CURARE

Design by Hanno Prettner

Here it is – the model that won the 1977 World R/C Aerobatics Champs at Springfield, Ohio, U.S.A.

Curare

Wherever 'aerobatics' is discussed the names of father and son team Hans and Hanno Prettner cannot be left unmentioned. Their outstanding successes, firstly with *Super Sicroly* (R.C.M.&E. plan No. R/C 1229) and *Curare*, now presented here, are written into the record books for all to see. Doylestown in 1971 saw Hanno nudge World Champion status for the first time with a fourth place. There was a series of 'one for you, one for me' results on the European contest circuit with Emil Giezendanner and Wolfgang Matt, followed in 1973 by World Championships 3rd place, then 2nd in 1975, culminating in 1st place at Springfield, Ohio, in 1977.

It must be said that both the experience gained by Hanno in the European circuit and the sympathetic teamwork of this father/son team contributed in no small measure to their successes! It has often been said that a caller can make or break an aerobatic flier's schedule, the close co-operation achieved between the Prettners weld them into a formidable team.

Teamwork apart, *Curare* is a supreme precision aerobatic model. Few compromises have been made by the Prettners in design or construction. Each part of this model has been carefully thought out and painstakingly developed to produce a model which aerodynamically and structurally leads the field. Paramount in order of importance is the ability of the model to 'go where it is pointed' and thus leave the flyer free to decide 'where to point it' and not to continuously feed in control corrections. Considerable care has been taken through progressive modifications to arrive at a model which flies as well in turbulence as it does in smooth air. Minor changes in fin area, the anhedral angle of the tailplane, plus alterations to the wing section have progressively produced a design which grooves to perfection.

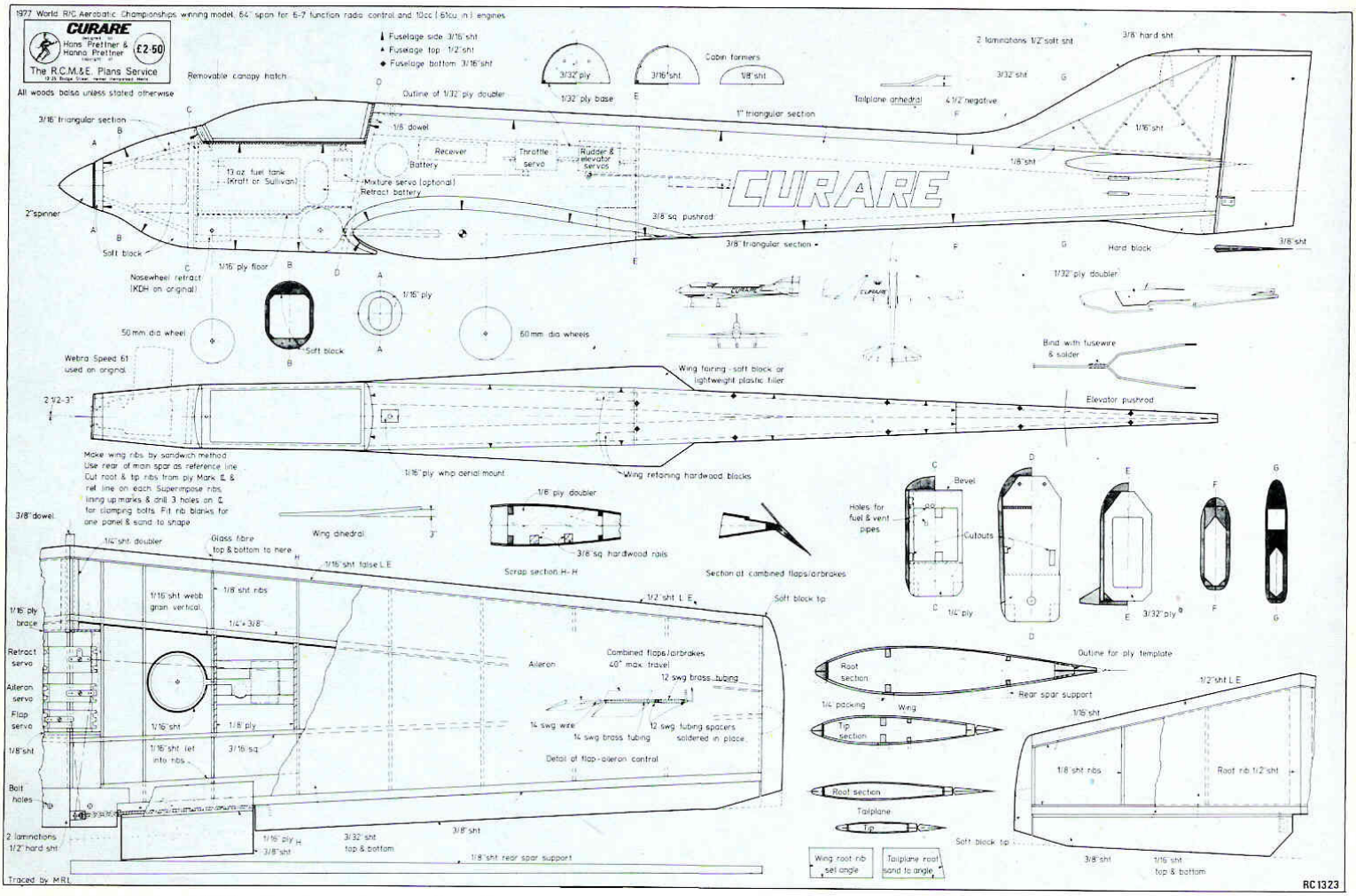
The European style of flying, originating in the late '60's and early '70's, of big wide open manoeuvres, coupled with the current F.A.I. aerobatic schedule have made more and more demands on engines to produce large amounts of power, and clean low-drag airframes. High nitro-methane content in the fuel and tuned pipe exhaust systems results in models which are fast flying. Excess speed can become an embarrassment when spins and landing approach are attempted.

Prettner's answer to this dilemma took the form of drag flaps which although not original were first applied in his case to the *Super Sicroly*. Normal trailing edge flaps, when depressed, have the effect of pitching up the nose of the aircraft. The addition of an extension to the flap in front of the pivot point becomes an upper wing surface spoiler which negates the pitching tendancy induced by the flap. Thus the flaps can be depressed even at full speed with no noticeable alteration in trim but a marked reduction in stalling speed.

Included on the plan are details of the latest improvement to *Curare* as used by Hanno at Springfield for the 1977 World Champs.

Upper wing surface spoilers are the latest refinement, considered to be beneficial for spins and final landing approaches. Only when the flaps are fully deflected are the spoilers deployed. Although the construction of the spoiler/flap system is well within the capabilities of most modellers, the method used by Hanno demands the skills of an electronics engineer for the necessary modifications to the R/C equipment.

Briefly, the flap servo is operated in conjunction with the elevator servo as an aid to looping manoeuvres (they are coupled for the *Rolling 8* etc.), but function normally otherwise. This is achieved by switching the transmitter control potentiometer for the elevator to the flap function pulse as well as the elevator control pulse, whilst simultaneously switching out the normal flap control potentiometer. Opening of the spoilers is triggered off when the flap servo reaches its limit of travel by a simple switching device. It could of course be operated completely independantly by an auxiliary channel. To complete the airborne electronic ensemble, the seventh channel is used to operate an in-flight mixture control lever on the latest Webra carburettor.



Full size copies of this plan shown here at 1/8 scale are obtainable from R.C.M. & E. Plans Service price £2.50 inclusive of V.A.T. Please quote plan no. RC/1323 and allow 15p post and package.

Construction

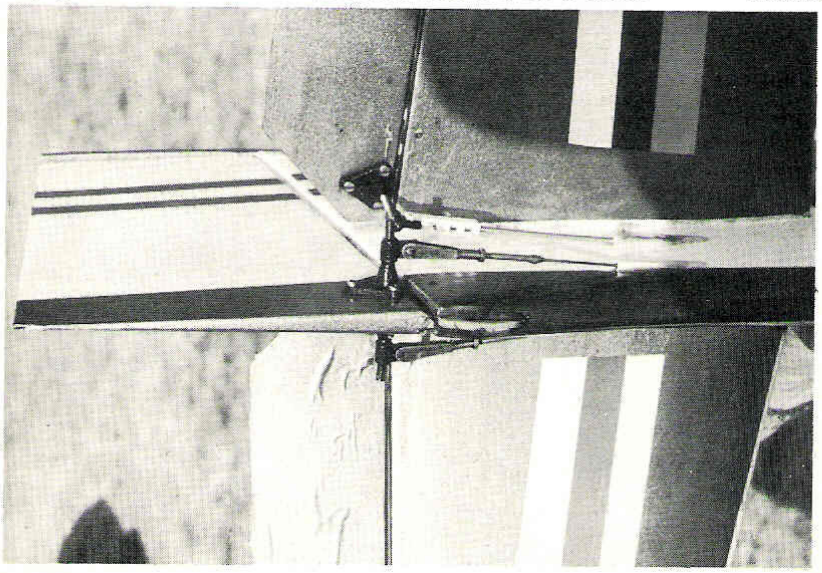
Hans and Hanno Prettner have designed a model which could be said to represent 'the state of the art' for competition aerobatic models. Every effort should be made to produce an airframe that is as accurate as possible. Foam cored wings and tailplane are used and highly recommended by the designer both for their strength and accuracy. The alternative of built-up wing and tailplane structure is detailed on the plan however, for those who prefer to utilise the more traditional approach. A jig would be advantageous when building the fuselage in order that correct alignment of motor mount, fin, tailplane etc. can be maintained.

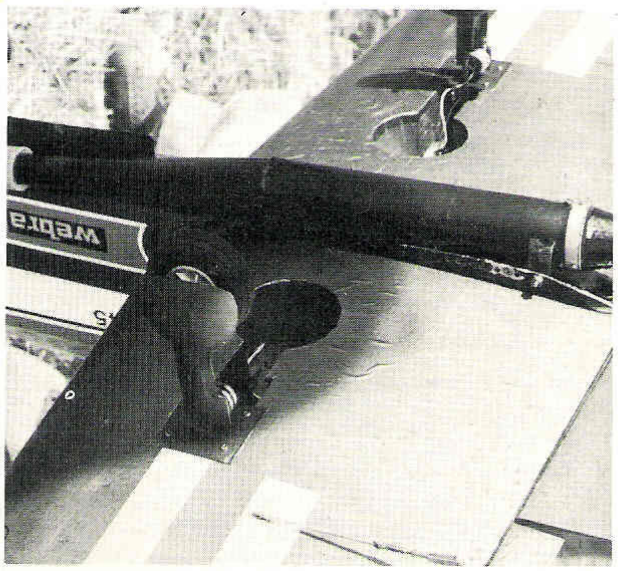
Wing

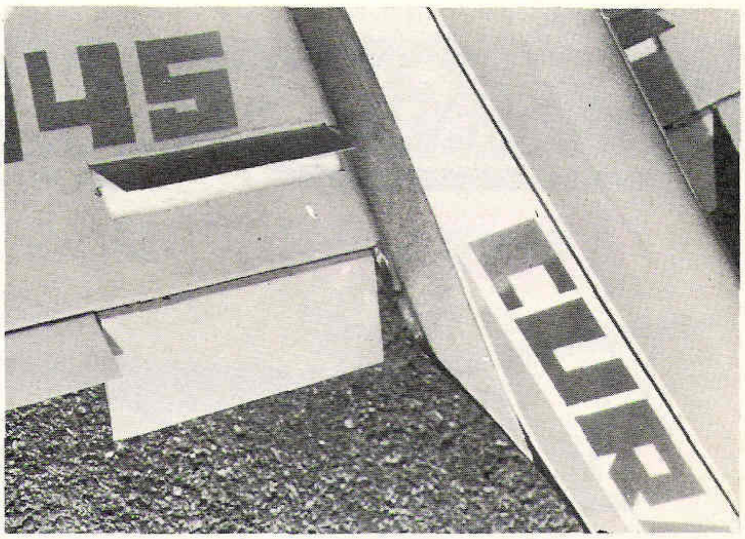
The most important feature of an R/C aerobatic model is a straight unwarped wing. Use extreme care when cutting and covering the wing cores. After joining the wing panels, put a wide piece of fibre glass cloth around the centre section, both on the top and bottom. When building the flap system make certain that the airfoil contour is not affected.

As an alternative to foam cored wings a built-up wing is shown on the plan. This wing is sheeted entirely with 3/32 in. balsa after completion of the basic structure. A jigging piece is drawn on the plan and the use of this is highly recommended to ease the construction. All ribs are made by the sandwich method in two sets, between plywood or aluminium templates. The forward spar is pinned to the board and the rear spar supported on the jigging piece. All the ribs, leading and trailing edges, etc., can then be added. After the glue on this assembly has set, the second wing can be built onto the first after propping it up to the required dihedral angle. All undercarriage doublers and servo mounts should be added before the wing is sheeted over. Tip blocks, ailerons and flap torque rods are then added and finally the flaps and ailerons are tack-glued into position for sanding accurately to the indicated profile.

Below: two underside views of *Curare*. Left: the linkage to the rudder/elevators; note the dual push rods to both the control surfaces and skid to protect the rudder. Right: retract installation and tuned pipe mounting. The rear tuned pipe mounting features provision for adjustment of length. Even a W/Champ has covering troubles!







Fuselage

Fuselage sides are cut from 3/16 in. balsa sheet to the outline indicated on the plan. Reference to the pictorial view illustrates clearly the position of the 1/32 in. ply doublers and triangular balsa corner reinforcements. Remember to make one left and one right hand fuselage side. It will be necessary to chamfer the triangle stock at the rear of the fuselage in order to ensure that the rear ends mate correctly.

Cut exit holes for the elevator pushrod in each fuselage side and make up the forked pushrod, binding and soldering the joint thoroughly.

Assemble the basic fuselage with formers D & E and when this assembly is dry pull in the front of the sides and bond in motor mount bulkhead with epoxy glue noting the side thrust required. Insert the elevator push rod then sheet in the top and bottom rear fuselage.

The front lower block can now be fretted out to clear the retractable nose-leg and then bonded into place. Carefully mark out the nose ring former A and on the intersection of the centre lines drill a hole for the crankshaft of the motor. Cut out the former, retain the piece cut from the centre. From 3/8 in. balsa cut the nose ring back-up piece and tack glue the ply nose ring to it. Slip the laminated assembly over the crankshaft and using the piece retained from the nose ring line it up on the front of the motor. Fit soft block cowling pieces and rough carve to shape. Separate the tack-glued plywood nose ring from the front of the rough carved cowl and sand the front face down to achieve the necessary clearance for the spinner to be used. Re-glue the nose ring into position and finish sand the nose area.

A removable canopy is desirable for access to tank, battery and mixture servo. Use *Cling Film* to prevent the canopy parts from being bonded to the fuselage during assembly.

The fin can now be built over the plan and bonded to the rear fuselage before carving to shape. All fillets, wing bolt mounts and servo rails can now be added.

Tailplane

This design is the result of much development work. Elevator response is soft, yet still has the power to produce a tight turning radius. The tailplane is of foam cored construction and it may be more difficult to cut the tailplane foam cores because the airfoil is very thin. The tailplane can be built in a conventional manner as for the wing, and details are shown.

Note that the root rib is of 1/2 in. sheet and should be chamfered to the angle indicated on the template drawn on the plan. A check should be made after sanding to ensure that the anhedral required is correct at 4 1/2 in. Bond the tailplane halves together and install the completed unit into the fuselage. When the tailplane is fitted to the fuselage attach a piece of string to the fuselage centre front and place the opposite end of the string on the tailplane tips to check if the tips are an equal distance from the fixed point.

Above: spoilers and flaps. Flaps shown left: partially depressed *before the actuation of the spoilers which lift (right) as the flaps* reach the extent of their travel. Full detail now added to APS Plan.

Landing Flaps

The linkage to the landing flap/spoiler system uses a telescopic brass tubing bearing system running on the outside of the aileron torque rod. Watch that flaps depress equally so that the model doesn't roll to one side when the flaps are lowered!

Finish

The fuselage should be covered with tissue or light weight fibreglass cloth. Wing and tail are covered with plastic film which gives a good finish with minimum time expenditure. Use a contrasting colour combination so that the upper surface is light in colour and the lower surface dark for colour contrast when flying. See the November cover for the original colour scheme.

Flying

Using *Simprop Contest* Radio and a *Webra 61 Speed* with tuned pipe silencer system the balance point should be achieved without ballast. If different equipment is used, corrections on balance can be made by changing the location of the R/C equipment.

Before the first flight, check for warps and that all controls are in neutral. Adjust engine side thrust so that the model will go up vertically without turning. When the loops are not straight, add wieght to the high wing tip. Adjustments can also be made to the elevators to effect minor roll corrections.

Curare is a model with a pedigree second to none. Accurately built and carefully trimmed this model has built-in contest winning potential.

Sports flyers also can revel in aerobatics on a level of precision hitherto undreamt of. If you have thought of building and flying a 61 powered aerobatic model now is your chance. Why accept second best—build *Curare!*

Below left: wing mounted servo control arms are protected from any possibility of fouling, by foam packing, etc., with a neat cover. *No less than 4 servos nestle in the wing centre section of Curare.* Right: *Webra Speed 61* with mixture control carburetor. Note the neat and accessible manifold brazed to the silencer strap.