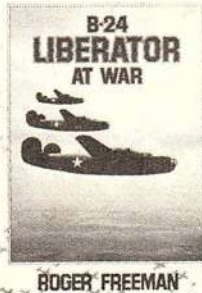
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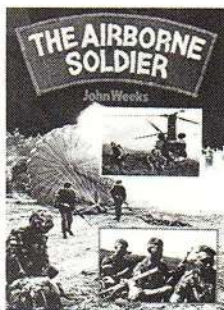
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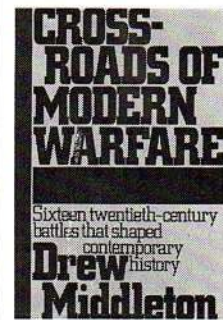
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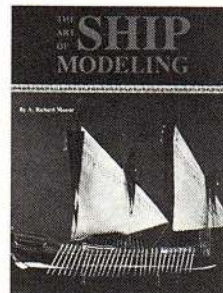


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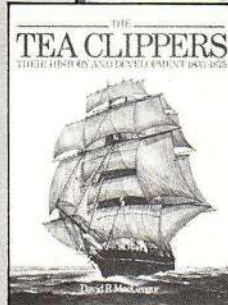
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