Devon Sutcliffe’s Wonderful Wakefields

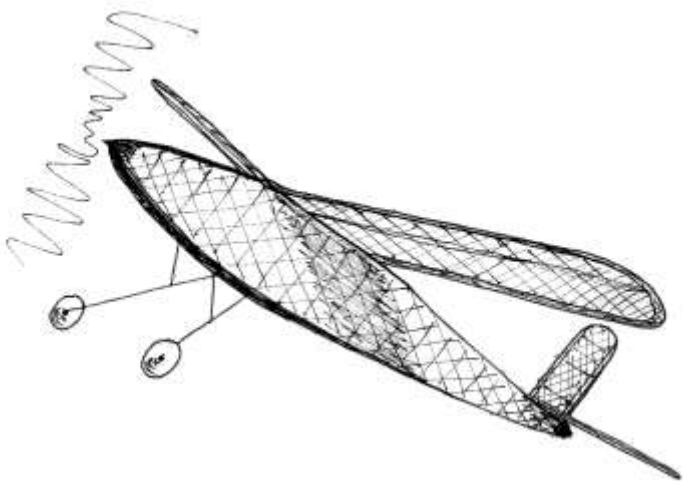
A collection of 64 articles published in SAM Speaks Magazine by the SAM 35 chapter of vintage aeromodellers

Devon (left) with Ron Warring in the UK

The following is a list of those CAD drawings produced by Mike Glaister which are relevant to the text: They are part of a much larger collection of such drawings. For copies please contact Mike at michael.glaister@gmail.com

1939 Earl Stahl
1939 Reg Parnham
1940 Blacklock's Wakefield
1940 Warring's Wakefield
1948 Bob Copland
1948 E.W. Evan's Jaguar
1949 Alan Lim Joon
1949 Art Lonergan
1949 Gianferro Janni
1949 Col Williamson
1949 E.W. Evan's Clipper
1950 Fred Boxall (all models referred to in the text (4)
1950 E.W. Evan's Vansteed
1951 Dick Everitt
1954 Alan Lim Joon (referred to in test, but not presented)

Paul Verdier (Canada) 1936



Back in the late 1980's I had the pleasure of spending a day with Sal Taibi, at his home in Los Angeles. While the majority of our conversation centred around power models, we did cover other modelling related topics. When we traversed rubber models, Sal mentioned a 4 oz. Wakefield which he considered a 'Sleeper'. Several SAM members in the Los Angeles area had built the design, and Sal thought that it had the potential to equal the performance of the Lanzo Duplex in the 4oz Wakefield category. I enquired the name of the model, to which Sal replied with a single word, 'Verdier' and said that the design had been published in a Frank Zaic Yearbook. The name meant nothing to me, even though I thought that I was familiar with most published designs.

When I returned to New Zealand, I consulted my stock of Yearbooks, and found that it had been published in the 1937 Frank Zaic Yearbook. While I had seen the three-view, it had not made any impression on me. Subsequently I was able to purchase a full-size plan from John Pond (now part of the A.M.A. Plan Collection), but I have never seen a completed model.

The design was typical of the period, and featured a rectangular fuselage some 33" long overall, with 28" between hooks. With the exception of the top longerons, the fuselage was constructed of 1/8" x 1/8", while the upper longeron was 3/16" x 1/8". The latter size was chosen because the upper fuselage outline was a series of straight lines, with the longeron being joined by scarf joints. A twin wire undercarriage of .036 diameter was employed, placed as far forward as possible. In common with many other designs of this era, the rubber motor extended the full length of the fuselage, and was anchored by a tail block at the rear. The motor was quoted as 18 strands of 1/8" brown rubber, 33" long, which meant that some form of tension device had to be employed to ensure that the propeller assembly did not fall out during the glide. A 17" diameter freewheeling propeller was quoted, carved from a 2" x 1 1/2" block.

The wing was of 40" span, with a 5" chord, and utilized a short, flat centre section in conjunction with straight dihedral of 3 1/2". A flat-bottomed Clark Y wing section was employed, with a single spar of 1/8" x 1/4" located on the undersurface. The wing was of constant chord with semi-circular tips. A similar description could be applied to the tailplane, which featured sparless construction. In common with other contemporary designs, the tailplane outline was used for the fin shape. The tailplane also featured a Clark Y section, and the same section was used to create a cambered fin. A balance point of 90% was quoted, but this appears incorrect when judged against contemporary models, and the general placement for models fitted with freewheeling propellers.

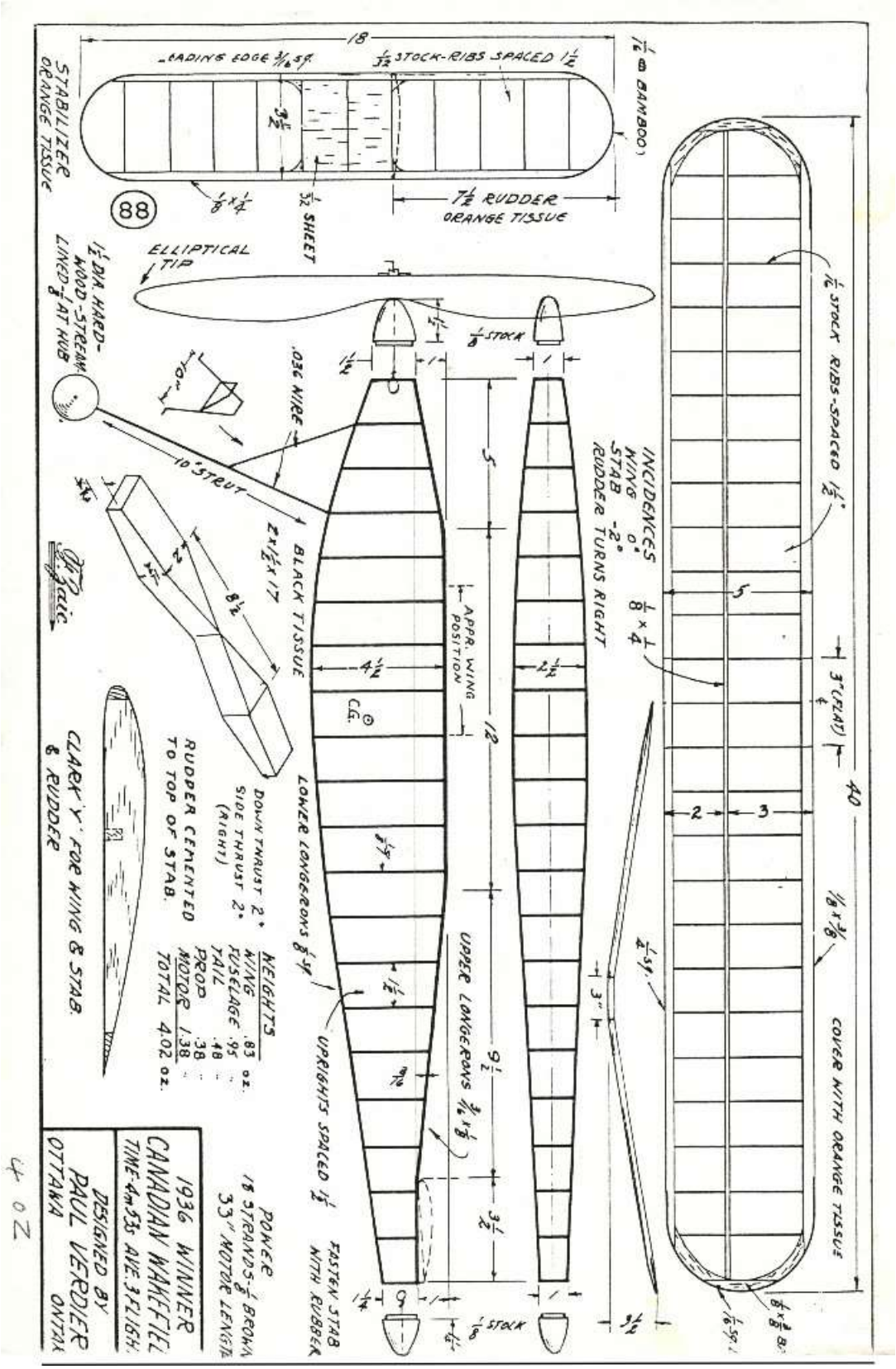
As the model was designed to a four-ounce weight requirement, it is fascinating to analyse the effort which Verdier expended to meet the weight specification. Individual category weights were as follows:

Wing	0.83
Fuselage	0.95
Tailplane	0.48
Propeller	0.38
Motor	1.38

	4.02 oz.

To achieve a structural weight of 2.64 oz. meant that very good quality light balsa was required, and accomplishing a propeller weight of .38 oz. would have been extremely difficult. Built down to Verdier's weights, there is no doubt that the model would have performed in a capable manner, and while not the 'sleeper' that Sal Taibi forecast, its capabilities should not be overlooked.

Verdier placed 19th in the 1936 Wakefield Finals held at Detroit, Michigan.



Roy Wriston (U.S.A.) – 1936

During the 1930's, an extremely talented group from Tulsa, OK, placed consistently high in rubber competitions. Perhaps the best known was Alvie Dague, but another successful member was Roy Wriston. His 1936 Moffett was featured in the 1937 Frank Zaic Yearbook, and on the three-view it was noted that a Wakefield version had been quickly built in order to qualify for the 1936 United States Wakefield Team. The Wakefield version had a larger wing (202 square inches against 150 square inches for the Moffett), together with a modified tailplane and fin. Obviously, the modifications were successful, as Wriston placed second in the Finals to Bert Judge (England).

In 1936, the 4oz total weight requirement applied for the final time. Wriston adopted a diamond fuselage approach, with the fuselage being 36" long overall. The cross section was 3 5/8" square, and the fuselage was constructed completely of 1 /8" x 1/8", with the spacers at 1 3/4" pitch. A wire parasol wing mount was employed, made from .040 wire and connected by 1/16" x 1/8" spruce. The mount was not permanently fixed to the fuselage, but was held in place by rubber bands, and could be moved for balancing purposes. A twin legged wire undercarriage of .047, complete with 1.875" diameter wheels was used. Again, this was rubber banded into place, although the position was fixed.

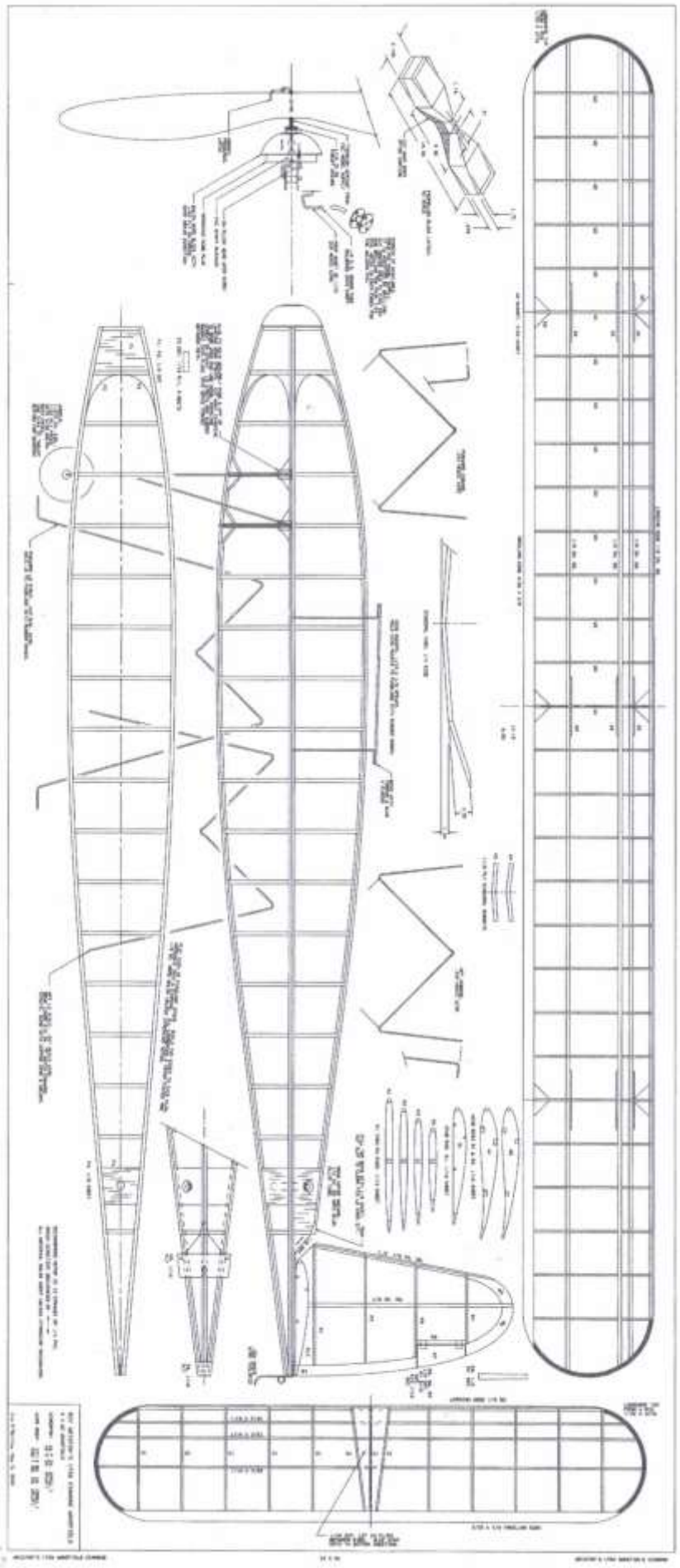
The polyhedral wing was 44" in span, with a 4 1/2" chord. Semi-circular tips terminated a constant chord wing. Ribs were of 1/16" sheet, and an RAF32 type wing section was chosen. Three spars of 1/8" x 1/8" provided structural integrity for the wing, comprising one upper spar and two on the lower surface.

The tailplane was of identical outline to the wing, and was of Clark Y type section. Ribs were of 1/16" sheet, and the three spars were 1/16" x 3/32". A single fin was attached to the top surface of the tailplane, and was of symmetrical section with an internal spar.

A 16" diameter freewheeling propeller, carved from a 2 1/8" x 1 3/4" block was specified, and the recommended motor was 12 strands of 1/4" rubber. Length was not quoted, although there was probably a little slack in the motor. Distance between hooks was 28", so about 30" would appear appropriate, when used in conjunction with a spring stop and a Garami freewheel latch.

In general, the design presented a 'modern appearance', with moderate proportions and a sensible structure. Jim O'Reilly has drawn up and made available a plan in CAD, and this is complemented with a short kit.

After qualifying with a flight of 41:10, at the 1936 Wakefield Finals Wriston had flights of 100, 555 and 73 seconds, for an average of 242.7 seconds. This was 21 seconds in aggregate behind the winner, Judge.



William Ying (U.S.A.) 1936

The December 1936 issue of Model Airplane News contains an article and plan for 'Building a World Record Fuselage Model'. Author of the article was William Ying, and his model falls into the 'one hit wonder' category. This was his only design which was ever published, but the model has a timeless quality which even nearly eighty years later is worth considering for old time events. Ying designed the model to conform to the then Wakefield rules, which required a 4oz minimum weight.

Over the years of the SAM movement, particularly in the U.S.A., the 4oz Wakefield class has been offered as a separate event, and just about every 4oz design ever published has been contemplated for competition purposes. By general consensus, the Lanzo Duplex is regarded as being the leading design, and by virtue of its large propeller, has been very successful. But the Ying has had a significant number of supporters, one of whom was George Perryman. In his opinion it was the best 4oz Wakefield, and he flew it with consistent success.

Ying related that he had designed the model after referring to current aeromodelling literature, and the design reflected contemporary trends, although some were close to being superseded. The fuselage was a rectangular slabsider, complete with glazed cabin, and constructed out of 1/8" x 1/8". It was 30 1/4" long, and fitted with a fixed undercarriage constructed of bamboo, with an .040 wire brace. The solid balsa wheels of 1 3/4" diameter was of oval section, and 1" thick at the hub. This feature was unique in that it has never been repeated in any design with which I am familiar. Following the practice adopted by the 1935 Wakefield Winner, Gordon S. Light, the model was fitted with a built-up motor stick which enabled the motor to be wound outside the fuselage. In the days prior to winding tubes, it was the only method which permitted winding outside the fuselage and prevented the possibility of catastrophic structural damage in the event of rubber breakage. However, use of the stick involved a weight penalty, and the stick became unwanted payload once the motor was inserted into the fuselage. Although it had a significant advantage, this was outweighed by the downside, and the use of motor

sticks for outdoor models virtually ceased in 1936. The motor stick was 25” long, constructed of 3/16” x 3/8” balsa, and was covered on all sides with hard 1/32” sheet balsa. It fitted into a slot in the noseblock and was held in place at the rear bulkhead by spring loaded wire. Two ‘U’ shaped wire clips at the noseblock held the assembly in place.

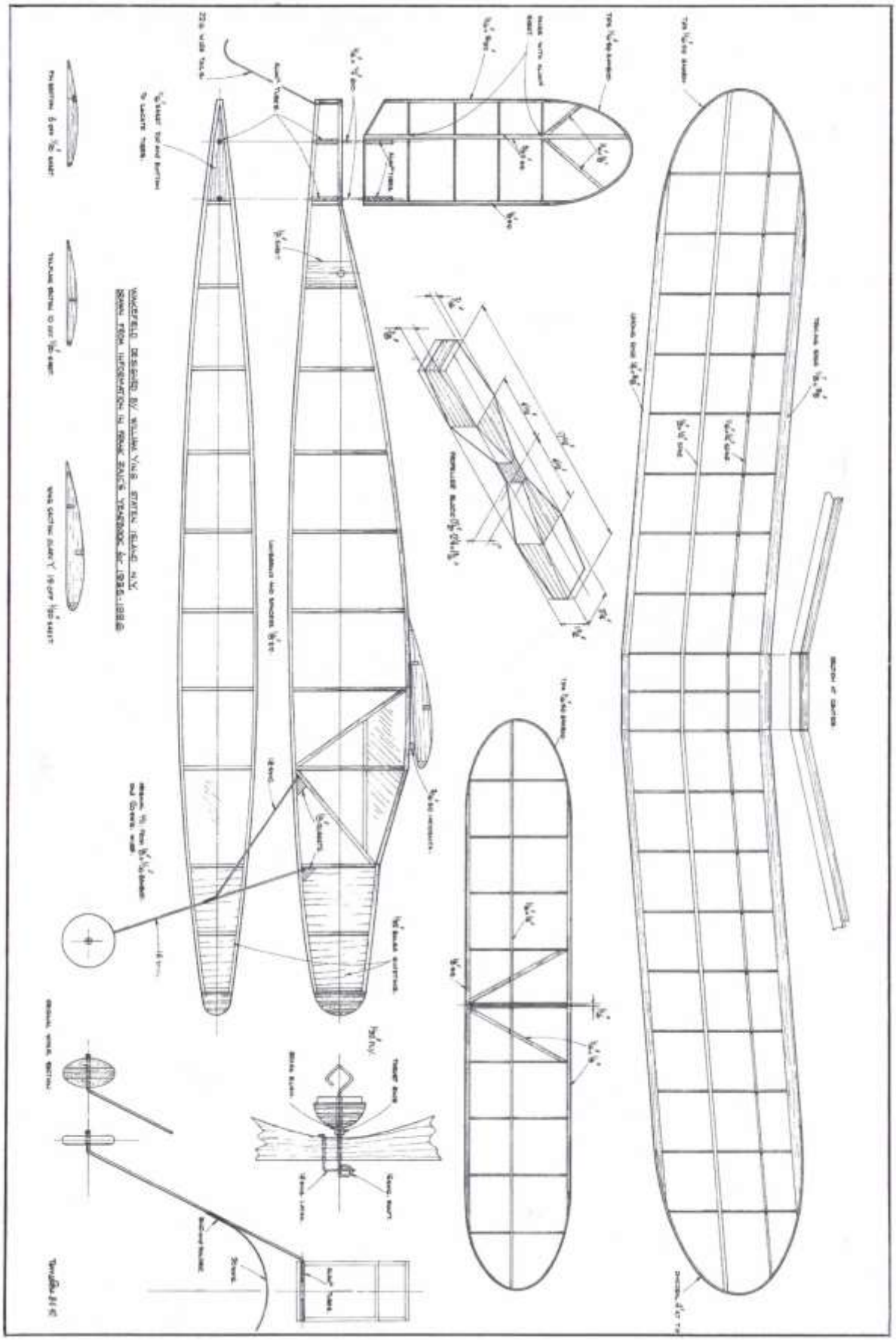
The wing was of 40” span with a flat-bottomed Clark Y section of 5” chord. Ribs were of 1/20” sheet. While the use of a flat-bottomed section was most unusual, provided the the model was built down to the 4oz weight requirement, the wing loading would have been such that the performance was not affected adversely. In a 1962 paper by John Pool in Northern Area News he contended that with a very low wing loading, a flat-bottomed section was just as effective as one with undercamber. Two spars were employed in the wing: a solid top spar of 1/8” x 1/4” at one third chord, together with a lighter lower spar of 1/16” x 1/4". Straight dihedral was 4”, and in another bow to contemporary practice, the wing was swept back 1 1/2”, to provide additional stability, at the cost of constructional complexity. Semi-circular tips of 1/16” square bamboo provided an attractive plan form.

The tailplane was of constant chord with tips mirroring the wing planform and construction. Ribs were of 1/20” sheet balsa, with a flat-bottomed section being used, combined with a single top spar of 1/16” x 1/4”. A single, tall fin was attached to the tailplane with aluminium tubes plugging into bamboo rods. The whole of the rear one-third of the fin, which was of flat section, was hinged for utilization as a rudder to provide turn.

Heart of the model was a 17 1/2” diameter freewheeling propeller, carved from a 2 1/4” x 1 3/4” block. This was almost of Lanzo Duplex size, and would have been a key factor in Perryman’s decision to build the design. Power was by 16 strands of 1/8” rubber, of which the length was not specified, but it would have been close to the length of the motor stick. With this relatively small motor, Ying employed a .040 diameter propeller shaft, but re-drawn plans suggest that 1/16” wire be substituted instead. No component weights were quoted with the original magazine article.

While the construction notes were deficient in terms of the length of motor used, and the balance point, they were quite explicit as to the tissue colour used. The original model employed two colours, red and yellow. The wing centre section was red, then outboard to the fifth rib was yellow, resuming with red again to the tip.

Red was used for the entire fuselage, and for the fin, while the tailplane was yellow. A three-view of the model was featured in the 1935-36 Frank Zaic Yearbook. Full size plans were subsequently drawn up, and of these the most authentic is one drafted by Roger Gregory, and available through Aerodyne. A slightly modernized version, complete with short kit is available through Bob Holman Plans.



James Cahill ‘Ducky’ (U.S.A.) 1938

In 1938 James Cahill qualified for the United States Wakefield Team, and flew in the Finals. He was aged 20 at the time, and was appointed Team Captain. The Finals were held at Guyancourt, France on 31 July 1938, and Cahill placed first with his ‘Clodhopper’, after a 30:54 first flight. Following the Finals, he stayed on for a few days, and flew in a contest at Anvers, Belgium a week later.

At Anvers he flew his reserve model, the ‘Ducky’, and this model was published as a plan in L’Aviation Belge for September 1938. Subsequently in 1985, Jim Noonan of the Oldtimer Model Supply, drew up a full-size plan. Noonan’s drawing was faithful to the original model, but incorporated comments regarding several areas where changes could be made to accommodate more modern materials.

In 1938 Cahill was a university student, with limited time and facilities for modelling. Because of these constraints, ‘Ducky’ would appear to have been designed as a simplified version of the ‘Clodhopper’, with the major change in layout being the use of a parasol wing mount in place of the shoulder mounting for the ‘Clodhopper’. The structure was also simplified, with a rectangular box fuselage being adopted instead of the ‘Clodhopper’s’ planked approach, while wing and tailplane spars were solid rather than built-up.

The fuselage had an overall length, including the propeller assembly, of 35”, while the maximum cross-section at 5 1/4” x 2 1/2” was very close to the minimum requirement.

Construction was entirely of 1/8” x 1/8” for longerons and spacers, with spacers set at an average pitch of 1 1/2”. Additional diagonal spacers for torsional strength were added between the nose and wing position. The wing mount itself was a complicated structure, made of hard 1/16” diameter aluminium wire and bamboo, that was rubber banded to dowels which slid in channels below the top longerons. This gave the potential of 1 1/2” wing movement for trimming purposes. Although not clear from the plan, it would appear that the wing mount was permanently affixed to the wing. In a common approach for the time, the tail boom was detachable for rear winding. Twin 1/16” diameter wire undercarriage legs, 4 1/2” long, with a 6” tread, were fitted with 1 1/2” wheels made of 1/16” ply.

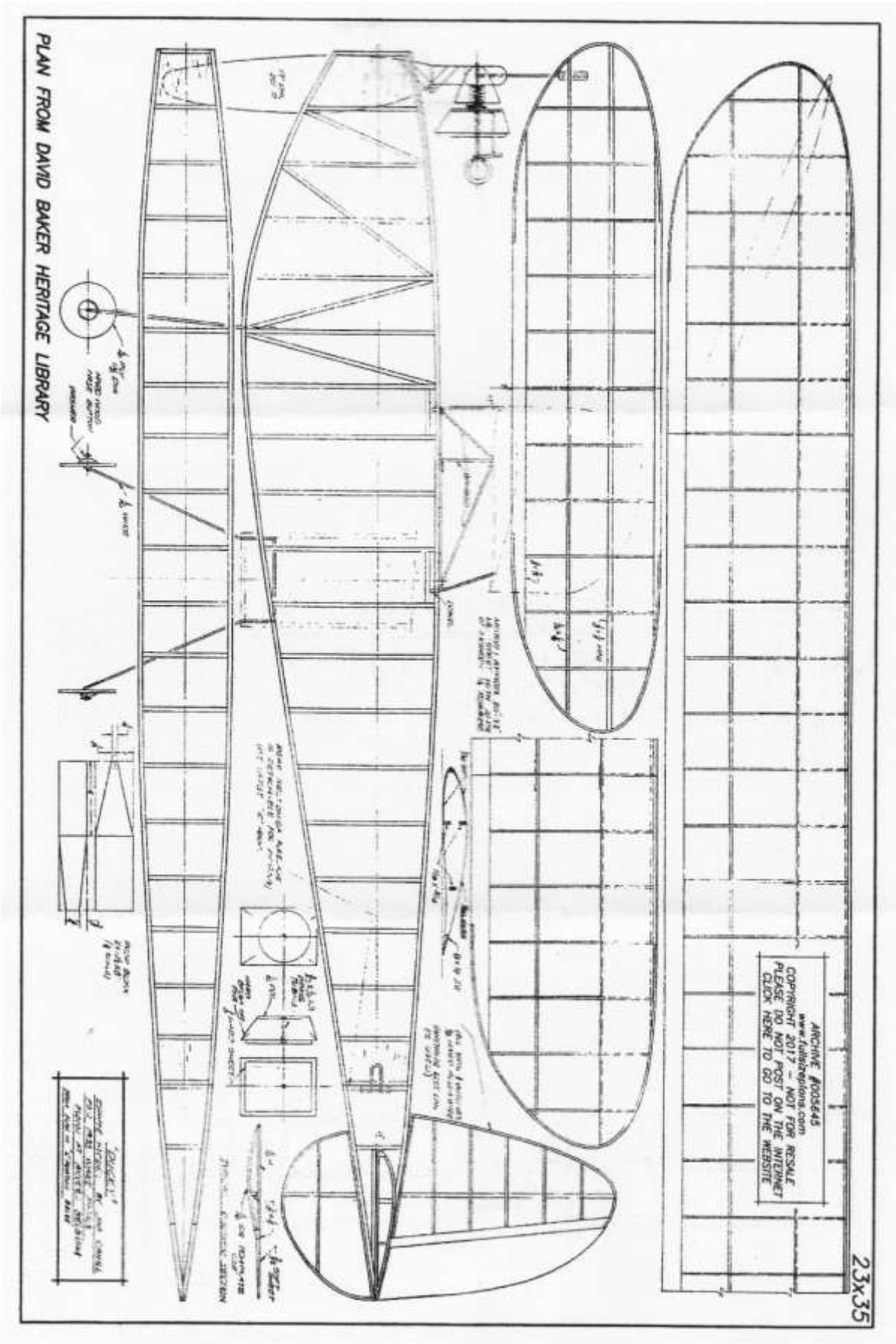
The wing was of similar planform to the ‘Clodhopper’, with a flat centre section and tip dihedral of 4”. While the name of the wing section was not specified, it resembled an RAF32, and ribs were of 1 /20” sheet pitched at 1 1/2”. The constant chord inner section had a chord of 5”, while the total span was 44”. Outline for the curved tips was 1/16” diameter hard aluminium wire, but Noonan suggested that other alternatives could be considered. The leading edge was 1/8” x 1/8”, while there were three spars of 1/16” x 3/16”. Two of these spars were located one above the other, on the rib surface at almost one-third chord, while the third was inset at two-thirds chord. The leading edge was sheeted back to the spars on both surfaces with 1/32” sheet.

The tailplane was of similar planform to the wing, with 18” span and 4” chord. Hard 1/16” diameter aluminium wire was again used for the tips. Ribs were pitched at 1 1/2”, but there were no solid ribs. They were built up from strip, around two spars, with the front spar being 1/8” x 3/8” and the rear 1/16” x 1/4”. A Clark Y type section was employed, with a straight lower surface of 1/16” x 1/16”, and upper surface also 1/16” x 1/16”, but sliced from sheet to the appropriate curved shape.

Structurally, the fin and underfin were built in the same manner as the tailplane, save that a single spar of 1/8” x 1/4” was used. The fins were also flat on the right-hand side, and cambered on the left to give a right turning moment, requiring the model to be flown right/right. The rear 1 1/4” of the fin was 3/32” sheet, and was no doubt intended to be hinged for use as a rudder.

A single bladed folding propeller of 17” diameter and 20” pitch was used. This was carved from a block of 2” x 1 1/2” x 8”, and was set in a 1 1/4” spinner. The original motor used by Cahill was not specified, but Noonan suggested as a starting point 10 strands of 1/4” rubber, 30-32” long. No balance point was shown on the plan.

'Ducky' is a design which has operated under the radar. I have never seen any mention of one having been built, but it would seem to have the potential for a reasonable performance equal to most designs of its era.



H.W. Bexley - HWB 100 and HWB 101

One of the most prominent members of the Luton and District MAS was H.W. (Bill) Bexley, who produced two Wakefield designs immediately pre-war, which have survived despite the odds. The earlier of the two was the HWB 100, which was designed in 1938. It was an orthodox slab-sider, with a straight dihedral wing set on a wire parasol, powered by a double-bladed freewheeler, and with a single fin.

The fuselage had an overall length of 33”, including the noseblock. It was constructed of 1/8” x 1/8” strips for the longerons and spacers, with the latter being pitched at 2 1/2”, while the maximum cross-section was 4 1/2” x 2”. Additional diagonals were fitted back from the nose to the rear of the wing position. Unusually for the time, the rear rubber anchorage was shown as a dowel. By contrast, the style of undercarriage was dated, being placed as far forward as possible, and consisting of two wire legs, 7 1/4” long, with a 10 1/2” track. The rear leg was 16g., with the front leg being 18g., and the assembly was completed with a 1/16” ply wheel of 2 1/2” diameter.

The wing was 44” span with a 5” chord which was constant until 5” from the tips when it curved into a semi-elliptical shape. No name was given to the wing section, which was quite thin by contemporary standards, with a medium undercamber. Ribs were 1/16” sheet and were pitched at 2”. The structure was slightly unorthodox, with the leading edge of 1/8” x 1/16” being let into the rib horizontally. This was supplemented by a solid main spar of 1/4” x 1/8” placed on the bottom surface at one-third chord, while there was a top spar of 1/8” x 1/16” situated slightly further aft. Top sheeting of 1/32” sheet extended from the leading edge to the top spar. The tips were built up from 1/8” sheet, reinforced by a 1/16” bamboo outline. A relatively light `1/4” x 1/8” trailing edge was employed. At this point the complexity factor really kicked in, with each wing panel being swept back approximately 1 1/2”. Combined with this was a wing parasol of 18g.wire, approximately 1” high, which was permanently sewn to the bottom of the main spar and the front of the leading edge. No dihedral dimension was quoted on the plan, and dihedral was set entirely by 1/32” ply braces glued on either side of the main spar at the centre. The wire parasol was held in position on the fuselage by rubber bands, which went around the fuselage and were joined by ‘S’ hooks. No balance point was indicated on the plan, but the later HWB 101 suggested a balance point of 50%, and this would seem a good starting position.

The tailplane featured a double tapered plan form, with a span of 18" and a centre chord of 5”. Only eight ribs of 1/16” sheet were used, pitched at 2 1/2”. A Clark Y type section was employed, with a 1/8” x 1/8” leading edge, a single lower spar of 1/8” x 1/4”, and a trailing edge of 1/8” x 1/16”. Tips were of 1/16” bamboo.

A single rounded upper fin used symmetrical 1/32" ribs, with a 1/8” x 1/4” spar and a 1/16” sheet outline. It was removeable and located by a 1/16” diameter bamboo spar which plugged into a tube in the rear fuselage. In addition, there was a fin locating hook of 22g. wire, bound to the leading edge, similar that employed by Bob Copland’s ‘Northern Star’, which located the fin but still allowed turn adjustment for trimming purposes. There was also an underfin of 1/16” sheet, with lightening holes, and an outline enhanced by 1/16” bamboo.

The freewheeling propeller was carved from a block 17” x 2” x 1 1/2”, and was powered by 14 strands 1/4” x 1/30” rubber 43” long, and pre-tensioned. With this motor total weight was quoted at 8 1/2 oz. The model was covered with white jap tissue, enhanced by a red noseblock and a red stripe along the wing top spar.

Plans for the HWB 100 were drawn up by Terry Rose in 1993 from fragments of the original plan and photographs. A short kit is available from Belair.

In 1939 Bexley produced a successor design, the HWB 101. In keeping with the practice of most designers, his approach was one of incremental change, with many of the details not being altered. The largest change came with the fuselage, where the slab-sided approach was replaced by a more streamlined octagonal layout. But the same fuselage length was retained, as was the size and

positioning of the undercarriage. The fuselage was constructed around a square box of 1/8” x 1/8”, with a maximum cross-section of 3 1/8”, which was set on the diamond. To this were added 1/16” sheet ‘runners’, cemented at the mid-point on the spacer to create an octagonal section. Gussets of 1/16” x 5/16” were added for strength where the wing saddle sat on the fuselage. As the ‘runners’ were 5/8” in depth, it is surprising that more gussets were not shown on the plan, because the ‘runners’ would have been floppy without additional support.

The HWB 101 wing was identical with the HWB 101 wing in every respect. Again, no dihedral dimension has been quoted on the plan, which carried the assertion that 1/32” ply gussets must be cut true to the pattern shown, to ‘give necessary dihedral and sweepback’. While the gussets should supply the dihedral angle, of themselves they could not provide any sweepback. The 18g.wire wing cradle was identical to that for the earlier model, save for the base which had been modified to accommodate the new octagonal fuselage shape. As before, the cradle was sewn to the lower main spar and trailing edge, and attached to the fuselage by rubber bands joined by S hooks. A balance point at approximately 50% of the wing chord, was indicated on the plan.

The tailplane on the new model retained the same shape, size and construction as the earlier model, but six ribs were utilised in place of four, which meant that their spacing was reduced to 1 1/2”. It was suggested that the ribs be cut from 1/2” wide strips of 1/16” sheet, and sanded after assembly to a Clark Y shape with a flat under-surface.

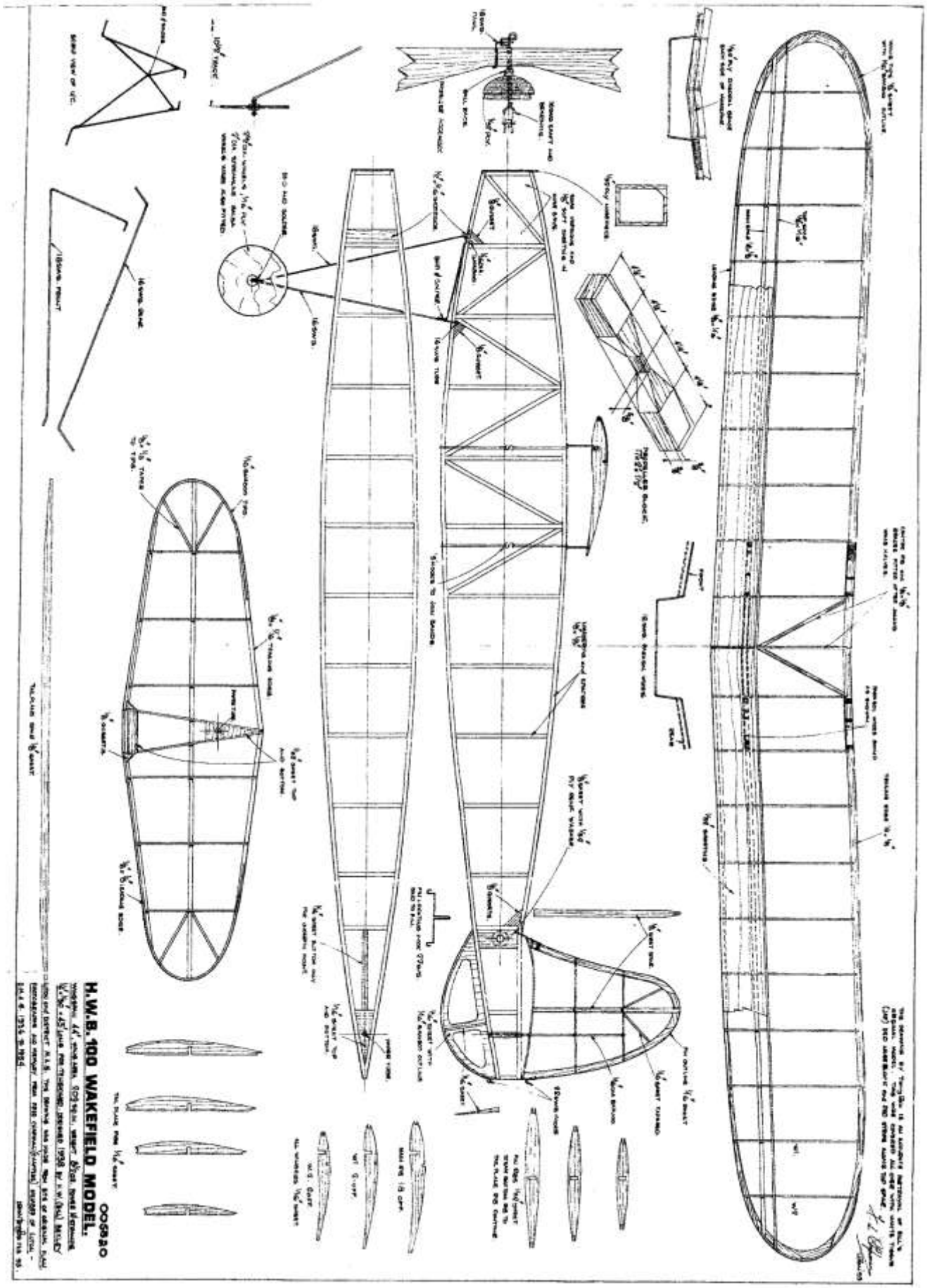
After the fuselage, the next greatest area of change came with the fin, where a fresh outline was chosen. A straight leading edge was combined with a curved trailing edge to create a few more square inches of area. With the changed fuselage shape, the bottom portion of the fin was fixed permanently to the fuselage, and held tubes to take 1/16” diameter bamboo dowels fixed in the upper fin. There were three ribs, and it was again suggested they be cut from 1/16” sheet, 1/2” wide and sanded to section. The text suggested they be sanded to ‘airfoil’ shape, but probably a symmetrical section was intended, similar to the HWB 100. Details about the leading-edge fitting for the fin are also vague, although a spring-loaded wire is implied.

An increase in propeller diameter by 1” to 18”, with a pitch of 27” was effected on the new model, and was again carved from a 2” x 1 1/2” block. To give a clean entry to the new fuselage shape, a removeable spinner was fitted to enclose the freewheeling mechanism. Power was retained at 14 strands of 1/4” x 1/30” pre-tensioned, but the length was increased by 5” to 48”. Despite the increased motor weight, the overall weight remained the same at 8 1/2 oz.

These factors indicate that the HWB 101 was probably the superior performer. It had an improved power/weight ratio, and a more effective propeller, which were assisted by the new streamlined fuselage and spinner. Any loss in stability from the damping effect of the slabsider HWB 100, was probably regained by the larger fin of the HWB101.

Plans for the HWB100 are still available from Terry Rose stockists, while the HWB101 is still listed from Ben Buckle.

The HWB 100 and HWB 101 were both kitted by Luton Model Aircraft Supplies, and remained available after the War. In a typical advertisement carried in the April 1946 *Aeromodeller* p.336, the 100 is quoted at 21/-, while the 101 was 23/-. Both were full kits containing strip and sheet wood, dope, cement, tissue and full-size blueprints but no rubber. Printed ribs and carved propellers were also included. The 101 was quoted as having an average duration of 3 minutes. An interesting mistake was made in the advertisement, in that the designs were quoted as the ‘HBW 100’ and ‘HBW 101’. However, the correct designation was applied in subsequent advertisements.


H.W.B.100 WAKEFIELD MODEL.
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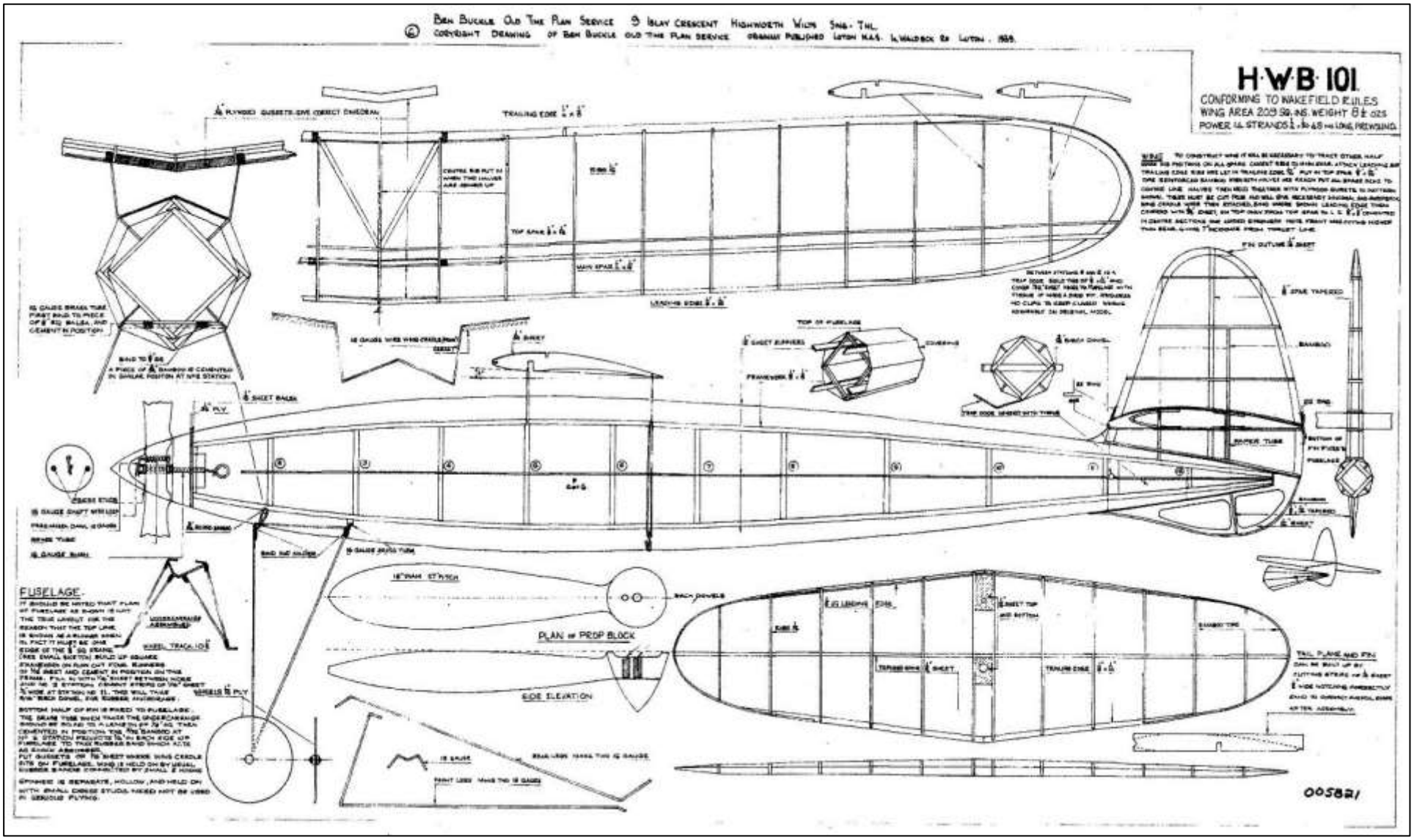

Ben Buckle Old Time Plan Service 9 Islay Crescent Highworth Wilts Sn6 7HL
© Copyright Drawing of Ben Buckle Old Time Plan Service
H·W·B·101
CONFORMING TO WAKEFIELD RULES
WING AREA 209 SQ. INS. WEIGHT 8 ± .025
POWER 14 STRANDS
TRAILING EDGE
LEADING EDGE
TOP SPAR
MAIN SPAR
TOP OF FUSELAGE
FRAMEWORK
SHEET BALSA
PLY
FUSELAGE
PLAN OF PROP BLOCK
SIDE ELEVATION
WHEEL TRACK 10"
WHEELS PLY
TRAILING EDGE
TAIL PLANE AND FIN
005821

James Bohash (U.S.A.) 1938-39

During the late 1930's, one of the most active modellers in the American Mid-West was James Bohash, who lived in Detroit, Michigan. His name was mentioned frequently in contest results, and photographs of him appear in contemporary issues of Model Airplane News flying a Burd Korda. However, he soon developed his own design, and while flying this model, qualified on the United States team for the 1938 and 1939 Finals. He did not cover himself with glory on either occasion, and while I have not been able to determine his exact placing in 1938, it was lower than 16th, with an aggregate of less than six minutes from three flights. In 1939 Bohash placed 24th with an average time of 41.6 seconds, which gives an aggregate of just over two minutes.

Bohash's design was never published in any modelling magazines, but in the 1980's he advertised the plans as being available by direct mail. I ordered a copy, which I received promptly, and found it to be annotated with additional comments about detailed parts of the structure. Bohash had initially published the 1938 version of the design, but he subsequently included a separate sheet which outlined the 1939 modifications.

There is no doubt from the plan that Bohash tried a wide variety of modifications to the basic design in an effort to identify possible improvements. The basic model featured a rectangular slab-sided fuselage, which combined with elliptical flying surfaces and fin. Stringers around the nose faired into a spinner. The fuselage structure was 1/8" square, with the rear rubber anchorage being a 1/4" diameter bass dowel, in a very early example of this anchorage form, and progressing from the almost universal use of hooks prior to this time. A detachable tail plug was fitted, held in place by pins.

Two forms of undercarriage were offered. The first was a traditional twin leg assembly comprising a prime bamboo leg, to which was attached a streamlined balsa fairing. The alternative was a single wire retractable leg, with a single wheel which folded into the fuselage. When the retractable gear was used, the single built-up underfin was replaced by twin underfins, comprising two laminations of 1/16" sheet, which were on the underside of the tailplane at approximately 60% chord.

The wing was 48" in span, with a maximum chord of 5 1/2", and consisted of five panels, with a short, flat section over the fuselage, then polyhedral for the outer panels. Inner panel dihedral was only 1/2" at the break, with the tips being raised 4 1/2" in total. The wing section was not named, but it resembled a hybrid of an Eiffel 400 and an RAF 32. Three 1/8" x 1/8" spars were used; one above the other at a quarter chord, with the third being situated at two thirds chord on the lower surface. After the wing was fully assembled and the dihedral incorporated, 1/64" sheet was added to the top surface, extending back to about 30% chord. The rear top surface of the ribs was then completed with 1/64" x 1/8" capstrips, so that the whole top surface was smooth. Ribs were of 1/32" sheet, and all materials used in the wing were of indoor stock. As an alternative, Bohash suggested using a heavier leading edge than the specified 1/8" x 1/8", with either 1/16" or 1/20" ribs, and deleting the capstrips.

1/16" square on the upper surface, and 1/8" x 1/16" on the lower. Ribs were undercambered 1/16" and constructed of 1/32" sheet, while 1/64" sheet covering was employed on the top surface back to the spar, with1/64" x 1/8" capstrips similar to the wing.

A single fin, fitted with an adjustable rudder, was cemented to the top of the tailplane. In an attached note, Bohash suggested that 1/2" be added to the leading edge of the fin for enhanced directional stability when flying in high winds.

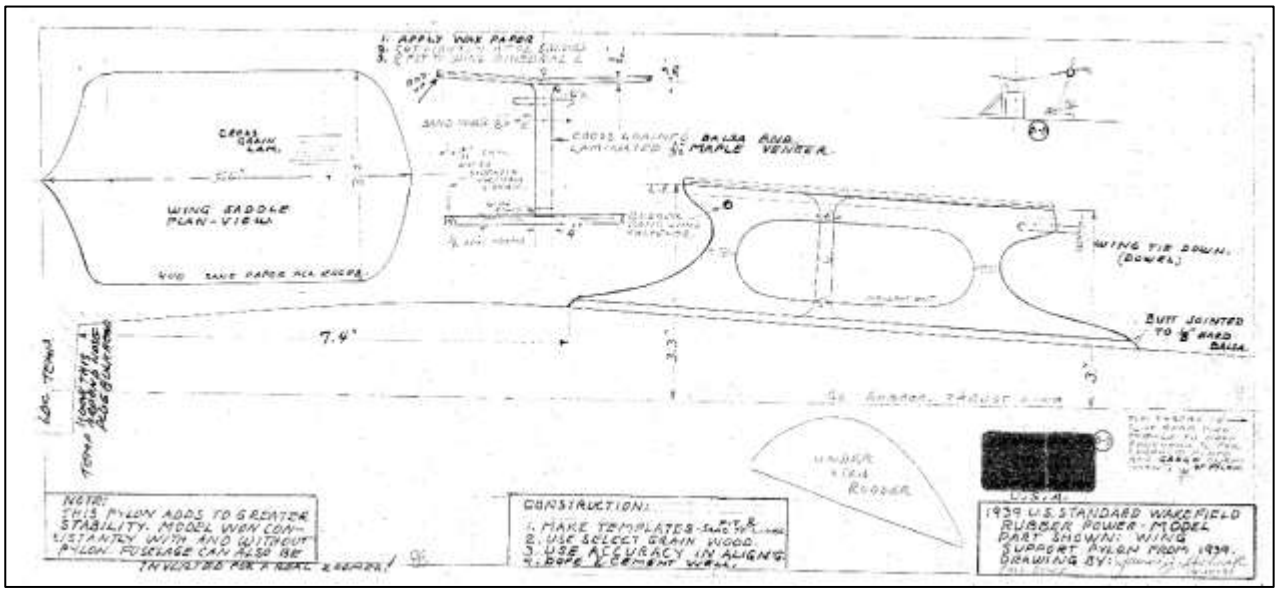
A 17" diameter propeller carved fro a 2 1/4" x 1 3/4" block was shown on the plan, with the option of either a double or single bladed folder. They flew equally well, but Bohash thought that the two bladed propeller gave more torque, while the single bladed propeller gave less torque and resulted in a simpler to adjust model.

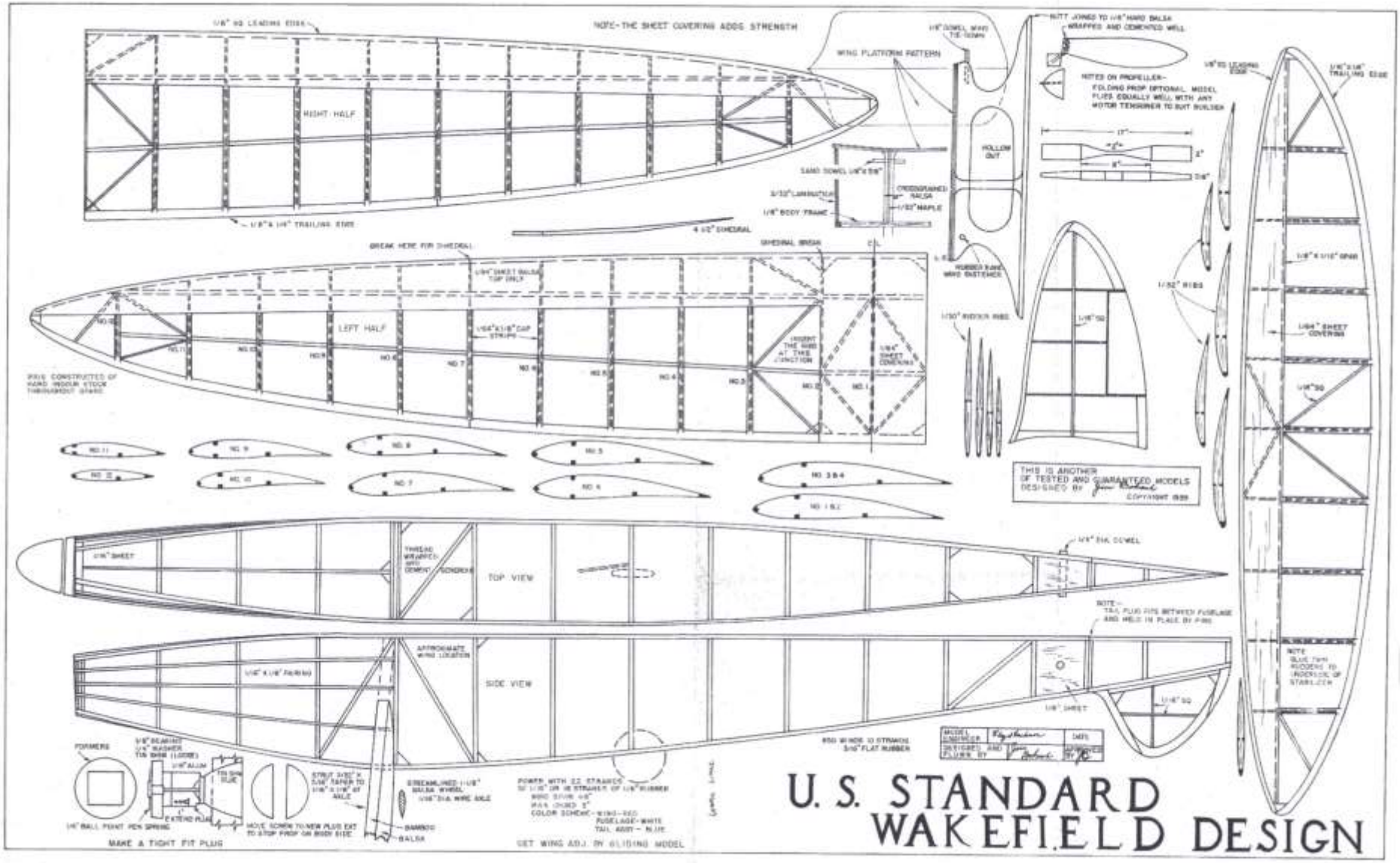
Power was either 22 strands of 3/16" or 18 strands of 1/4" rubber, but no length was specified. On 22 strands of 3/16", 850 winds were obtained. Right thrust of 1/16" was employed, and between 1/16" and

1/8” downthrust. No balance point was indicated, but the wing was moved to obtain a satisfactory adjustment.

The original plan for the Bohash Wakefield is dated March 1939, indicating that the model reflected the 1938 approach, but in 1981 Bohash issued a supplementary sheet illustrating a pylon which he added for the 1939 version. He felt that the pylon enhanced the stability of the model, but he also claimed consistent success, both with and without the pylon. As a final punchline, the fuselage could also be inverted for a real zoomer!

When his models flew at the 1939 Finals, Bohash used a very patriotic colour scheme of a red wing, white fuselage and blue tail assembly. A photograph of this model appears in the November 1939 issue of Model Airplane News. While Bohash was not conspicuously successful in the international arena, he won the Canadian Nationals in 1940, and the Michigan State Championships in 1939 and 1952. In later life he lived in Taylor, Michigan, and was inducted into the AMA Hall of Fame in 1991.




U.S. STANDARD
WAKEFIELD DESIGN
NOTE- THE SHEET COVERING ADDS STRENGTH
RIGHT HALF
LEFT HALF
TOP VIEW
SIDE VIEW
WING PLATFORM PATTERN
HOLLOW OUT
BUTT JOINED TO 1/16" HARD BALSA WRAPPED AND CEMENTED WELL
NOTES ON PROPELLER-
FOLDING PROP OPTIONAL. MODEL FLIES EQUALLY WELL WITH ANY MOTOR TENSIONER TO SUIT BUILDER
BREAK HERE FOR DIHEDRAL
DIHEDRAL BRACE
4 1/2" DIHEDRAL
1/16" SHEET
1/16" DIA. DOWEL
APPROXIMATE WING LOCATION
FORMERS
MAKE A TIGHT FIT PLUG
STREAMLINED 1-1/8" BALSA WHEEL
1/16" DIA. WIRE AXLE
BAMBOO
BALSA
SET WING ADJ. BY GLIDING MODEL
THIS IS ANOTHER OF TESTED AND GUARANTEED MODELS DESIGNED BY
COPYRIGHT 1939
MODEL NUMBER
DATE
DESIGNED AND FLOWN BY
1/16" SHEET
1/16" SQ.
1/16" SHEET COVERING
1/16" SQ.
1/32" RIBS
1/16" SQ.
1/16" SHEET
1/16" SQ.

Frank Zaic (U.S.A.) 1939

The June 1939 issue of *Model Airplane News* carried a construction article and plan for the 'New Yorker IV', designed by Frank Zaic. It was later republished by *Model Builder* in their July 1977 issue, accompanied by a full-size plan. This model featured a semi-streamlined fuselage with polyhedral wings and twin fins. It was most attractive in appearance, but very few have been built by the SAM movement, and it has not emerged as a contest threat. Given the pedigree of the designer a high expectation of performance could be expected, but this has not been the case, and some analysis of the design may provide an answer.

The fuselage, conventionally for the period, had a length of 34" minus the propeller and spinner. It was constructed around a box, with longerons, uprights and spaces of 5/32" square. Balsa weights for each component were specified on the plan, and 11 lb. was suggested for the basic fuselage structure. Added to the basic box were stringers of 1/8" sheet (6 lb. quarter grain) which had the effect of creating an octagonal structure. Twin undercarriage legs of 1/16" wire was placed at the midway point between the propeller and cabin, but were swept forward to give some measure of protection to the freewheeling propeller. Balsa blocks were used at the fuselage nose in order to create a smooth transition into the spinner. Silk covering, applied wet, was used on the fuselage only.

The wing was a further example of an over-engineered approach, with a 39" span and 199 square inches of area. Polyhedral was employed with a constant chord (6") centre section, and elliptical tips. A single spar of 1/8" x 3/8" on the under-surface was placed at 37.5% chord. Upper sheeting of 1/32" (6 lb.) extended back to 25% chord on the 1/32" (8 lb.) ribs, which were strengthened top and bottom by 1/32" x 3/16" caps. The wing section was HMZ – 3, and was of Zaic's own design

A similar structural approach was used on the tailplane, although with slightly smaller spar sizes. The tailplane had a swept back leading edge, matched with a straight trailing edge. Twin oval shaped built-up fins were cemented to the tailplane tips. *

The freewheeling propeller was set in a long pointed spinner, and carved from a 17" x 1 3/4" x 1 3/4" block. A suggested density of 14 lb. balsa for the block was quoted, while the block produced a pitch of 34", giving a P/D ratio of 2. A spiral spring on the rear of the noseblock was used for rubber tensioning, while a Garami freewheel device was attached to the front of the propeller. In addition to these features, a rubber band extended from the undercarriage to the noseblock to ensure that the nose assembly was held in place.

Weights of the components were as follows:

Wing	1.25	
Fuselage	3.40	
Tailplane and Fins	0.50	
Propeller	1.25	
	6.40 oz.	
Rubber	2.50	18 strands 1/4" x 32" long
	8.90 oz.	

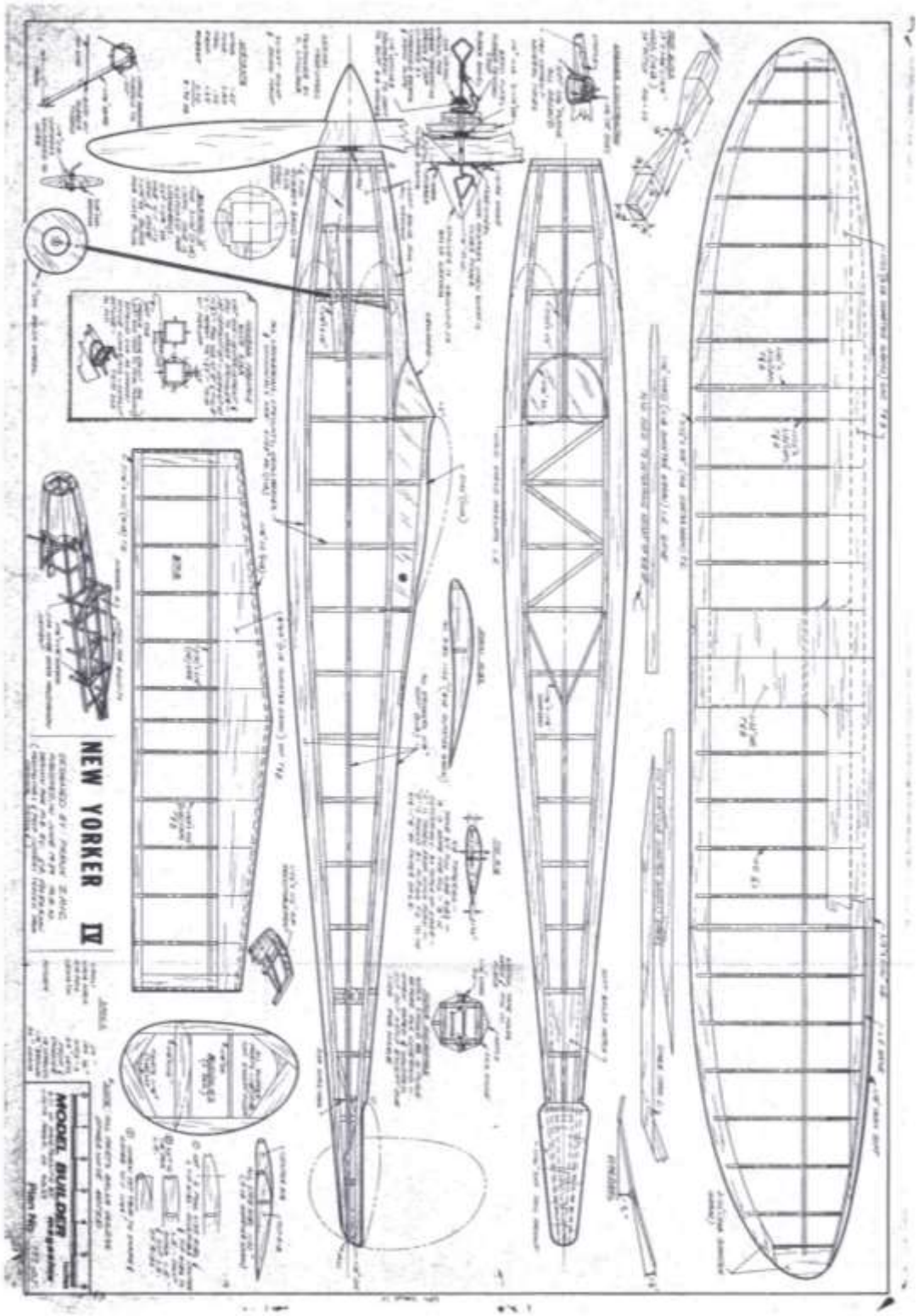
Zaic had contest success with the design, winning the 1938 Stout Trophy with a lucky thermal flight, and later placing 6th in the Moffett Finals with a flight of over two minutes. He w

as not completely satisfied with the design, and later shifted the rubber anchorage 2" forward. He also felt that a single fin would be an improvement, and proposed incorporating that change in New Yorker V as well as lightening the model and using a longer motor.

Viewed with the hindsight of some 75 years, the model was undoubtedly over-engineered. There is too much wood in the fuselage, resulting in a component weight of 3.4 oz., which was matched by total

model weights in the early 1950's. As a result of the excessive structural weight, rubber weight was only 2.5 oz., which was less than the 80-gram rubber weight limit introduced in 1954. On top of these factors, a P/D ratio of 2 meant that the propeller was over–pitched for optimum climb, although Zaic claimed the opposite.

Zaic must have liked the design, because he re-published it in his 1953 Yearbook. Perhaps the fact that it was overweight and underpowered, are the reasons why more examples of this undoubtedly attractive design are not seen on the flying field.



Sigurd Isacson (Sweden) – Rimfaxe

One of the most notable Swedish modellers was Sigurd Isacson, who was a successful Wakefield competitor from pre-Second World War times, and who later developed the SI series of aerofoils. This series attracted wide publicity in the late 1940's, and were used widely in the next decade.

One of Isacson's early Wakefields was the Rimfaxe, which was designed in 1939, and won the Sweden – Finland trophy event held that year at Jamijarvi, Finland. Isacson averaged 3.15 for his flights.

His model followed a typical Scandinavian approach, with a slabsider fuselage some 950mm in length. The maximum cross-section was 125 x 75mm. Longerons were the standard Scandinavian 4 x 4mm, while the front spacers to the undercarriage location were also 4 x 4mm, but transitioned to 4 x 2mm rear of this point. The front longerons from the nose to the rear of the undercarriage were also reinforced by an additional 4 x 2mm strip. Return gears were installed at the rear, just in front of the tailplane mounting. Distance between the rubber hooks was about 770mm. Aft of the gear mounting, the tail plug was detachable, and connected to the main fuselage structure with hooks and rubber bands. The wing fitted to runners on top of the fuselage. A twin leg wire undercarriage was employed, with the main leg of 1.25mm wire, and a brace of .8mm wire, fitted with 35mm wheels. Downthrust and sidethrust of 2° were built in.

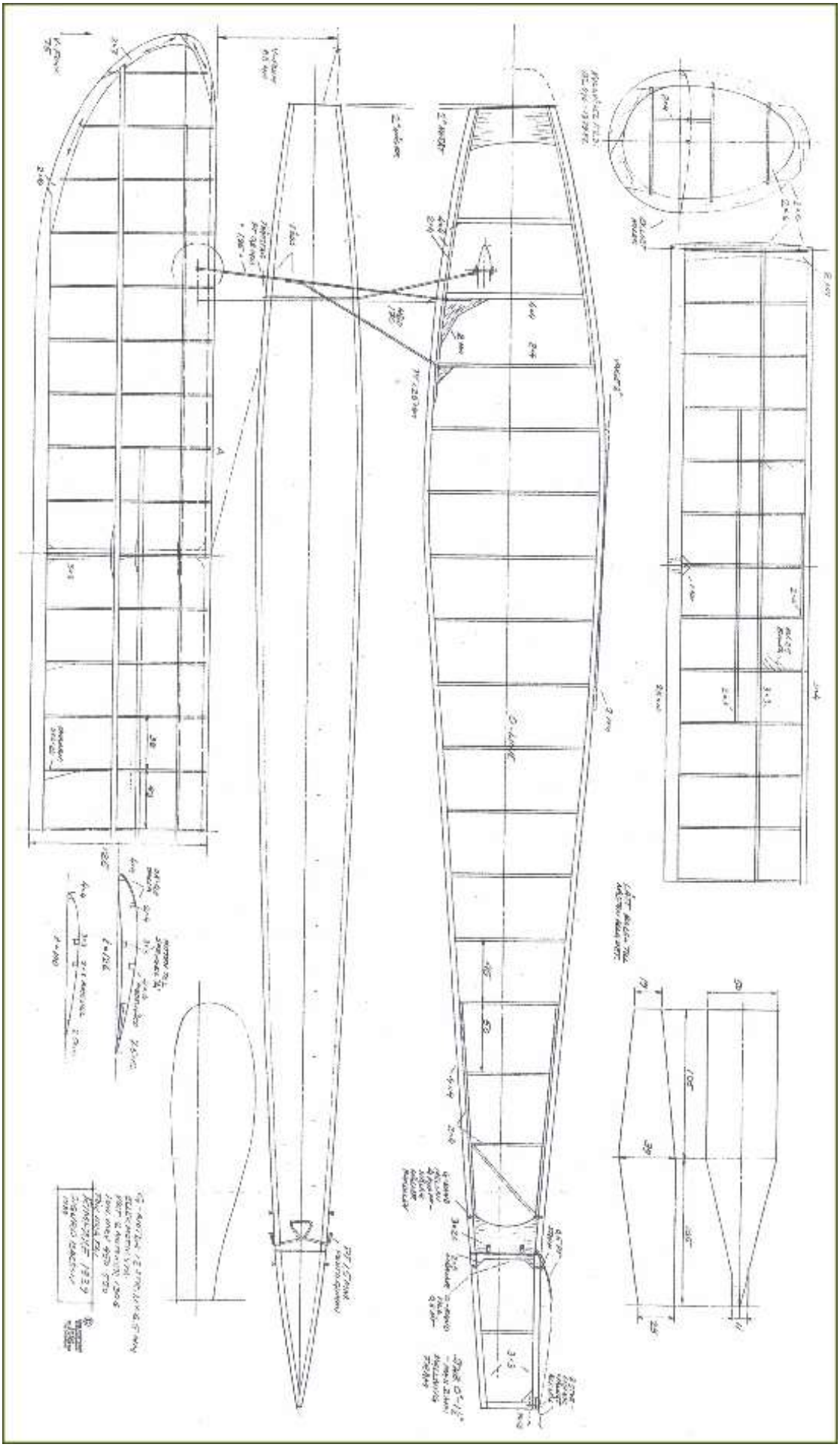
The wing was of 1120mm span, with a chord of 125mm. It was flat for an initial 195mm, with a tip dihedral of 85mm No name was attributed to the wing section, but for the period it was thin and moderately cambered. The ribs appear to be 1.5mm thick, and were combined with a robust structure. Two upper spars extended full span, while a lower spar terminated two ribs beyond the dihedral break. An upper surface sheeting of .8mm extended back from the leading edge to the front upper spar. Semi-elliptical tips faired into a wing which was basically constant chord.

A constant chord tailplane with a flat under-surface, similar to a typical Clark Y type section, was used. A main spar, extending for the full span was situated on the upper surface in conjunction with a secondary spar which terminated at the third rib. Built up twin fins of symmetrical section were attached to the tailplane tips.

A freewheeling propeller of 420mm diameter, and carved from a 50 x 39mm block, completed the model. This was powered by twin 12 strand motors of 6 x 1mm, which had a weight of 130 grams. Maximum turns varied between 450 -520 per motor. By contemporary standards, the propeller diameter was slightly smaller than the popular 18" (457mm) diameter used by American and English modellers, while the motor weight was above their current usage as well.

Rimfaxe was an eminently sensible design, with sound proportions, and structurally well engineered. For its time it must have been in the top tier of competitive Wakefields.

Incidentally, in Nordic mythology, Rimfaxe (*Hrímfaxi)*, was the goddess *Nótt's* horse, who dribbled up the morning dew.



Roy Marquardt (U.S.A.) 1939

One prominent American modeller of the 1930's who transitioned from modelling to a successful full-size aviation career was Roy Marquardt. His rubber model designs were published in early Frank Zaic Yearbooks, and were characterized by sparless flying surfaces of elliptical shape. The wings were coaxed into assuming a natural curved dihedral, by doping and then weighing the centre down. Later models were built on a curved jig to assist the process. Marquardt also used his own wing section, and he developed a series of sections which utilized the McBride B7 for the upper surface ordinates. These sections were used widely, with the most popular being the Marquardt S2. Most English lightweights of the 1940's employed this section.

In 1939 Marquardt designed and built a Wakefield which he flew at the 1939 Nationals in Detroit. The design generated wide interest, and Frank Zaic drew up a three-view which he published in 'The 1939 Nationals in Pictures'. One person attracted to the design was Jim Noonan, who drew up a full-size plan. Noonan thought that it would be a fine challenge to build and fly.

This was probably an understatement, particularly with the fuselage. This was 36" long, and was constructed out of 1/16" sheet. It was of octagonal shape, and built around ten formers constructed from 1/16" x 3/16" to produce straight sides. The fuselage was then planked with eight gores cut from 1/16" sheet. Although not mentioned on the plan, each frame was probably constructed around a cardboard former, which could then be mounted on a central rod, in order for the planking process to be carried out. This is pure speculation, but it was the process followed in the construction of contemporary English streamlined Wakefields, and could well have been adapted to this model. The wing was mounted on a 3" high streamlined pylon, constructed of 1/16" sheet, with an internal former. A single leg retracting undercarriage made of 1/16" diameter wire was fitted with a 1 1/2" diameter wheel.

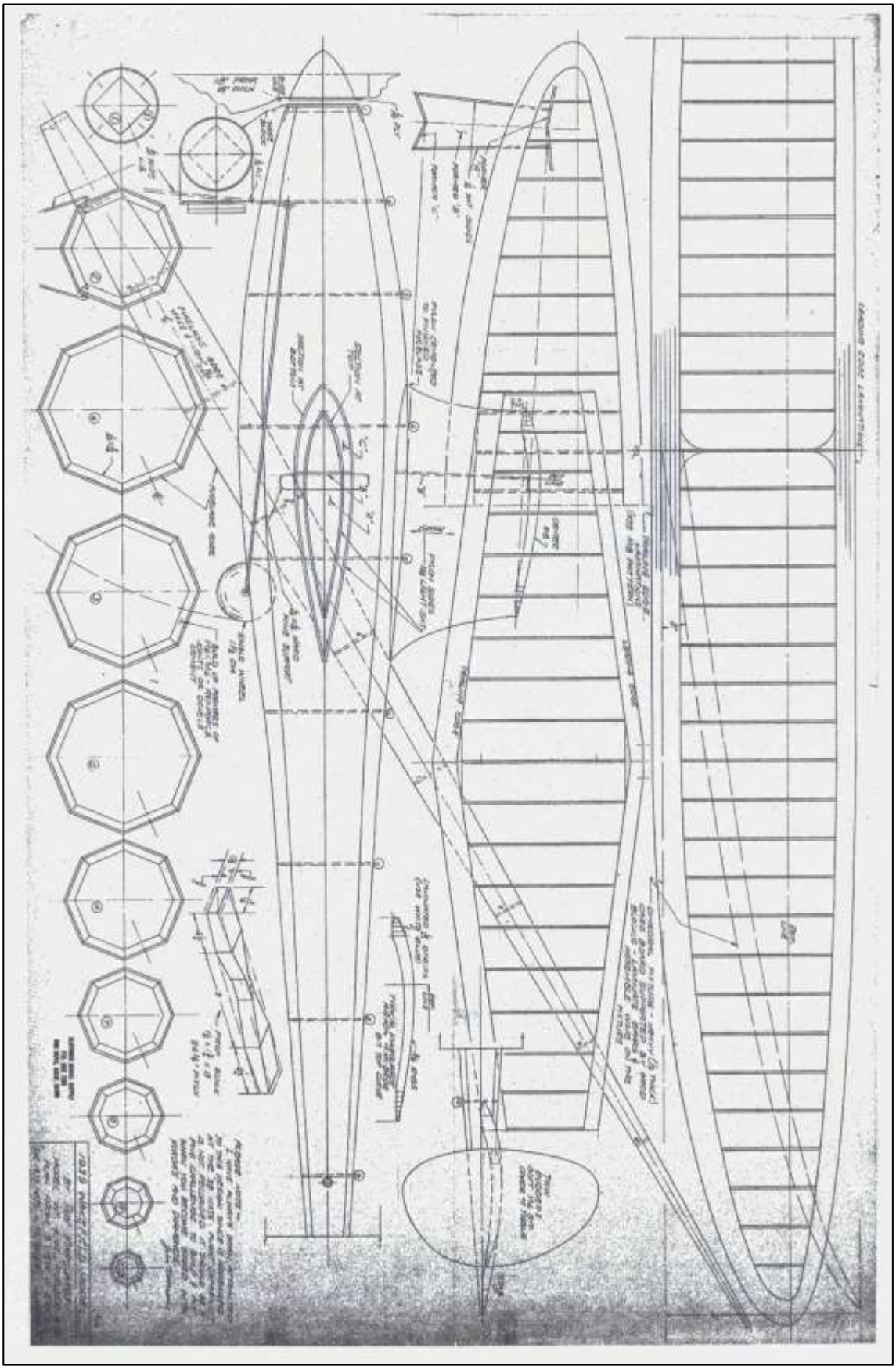
The wing was of 44" span, with a 5 1/8" root chord. It was of elliptical shape and featured sparless construction. Both the leading and trailing edges were built up from 1/8" sheet laminations, with the leading edge comprising four strips, while six were used for the trailing edge. Ribs were of 1/16" sheet, and were of Marquardt S2 section. The dihedral commenced at 8°, but accelerated near the tip as curved dihedral was involved to produce a tip dihedral of 5". This necessitated the construction of the wing on a jig to ensure that an accurate capture of curves in two planes could be achieved.

By comparison with the wing, the tailplane was simplicity itself, being of sparless construction with straight outlines, and tapered on both edges. Probably solid spars were utilized, as there was no need for laminating, and an undercambered section, similar to the wing, was employed. Twin fins of soft 1/16" sheet were attached to the tailplane tips.

The propeller was an 18" double bladed folder, and fitted with a spinner to fair into the fuselage nose. It was carved from a 1 3/4" x 1 1/2" block with a nominal pitch of 24 1/4". No motor size was quoted, but the rubber weight was 4oz. This equalled the structure weight, which would have been a major task requiring extensive use of indoor balsa to meet the weight targets.

Roy Marquardt was an innovative modeller and did not limit has activities to rubber models alone. In 1939 he also designed the 'Riser Rider', a power model fitted with a .29, which incorporated many of the approaches used in his Wakefield. However, the power model employed a shoulder wing, and was very successful, with a high rate of climb. In 1944 Marquardt formed the Marquardt Corporation, located in Los Angeles, which concentrated on the development of ramjet engines. It operated successfully in the 1940's and 1950's.

Plans for Marquardt's Wakefield are available from Aerodyne.



Fred Bowers (Canada) 1939

Second place winner at the 1939 Wakefield Finals was Fred Bowers of Toronto, Ontario, Canada. His first flight was of 13:32.5, but his second was only 5.5 seconds, and there was no third flight, which would imply catastrophic damage. These flights produced an average of 4:32.66, which was only exceeded by Richard Korda of the United States of America.

The model was a conventional slab-sided diamond, with the wing set on a wire parasol, and equipped with a single fin. In keeping with the times, the fuselage had an overall length of 37”, and was of square section measuring 3 1/2” x 3 1/2”. Construction was of 1/8” x 1/8”. The wire parasol for the wing mount was constructed of 1/16” diameter wire, while the wing runners were two lengths of 1/8” x 1/8” cemented together, and overlong so that the wing could be moved for flight adjustment. Twin legs, also of 1/16” wire, were employed for the undercarriage, complete with 2” diameter wheels. This undercarriage was mounted firmly in the fuselage between two vertical sheets of 1/8” balsa, and additional horizontal sheet was used to reinforce the mounting as well. In addition, the spacers on which the undercarriage was located, as well as those used for mounting the wing parasol, were doubled. Bowers obviously wished to ensure that local stress points were adequately strong for their intended role. While the fuselage was constructed in one piece, the tail cone was subsequently separated, and held in place by rubber bands. This was probably to assist rear winding, which was a common practice at the time. Another transitional practice was the use of a 1/8” x 1/4” bamboo peg for the rear rubber location. Prior to this time wire rear hooks were universal, but in 1940 Ed Wallenhorst introduced the use of dural tubing, and this innovation spread widely and with rapidity.

The model featured a polyhedral wing, with a constant chord inner section and elliptical tips. It was recommended that the wing be built in four separate sections, and then joined when setting the dihedral. The name of the wing section was not stated, but it was of conventional proportions with a moderate undercamber. All ribs were of soft 1/16” sheet. However, the structure was slightly less conventional, with three 1/8” x 1/8” spars on the lower surface. On the top surface a single 1/8” x 1/8” spar was let into a 1/4” deep slot, and the resulting gap was filled with scrap sheet to leave a smooth upper surface. Total flat span was about 48”, with a 4 3/4” centre chord. A tip dihedral of 6” was employed, which was somewhat greater than current usage at the time.

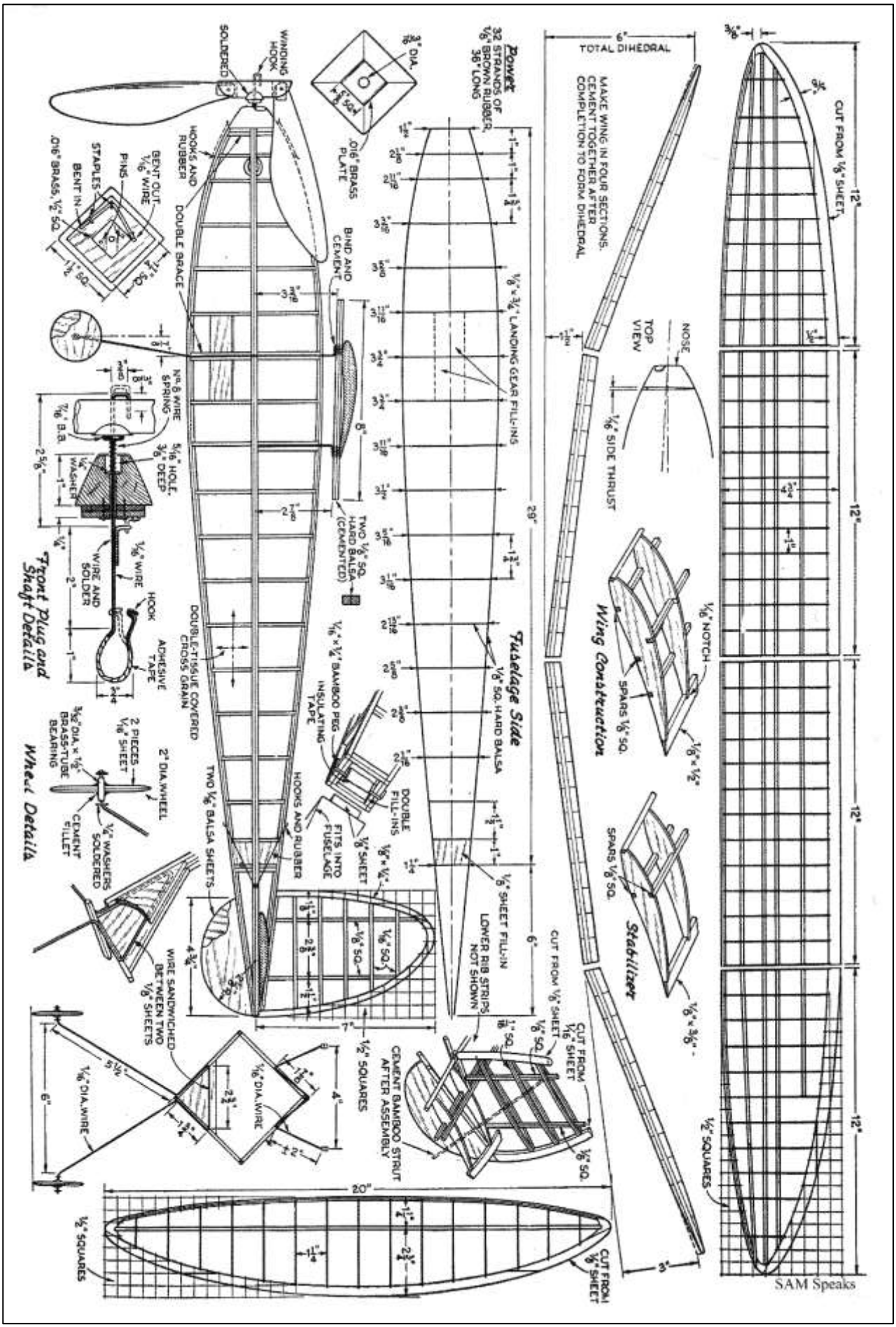
The single fin was also taller than average, and was perhaps a reflection of earlier times. It had a straight leading edge, combined with a rounded trailing edge, and did not use any ribs. Instead, 1/16” x 1/16” was laid over two 1/8” x 1/8” spars to create a symmetrical section. A small underfin was also used, cut from two pieces of 1/16’ sheet which had been cemented cross-grained. Another practical feature which Bowers adopted was the cementing, after assembly, of a bamboo strut to the right-hand side of the fin, to ensure that the fin remained perpendicular to the tailplane.

The tailplane itself was of elliptical planform, with ribs of 1/16” sheet. There were two spars of 1/8” x 1/8” placed one above the other at one third chord. A section with slight undercamber was employed. Although not named, it bears a strong resemblance to the wing section.

A double-bladed folding propeller was used. Again, this illustrated the traditional approach of this design, being only 16” diameter, and carved from a 2 1/8” x 1 3/4” block. This was powered by 32 strands of 1/8” rubber, 36” long.

In a further effort to create a more rugged model, Bowers double covered the fuselage with tissue, applied cross-grain. The model was covered entirely in red tissue, with ‘CANADA’ in black 3” letters on the top right wing, as well as on the lower surface of the left wing.

Plans for the model, drawn by Frank Zaic, were published in the Popular Science Monthly issue of June 1940. These plans are available through Outerzone. The Popular Science plans were re-drawn by modelling historian Peter Mann, in 1988, and his version is depicted in the accompanying three-view.


Power
32 STRANDS OF 1/16" BROWN RUBBER, 36" LONG
TOTAL DIHEDRAL
MAKE WING IN FOUR SECTIONS. CEMENT TOGETHER AFTER COMPLETION TO FORM DIHEDRAL
CUT FROM 1/8" SHEET
NOSE
TOP VIEW
1/16" SIDE THRUST
1/16" NOTCH
SPARS 1/8" SQ.
1/8" × 1/2"
Wing Construction
Stabilizer
1/8" × 3/8"
1/2" SQUARES
WINDING HOOK
SOLDERED
HOOKS AND RUBBER
DOUBLE BRACE
BIND AND CEMENT
1/8" × 3/4" LANDING GEAR FILL-INS
TWO 1/8" SQ. HARD BALSA (CEMENTED)
Fuselage Side
1/8" SQ. HARD BALSA
1/16" × 1/4" BAMBOO PEG
INSULATING TAPE
DOUBLE FILL-INS
FITS INTO FUSELAGE
1/8" SHEET
1/8" SHEET FILL-IN
LOWER RIB STRIPS NOT SHOWN
CUT FROM 1/8" SHEET
CUT FROM 1/16" SHEET
1/8" SQ.
CEMENT BAMBOO STRUT AFTER ASSEMBLY
1/2" SQUARES
DOUBLE-TISSUE COVERED CROSS GRAIN
TWO 1/8" BALSA SHEETS
HOOKS AND RUBBER
WIRE SANDWICHED BETWEEN TWO 1/8" SHEETS
1/16" DIA. WIRE
.016" BRASS PLATE
STAPLES
BENT IN
PINS
BENT OUT 1/16" WIRE
.016" BRASS, 1/2" SQ.
No. 6 WIRE SPRING
1/16" B.B.
5/16" HOLE, 3/8" DEEP
1/4" WASHER
1/16" WIRE
WIRE AND SOLDER
HOOK
ADHESIVE TAPE
Front Plug and Shaft Details
3/32" DIA. × 1/2" BRASS-TUBE BEARING
2 PIECES 1/8" SHEET
2" DIA. WHEEL
1/4" WASHERS SOLDERED
CEMENT FILLET
Wheel Details
1/2" SQUARES
CUT FROM 1/8" SHEET
SAM Speaks

Richard Morgan - Canadian National Contest Winner 1939

At the 1939 Canadian Nationals, Richard Morgan of London, Ontario, Canada won the Wakefield event with an average time of 10 minutes 39 seconds, with a best flight of 28 minutes. The design, with some modifications, was subsequently kitted by Easy Built Models, and has remained in production ever since. A continuous run of 77 years must place the kit among the leaders in longevity.

In layout, the model was a slabsider, equipped with a cabin and a twin wheel landing gear. The wing had a flat centre section, with a constant chord inner section, and semi-elliptical tips. The tailplane was of constant chord, with two end plate fins.

As kitted, the model featured longerons and spacers of 5/32” square strips. The 5/32” square strips supplied in the kit were only 18”, which necessitated splicing for the longerons to meet the basic 29 1/2” fuselage length. This short length meant that the cross-section requirement could be met by dimensions of 4 1/4” x 2”. Spacers varied in their pitch, but were generally located at 2” intervals. A hook is shown for the rear rubber anchorage, which is surprising given the almost universal adoption of a rear dowel in contemporary models. Another distinctive feature was the omission of any sheet to strengthen the nose area, save for the suggestion that double spacers be employed for this function at the nose. Three semi-circular formers were set above the first three fuselage spacers, to fair the nose into the cabin, being joined by 5/32” square stringers. The cabin was glazed, but no mention was made of the material employed. Wing mounts 7 3/8” long, of 1/8” x 1/4”, were glued to the top longerons, and drilled at each end with 1/16” diameter holes to take the ‘wing pin’, which appeared to be of wire. The main undercarriage leg was of 1/16” wire 8” long, and plugged into aluminium tubes permanently located in the fuselage, suitably splayed to give a 10” tread. A smaller diameter undercarriage reinforcing wire also plugged into the fuselage. Twin wheels of 1 5/8” were supplied, but it was suggested that 1 5/8” Trexler air wheels could be used as an alternative.

In the wing, a conventional aerofoil was employed. It was not named, but resembled an RAF 32, and featured a slight undercamber. The ribs were 1/16” sheet, and were pitched at 2”. The leading edge was 1/8” x 1/4”, while the sole spar was of 1/8” x 3/8”, located on the undersurface at one-third chord. In the tips this spar tapered to 1/8 x 1/8”. A relatively light trailing edge was used, of 1/8” x 3/8”. With a centre section chord of 5 1/8”, the total span was 44”, which gave a wing area of 209 square inches. Tip dihedral of 4” was employed, but no gussets or dihedral braces were shown at the dihedral breaks.

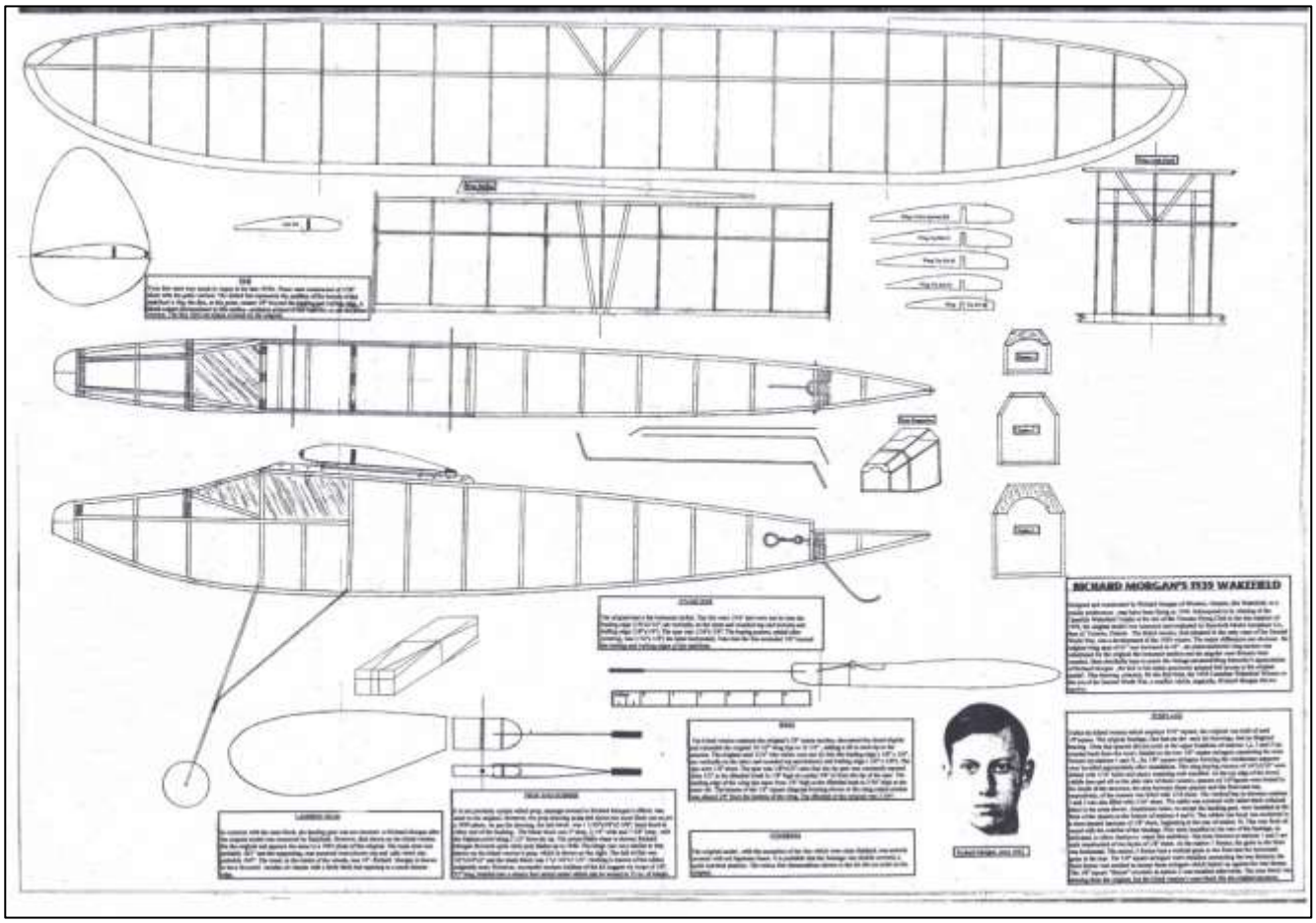
The tailplane was straightforward, with a span of 15 3/4" and a chord of 4". Basically, the same construction approach as the wing was used, being a 1/8” x 1/4” leading edge, a 1/8” x 1/4” spar set on the lower surface at one-third chord, and a 3/32” x 1/4” trailing edge. A Clark Y type section was used, with ribs of 1/16” sheet, pitched at 2”. The tailplane was attached to the fuselage by rubber bands, with these bands being anchored to pins pushed into the fuselage longerons. For keying purposes, two strips of 1/8” x 1/16” were cemented to the bottom of the tailplane after covering, to ensure accurate assembly. Twin sheet fins were attached to the tailplane tips.

Although not mentioned in the instructions, it would seem that the original kit featured a 16” double bladed propeller, as shown on the plan. No freewheeling device is shown, but the noseblock was held in by rubber bands looped around pins located in the fuselage nose. There is also a single bladed folding propeller shown on the plan, which is described as being optional. This propeller is 16” in diameter, carved from a 1” x 1 3/4” x 71/2” block, with a 1/2” x 3/4” x 2” hub. The drawing for this propeller is detailed, and includes a spring and stop, which means that the rubber band and pins noseblock system could be omitted. Although the plan indicates that the propeller could be 16-18” in diameter, the current kit offers a 12” plastic propeller.

No mention is made of any motor size, nor is any balance point indicated. Trimming was to be carried out by shifting the location of the wing. Probably the model was powered modestly, with say the equivalent of 10-12 strands of 1/4” rubber around 25” long. This amount of power, combined with the inherent stability of the design, have probably contributed to its longevity. The level of performance

would be more akin to a sports model than to a dedicated competition model, and website comments indicate that many purchasers of the kit are first-time rubber modellers.

Some fifteen years ago, the modelling effects of Richard Morgan surfaced following his death, which included remnants and details of his original model. These indicated that the Easy Built kit made a number of changes. The original model was 4” less in span, had a flat-bottomed aerofoil, angular nose formers, while the fuselage was built of 1/8” square strips, rather than 5/32” square. Plans for the original model were drawn by David Owen and a kit of The Canadian National Contest Winner is still available from Easy Built as kit FF08.



Reg T Parham (England) 1939

The 1939 Wakefield Finals held at Bendix Golf Course in New Jersey, are best remembered for the 43:29 flight of Dick Korda. This flight, the first in the contest, effectively won the event. The Great Britain Team of Bob Copland, Charles Gibson, Ronald Hill, Len Stott, Norman Lees and Reg Parham placed 4th, 5th, 7th, 11th, 12th and 17th respectively, and flew consistently without any significant long flights. Parham averaged 98.0 seconds for his placing. Most of the British models were streamlined, as opposed to the boxy approach adopted by the American modellers. Falling into the former category was Parham's model.

It had a completely circular fuselage, 34 3/32" long, with an overall diameter of 3 7/8". Instead of using wound formers, Parham made up the formers from two laminations of 1/16" sheet, cemented together with opposite grain. The wall thickness of each former was 1/4". Instead of assembling the fuselage utilising cardboard formers mounted on a central dowel, which was the standard procedure, Parham created an external jig. This was made of 1/4" sheet balsa, and profiles of the external fuselage shape were drawn on these sheets. An inner profile 1/8" smaller was then drawn, and the sheet was removed to this line. Former notches were then cut in the outer sheet, and the formers positioned. Stringers of 3/32" x 3/32" were then attached in pairs, starting with those at right angles to the jig. Sixteen stringers were required, with fourteen being fixed in position before removing the two parts of the jig, which allowed the final two stringers to be cemented. A fixed twin wheel undercarriage was fitted, comprised of tapered bamboo legs, which fitted inside paper tubes mounted in the fuselage. Wheel diameter was 2".

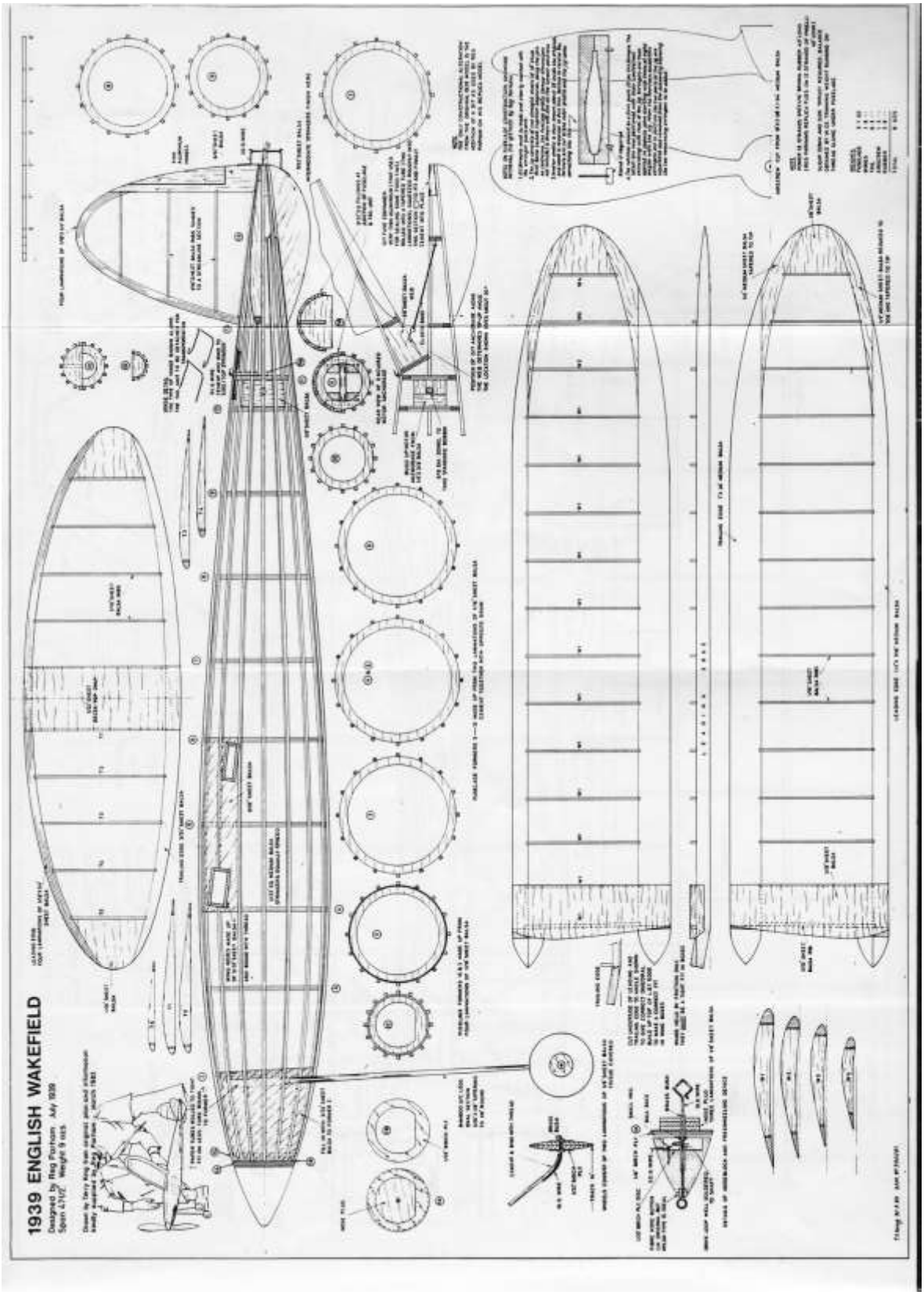
The wing was shoulder mounted, plugging into two boxes of 3/32" sheet located in the fuselage. To assist this form of location, the wings were of sparless construction, while the roots were built-up and set at the appropriate dihedral angle. The wings had a span of 47 1/2", with a root chord of 5", and were of constant chord terminating in elliptical tips. No section name was quoted, although it bears a resemblance to an NACA 6409. Ribs were of 1/16" sheet, and were pitched at 1 3/8". The leading edge was 7/16" x 1/2", with the trailing edge 1" x 1/4". Straight dihedral was employed, being 4 1/2" under each tip.

The tailplane and single fin were both of elliptical shape and sparless construction. Tailplane ribs were pitched 1 1/2", and made of 1/16" sheet with a flat-bottomed section. The leading edge of both the tailplane and fin was made from four laminations of 1/4" x 1/16", while the fin ribs of 1/16" sheet were sanded to a symmetrical section. A small adjustable tab was fitted to the fin, and there was a small underfin of 3/32" sheet fitted as well.

A twin- bladed freewheeling propeller of 18" diameter was fitted, carved from a block measuring 2" x 1 3/4". In keeping with the streamlined fuselage, it was fitted with a spinner. Power was 18 strands of 3/16" brown rubber, 40" long. During flight tests, slight downthrust and right sidethrust were required. Although no balance point was stated on the plan, with the fixed wing position it was necessary to employ a 1/4oz trimming weight, which ran along a thread running under the fuselage nose.

Weights were:		
	Fuselage	3.1
	Wings	1.6
	Tailplane	0.3
	Propeller	1.3
		6.3
	Rubber.	2.8
		9.1oz

No plan was published for the original model, but in 1983 Reg Parham built a replica of the original, and Terry King drew up a plan. The replica was faithful to the original, save for the fitting of a DT tailplane. Copies of this plan are available from Aerodyne.


1939 ENGLISH WAKEFIELD
Designed by Reg Pierson July 1939
Span 47½" Weight 9 ozs

Earl Stahl (U.S.A.) 'Gypsy' 1939

One of the best-known scale designers of the 1940's was Earl Stahl. He produced a range of designs which were well engineered and had the capacity to fly well. Apart from increases in dihedral, and tailplane size, the designs were as accurate as Stahl could make them from the information at his disposal.

However, before embarking on his scale range, he was an active contest flier, and produced a number of competitive rubber models, some of which were featured in *Model Airplane News.* He placed second in the Moffett Trophy, and in 1939 qualified for the American Wakefield Team.

The design with which he won his place on the team, was a progression from his previously published model, and featured a rectangular slabsider approach on a fuselage which was 35" long. Longerons and spacers were 1/8" x 1/8", with a typical spacer pitch of 2". A celluloid cabin was fitted to the fuselage, and this was faired down to the noseblock with three stringers of 3/32" x 3/32". A twin leg wire undercarriage of 1/16" wire 6 1/4" long was attached to the lower fuselage just forward of the wing leading edge, and was fitted with 1 3/4" wheels. In keeping with earlier traditions, the tail end of the fuselage, aft of the rear motor tube, was a separate component. This was held on by rubber bands and housed the fin, underfin and tailplane. Undoubtedly this separation was provided to allow rear winding. The single fin featured a straight leading edge, and was combined with a curved trailing edge of sheet. It had a structure of 1/8" x 1/8", while the ribs were enhanced by strips of 1/8" x 1/16" which was subsequently sanded to a streamlined section. The wing was mounted on top of the fuselage above the cabin, and v-section formers were provided in the fuselage top to allow a neat seating.

The wing itself was of 44" span, while the inner section chord was 4 3/4". A polyhedral layout was adopted, with a constant chord inner section, which merged into curved tips made from sheet. No name was given to the wing section employed, but it resembled an NACA 6412. Ribs were of 1/16" sheet, pitched at 2", and multi-spar construction was employed with 3/32" x 3/32" spars. Three were on the top surface of the wing, and two on the undersurface. For the period, substantial dihedral was recommended, with 1 3/4"at the inner break, and 5 3/4" at the tip.

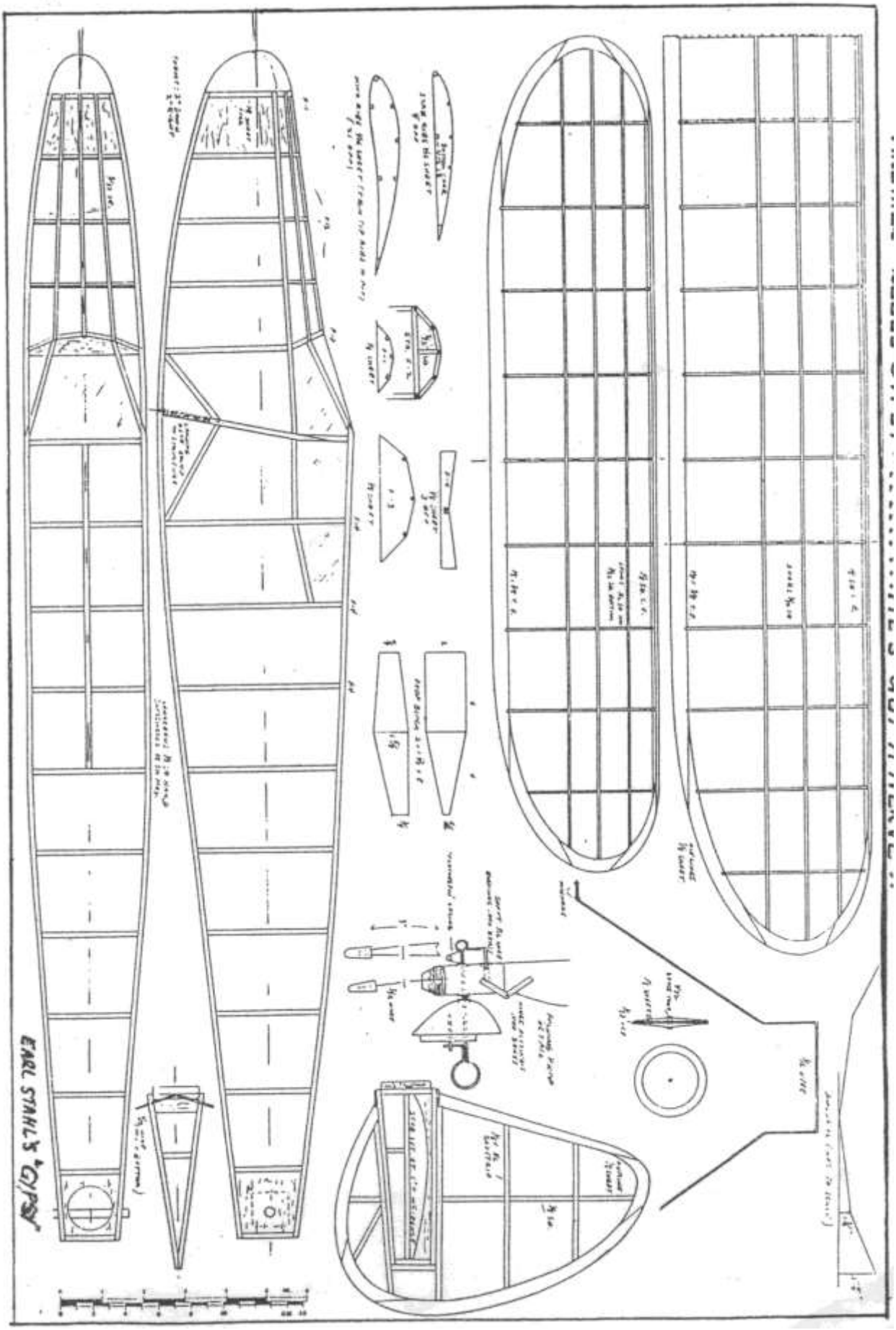
The tailplane followed the wing planform, and 1/16" ribs were again utilised, with a thinned Clark Y type section. Multi-spar construction was again employed, with three spars of 1/16" x 1/16" on the top surface, and a single spar of 3/32" x 3/32" on the bottom surface.

A single bladed folding propeller of 18" diameter, carved from a 2" x 1 5/8" block, was employed. This was powered by 18-20 strands of 3/16" brown rubber, 36" long. The flight pattern was right/right. This was obtained by off-setting the fin 1/16", and controlling the power flight by side and downthrust. The glide was adjusted by shifting the position of the wing, and no balance point was quoted.

At the 1939 Wakefield Finals held at Bendix, New Jersey, Stahl was not able to attend, and his model was proxy flown by Ted Just. The model averaged 20.3 seconds, and placed 28th, or second to last. A broken motor, which destroyed the model, prevented a full complement of flights being achieved.

Plans for the model were published by *Flying Aces* in their September 1942 issue. Over the years a number of full-size plans have been produced, including one by Terry King in 1982, and another by Bob Jones in 1994. In the latter plan Bob has shown two tailplanes, as the original published plan was oversize to the 33% Wakefield specification. Bob's amended drawing provides an area of 65 square inches against a maximum permitted area of 65.3 square inches. This plan is available from Mike Woodhouse at Free Flight Supplies, and Belair offer a short kit to match the plan.

This was Stahl's last published Wakefield design, and he went on to a successful career with NACA/NASA working with them for 41 years.


EARL STAHL'S "GYPSY"

Gene Chaille (U.S.A.) 1939

In the 1930's, and in the years immediately prior to the United States of America's entry into the Second World War, there is little doubt that *Air Trails* was the leading magazine for the publication of successful competition model aircraft. While other magazines published the occasional competition winner, *Air Trails* did so on a consistent basis, and provided an excellent record of the progress which occurred during a rapidly evolving period.

In December 1938 *Air Trails* published plans for the 1938 Moffett Trophy Winner, flown by Roy Nelder of Canada. The plans were for a conventional slab-sided fuselage, with the wings placed on a low parasol and fitted with a double-bladed freewheeling propeller. The design proceeded to be very popular, and was widely produced. In New Zealand, it even held the New Zealand Wakefield record for a short period immediately post-war.

In 1939, Gene Chaille from Miami, Florida placed top in the United States of America's Wakefield Eliminations, flying a variant of Nelder's Moffett Winner, and as a result of this placing, was appointed Team Captain. Chaille was aged only 16 at the time of his appointment, and took precedence over more experienced team members, such as Dick Korda.

Some months after the Eliminations, which were held in Detroit from July 5-9, and were followed by the Finals at Bendix, New Jersey on 6 August 1939, *Air Trails* published the plans for Chaille's 'Elimination Winner' in their March 1940 issue. The accompanying article gave credit for the origin of the design to Nelder, but claimed that it had been subsequently updated. The updating consisted principally of substituting a single bladed folding propeller for the freewheeling propeller used by Nelder, with the shape of other components remaining the same, but with structural changes.

The wing was of 47" span, with a constant 5" chord inner panel, combined with elliptical outer panels. Generous dihedral was employed, with 1 1/2" at the inner break and 6" at the tip. Although the name of the wing section was not quoted, it bore a resemblance to the RAF 32, and a multi-spar approach was adopted, with five spars of 1/8" x 1/8". Ribs were of 1/16" sheet, and Chaille incorporated additional ribs by comparison with Nelder, using nine ribs pitched at 1 9/16" for the inner section in place of Nelder's eight at 1 3/4", while the tip panels utilised seven ribs, rather than the six employed by Nelder. Apart from the main inner section rib, which was illustrated, all other ribs had to be inferred. Chaille used a 1/8" x 1/8" leading edge in place of the 3/16" x 3/16" utilised by Nelder. Nelder also used a detachable tail which Chaille did not embrace.

The two fuselages were identical in shape, dimensions and structure. All longerons and spacers were 1/8" x 1/8". However, there was some uncertainty regarding the sheeting to the front of the fuselage. While the Chaille plan quotes 1/20" sheet, the accompanying text states 1/32" sheet, which is the same as Nelder. Two other changes Chaille made, were to substitute balsa for bamboo on the wing mount runners, while he used single wire struts for the undercarriage, as opposed to the dual bamboo/wire approach employed by Nelder. Chaille also set his wing further aft than did Nelder.

With the tailplane Chaille used the same planform, but reduced the span by 1/2". He also used 1/32" sheet ribs, in place of Nelder's 1/16" sheet ribs, but otherwise retained the same structure, with a 1/8" x 1/8" leading edge, and five spars of 3/32" x 3/32".

The fin was identical in shape for both models, with a similar structure, but Chaille substituted a 1/8" x 1/8" leading edge for Nelder's 1/8" x 3/16", and reduced the number of ribs by one.

But the biggest change related to the propeller, where Chaille employed a s single bladed folding propeller, carved from a block measuring 10" x 2" x 1 5/8", to give a propeller of 17" diameter. This was dramatically different from Nelder's 18" diameter freewheeler, and reflected Cahill's 1938 Wakefield Finals win in France with the single bladed folder 'Clodhopper'.

Chaille was a trifle vague about the rubber requirement, suggesting that power was dependent on a particular model, but twenty-eight strands of 1/8" flat was suggested for initial trimming. If the climb was

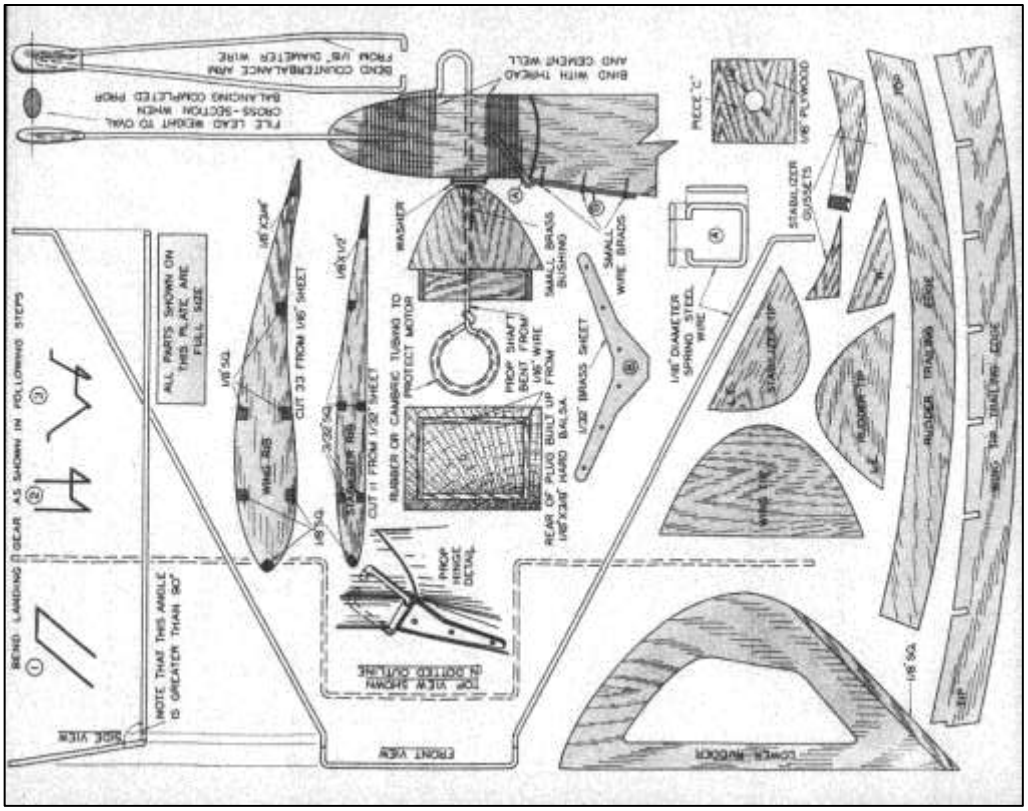
not satisfactory, Chaille thought that another two strands could be added. He did not mention the length of motor required, but around 36” could well have been used.

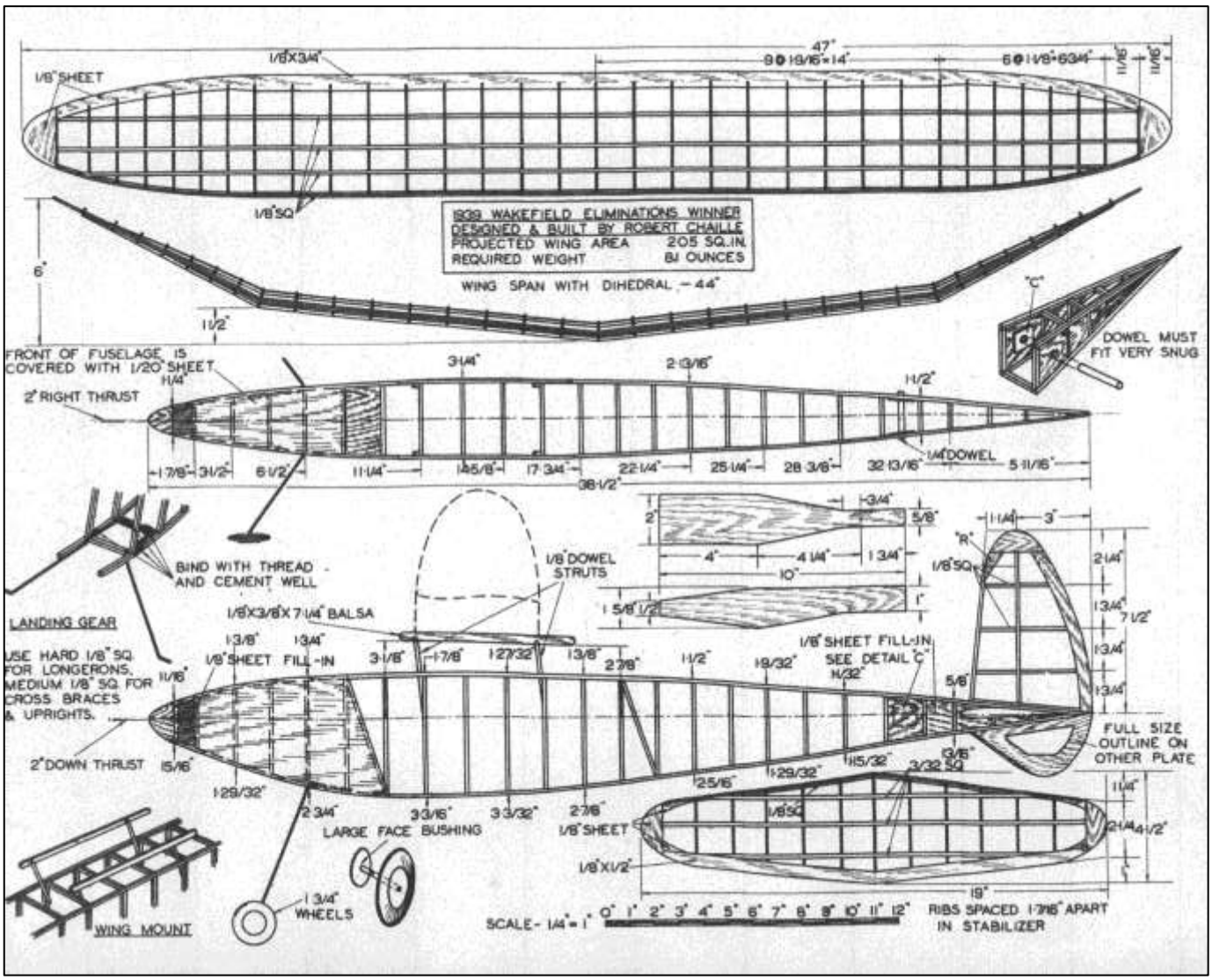
In the instructions accompanying the plan, Chaille gave, for the time, comprehensive flying instructions. After initial trimming, for maximum performance he recommended placing the wing as far forward as possible, then removing a little incidence to compensate, which would result in a better climb without stalling, but retaining the glide. Chaille also gave an interesting description of his tactical flying at the Wakefield Eliminations. By American standards, major thermal flights were uncommon, so Chaille adjusted his model to fly straight under power, rather than its normal circling pattern. Beyond the perimeter of the airport lay two sealed roads, and Chaille pointed his model towards them on each flight. The model flew past the airport boundary, and started gliding in circles over the roads. Weak thermals developed from the roads, which the model utilised, resulting in an average of over eight minutes, and top place in the Wakefield Team.

At the Wakefield Finals, Chaille's model was damaged while en route to the contest, which necessitated repairs to the fin. These were carried out satisfactorily, and the model recorded 421.5 seconds in the first round. The second round produced a flight of only 58 seconds, while no third-round flight score was recorded. These flights gave an average of 159.8 seconds, and 6th place overall. Chaille was second in the U.S.A. Team after Korda.

The 1939 Wakefield Finals were Chaille’s sole opportunity to fly in an international contest. In Europe the clouds of war were developing, and Chaille commenced pilot training, eventually progressing to multis. He joined the United States Army Air Force and flew 27 combat missions over Europe in B-24’s, earning the Distinguished Flying Cross and Air Medal.

After the war, Chaille joined Eastern Airlines and retired in 1982 after flying the Martin 202 and 404, Convair 240, 340 and 440, DC6, Constellation, Electra and finally the Tri-Star. In retirement he returned to Florida, and flew R/C sailplanes into his 90’s.
Duplicating his success in 1938, Nelder won the Moffett Trophy again in 1940. His model was a development of the 1938 design, and incorporated a number of changes which Chaille had introduced, most notably the single bladed folder and the wire undercarriage. *Air Trails* again published this design, and even offered it as a full size plan. This plan is available through the A.M.A. Plan Service, while Easy-Built currently offer a kit set for this design. However, notwithstanding its success in Nelder’s hands, nobody else has been able to fly it consistently. For this reason, it has never figured prominently in SAM contests, and today is seldom seen.


BEND LANDING GEAR AS SHOWN IN FOLLOWING STEPS
ALL PARTS SHOWN ON THIS PLATE ARE FULL SIZE
NOTE THAT THIS ANGLE IS GREATER THAN 90°
SIDE VIEW
FRONT VIEW
TOP VIEW SHOWN IN DOTTED OUTLINE
WING TIP
CUT 33 FROM 1/16" SHEET
CUT 11 FROM 1/32" SHEET
RUBBER OR CAMBRIC TUBING TO PROTECT MOTOR
PROP SHAFT BENT FROM 1/16" WIRE
REAR OF PLUG BUILT UP FROM 1/16"X3/8" HARD BALSA
PROP HINGE DETAIL
WASHER
SMALL BRASS BUSHING
SMALL WIRE BRADS
1/32" BRASS SHEET
1/16" DIAMETER SPRING STEEL WIRE
STABILIZER GUSSETS
1/16" PLYWOOD
PIECE "C"
STABILIZER TIP
RUDDER TIP
RUDDER TRAILING EDGE
STABILIZER TRAILING EDGE
LOWER RUDDER
FILE LEAD WEIGHT TO OVAL CROSS-SECTION WHEN BALANCING COMPLETED PROP
BEND COUNTERBALANCE ARM FROM 1/8" DIAMETER WIRE
BIND WITH THREAD AND CEMENT WELL


1/8"X3/4"
1/8" SHEET
1/8" SQ
1939 WAKEFIELD ELIMINATIONS WINNER
DESIGNED & BUILT BY ROBERT CHAILLE
PROJECTED WING AREA 205 SQ.IN.
REQUIRED WEIGHT 8½ OUNCES
WING SPAN WITH DIHEDRAL – 44"
FRONT OF FUSELAGE IS COVERED WITH 1/20" SHEET
2" RIGHT THRUST
1/4" DOWEL
DOWEL MUST FIT VERY SNUG
BIND WITH THREAD AND CEMENT WELL
1/8" DOWEL STRUTS
1/8"X3/8"X7 1/4" BALSA
LANDING GEAR
USE HARD 1/8" SQ FOR LONGERONS, MEDIUM 1/8" SQ FOR CROSS BRACES & UPRIGHTS.
1/8" SHEET FILL-IN
1/8" SHEET FILL-IN SEE DETAIL "C"
2" DOWN THRUST
FULL SIZE OUTLINE ON OTHER PLATE
LARGE FACE BUSHING
1/8" SHEET
1/8"X1/2"
1 3/4" WHEELS
WING MOUNT
SCALE- 1/4" = 1"
RIBS SPACED 1 7/16" APART IN STABILIZER

B. Snyder – Super Snooper 1940

In the years prior to 1950 many manufacturers around the world produced kits for Wakefields. Examples in the United States included Cleveland with their 'Gull'; Burd for the '1937 Korda': Megow for the '1939 Korda Winner'; while in the U.K., Halfax had the 'Jaguar' and 'Flying Minutes; Keilkraft marketed Bill Dean's 'Contestor' and 'Gypsy'; and Premier kitted Bob Copland's 'GB3' and 'Masterplane'. Wakefields were then part of mainstream modelling activities, and sales probably justified the manufacturing and marketing efforts which were involved in producing a kit.

Not all kits were of contest winners (although this helped), with looks and stability being factors in the choice to proceed. One design which fitted into this category was the 'Super Snooper', which was designed by Barney Snyder and kitted by Modelcraft in the early 1940's. Modelcraft was a Californian firm, based in Los Angeles, and it ran advertisements in the national modelling magazines. One example was the June 1941 issue of Model Airplane News, which featured a Modelcraft advertisement that included the 'Super Snooper', offered for the sum of $1.50.

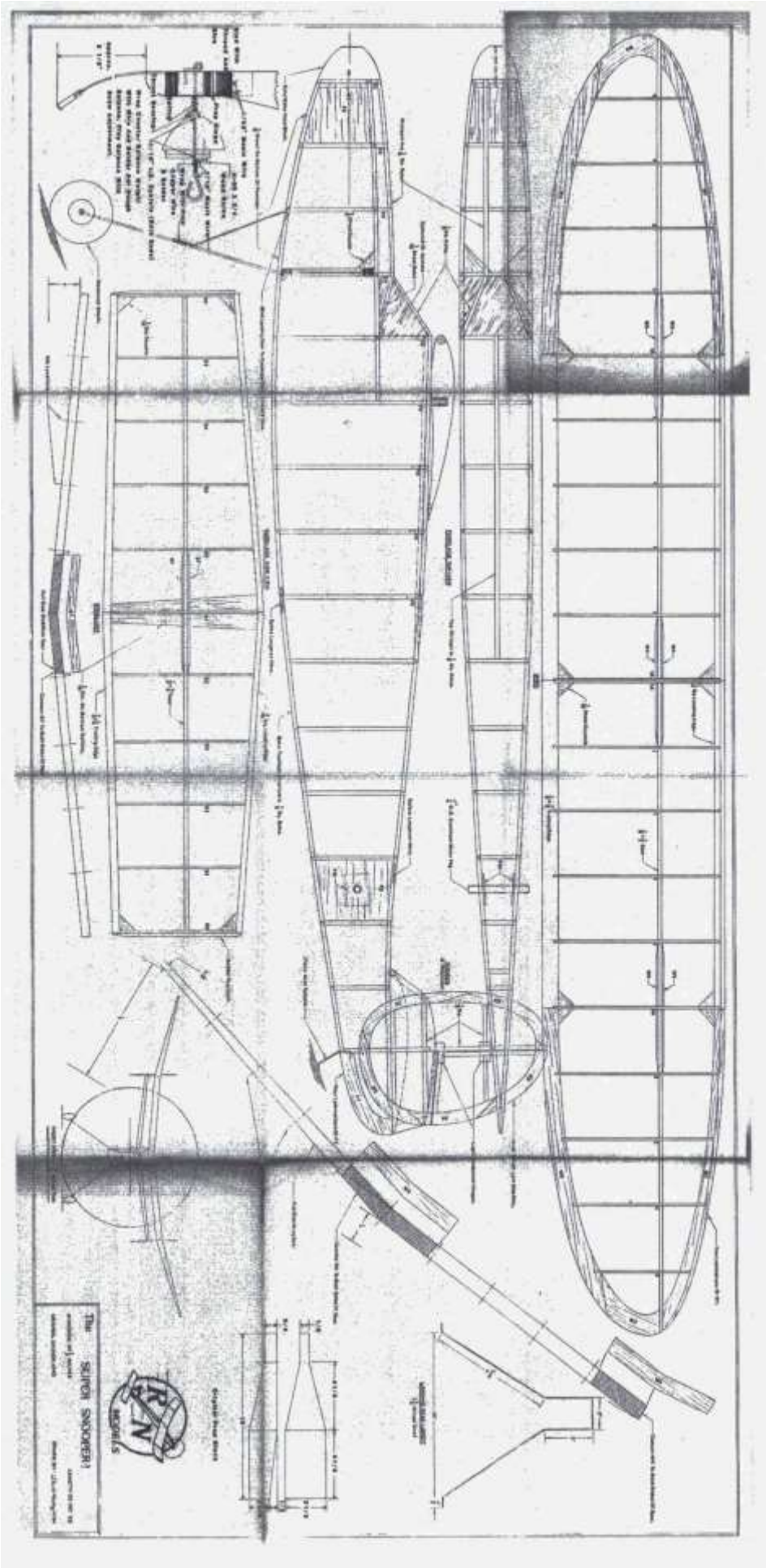
The 'Super Snooper' was a conventionally proportioned model, with a span of 40 1/2", and a length of 35". The fuselage was of rectangular shape, with the basic structure comprising 1/8" x 1/8". It incorporated a small cabin, glazed with celluloid, which was faired into the upper nose block with stringers on the top surface of the fuselage. Aft of the cabin, V-section formers were employed to give the wing a secure mounting. A twin leg fixed undercarriage was fitted, constructed out of 1/16" wire.

The polyhedral wing sat on top of the fuselage, and featured constant chord inner panels, while the outer panels employed semi-elliptical tips. While not specified on the plan, the wing section appears to be RAF 32. Structurally, the ribs were of 1/16" sheet, with the leading edge being a massive 1/4" square set diagonally, and the sole spar of 1/8" x 1/2" was located at approximately one third chord on the lower surface.

The tailplane also utilized 1/16" ribs, another solid leading edge of 3/16" square, and a single lower spar of 1/8" x 1/4". While the trailing edge was almost straight, the leading edge was swept back slightly, and one inch of dihedral was incorporated. Built up twin fins, mounted vertically, were attached to the tip ribs of the tailplane.

A single bladed folding propeller was used of 18" diameter, and was carved from a 2 1/2" x 1 3/4" block. No rubber size was mentioned on the plan, but could have been included in separate instructions. Overall, the design appears to be sensibly proportioned, with an equally sensible structure. It also appears that it should be stable, and would climb positively with the specified propeller

I have never seen one in the flesh, but over the years the design has placed consistently in SAM events. Perhaps some indication of its potential may be gauged by the reinstatement of the design in kit production after the demise of Modelcraft. In the late 1980's RN Models produced a kit complete with newly redrawn plans and printed wood. Being placed back into production after fifty years is not a bad recommendation for any design.



Norman Blacklock - Gutteridge Trophy Winner 1940

In the early years of the SAM movement in England, one of the popular designs flown initially was Norman Blacklock's Gutteridge Winner 1940. The model had been published in *Aeromodeller* as an early addition to their plans range, being drafted by A.H. Smith and printed as a dye-line. The design featured a slabsided fuselage, complete with a twin-legged wire undercarriage, parasol wing mounting, single fin and a single bladed folding propeller. In many respects it mirrored contemporary developments in the United States, and bore a resemblance to the Canadian Roy Nelder's designs which had performed successfully in American competitions. After the initial flush of activity with the design, interest has diminished and it is no longer flown widely. However, as a design which is sensibly proportioned with a balanced structure, it is worthy of consideration as a competitive model for Old – Timer events.

The fuselage had an overall length of 34 1/2" to the nose block, with a maximum cross-section of 4 3/4" x 3". It was constructed entirely of 1/8" x 1/8" hard strips, with an average spacer pitch of 2". The wing was set 1 1/2" above the fuselage on a mount of 5/16" x 1/8" hard balsa using 1/2" lap joints, with additional diagonal spacers to provide support at sheer points. The 16g wire undercarriage was permanently fixed to the bottom of the fuselage, comprising legs 6 1/2" long set at 10" tread with 2" balsa wheels.

The name of the wing section was not specified but it was a conventional under cambered section similar to the RAF 32, with the ribs being of 1/32" sheet. A non-standard leading edge size of 1/4" x 5/16" was specified, together with a single spar of 1/8" x 3/8", situated on the lower rib surface. Polyhedral was employed, and the tip was quite low at only 3", with 3/4" at the inner dihedral break. The centre section had a constant chord of 5.4", while the tips terminated in a semi-symmetrical shape built up from 3/16" sheet. Ribs were pitched at 1 1/4", and utilised 1/16" sheet at the dihedral breaks, being doubled at the outer breaks. Braces were also used at each break, being of 1mm ply at the leading edge, and 1/8" balsa at the spar and trailing edge. The wing span was 41 3/4".

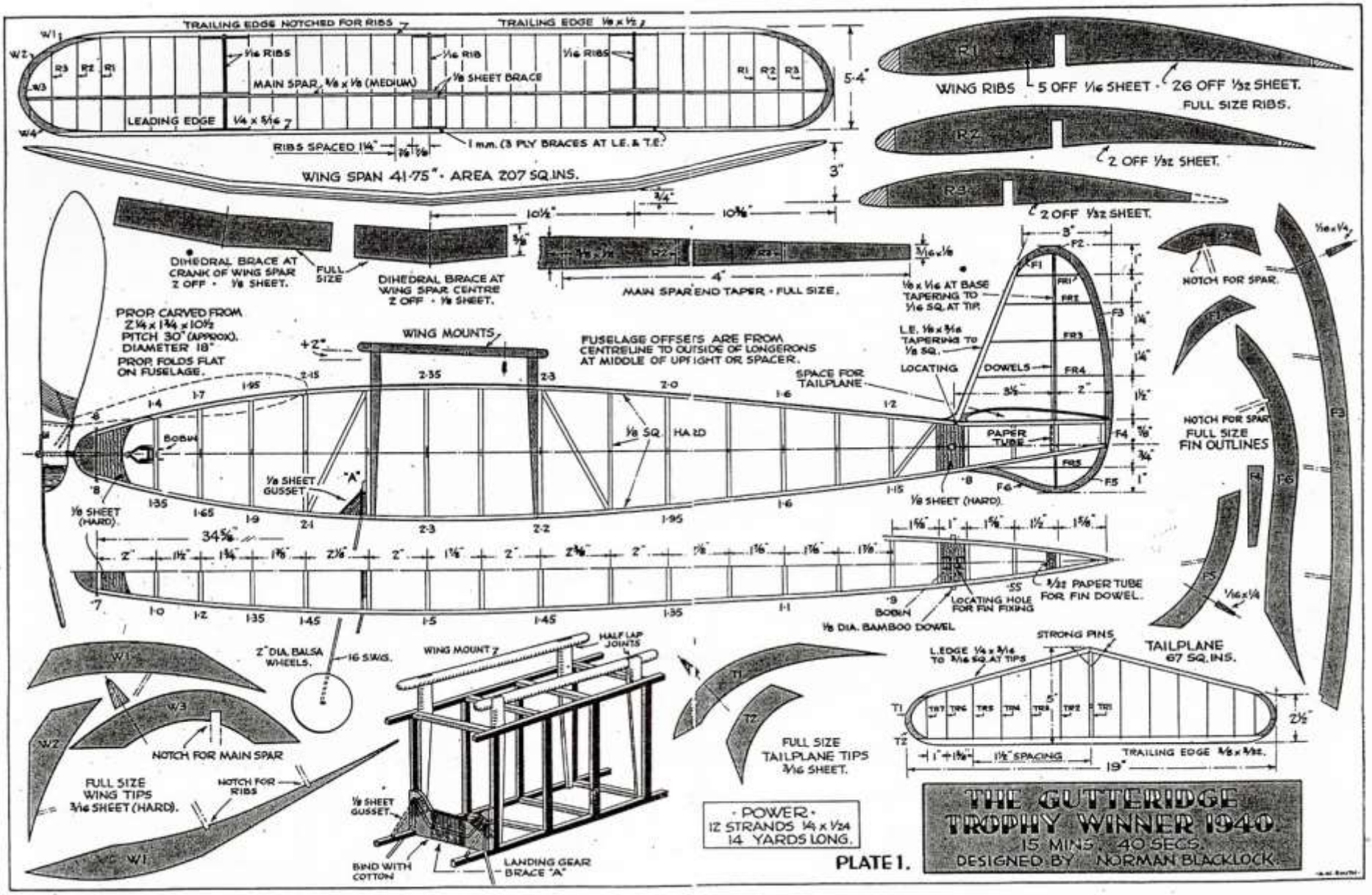
By contrast with the wing, the tailplane was of sparless construction, with a swept back leading edge, and a straight trailing edge. Ribs were of 1/32" sheet, and of the usual Clark Y type section.

A single removeable upper fin was employed, with 1/32" ribs of symmetrical section, held by a dowel which plugged into a paper tube located in the rear of the fuselage. The single fin spar tapered from 1/8" x 1/16" at the base to 1/16" square at the tip. A small under fin completed the three-point ROG requirement.

The propeller was a single bladed folder of 18" diameter and approximately 30" pitch. It was carved from a 2 1/4"x 1 3/4" x 10 1/2" block, but no diagram of this block was supplied. However, a sketch was supplied of the hinge, which was skewed to allow folding on top of the fuselage. Power was 12 strands of 1/4" x 1/24" rubber 14 yards long, which provided a strand length of 42". No balance point for the model was quoted on the plan, but the wing mount allowed a limited movement in wing position, which could have been required as the balance point of the rubber motor was 1" behind the trailing edge of the wing.

As the plan was an early addition to the *Aeromodeller* plans range, it is sparse on detail in several areas. For example, no dimensioned propeller is included; probably the wing main spar was tapered towards the tip, and some gussets could have been excluded. But the overall design approach looks sound, and should produce a well-flying model. Plans are available through the David Baker Heritage Library.

The design was published in the July 1941 *Aeromodeller* and featured on the cover with a Rupert Moore painting. This showed a red fuselage, while the wing, tailplane and fin were yellow. The rest of the painting is virtually a cartoon, as it depicts a modeller holding the model while striding along wearing short shorts, and with a cigarette dangling from his lips. There was no text accompanying the plan, which was most unusual, but wartime *Aeromodellers* were produced under difficult conditions.


TRAILING EDGE NOTCHED FOR RIBS
TRAILING EDGE 1/8 x 1/2
1/16 RIBS
1/16 RIB
1/16 RIBS
MAIN SPAR 1/8 x 1/8 (MEDIUM)
1/8 SHEET BRACE
LEADING EDGE 1/4 x 5/16
RIBS SPACED 1 1/4"
1 mm. (3 PLY BRACES AT L.E. & T.E.)
WING SPAN 41·75" · AREA 207 SQ.INS.
5·4"
3"
WING RIBS 5 OFF 1/16 SHEET · 26 OFF 1/32 SHEET.
FULL SIZE RIBS.
2 OFF 1/32 SHEET.
2 OFF 1/32 SHEET.
DIHEDRAL BRACE AT CRANK OF WING SPAR 2 OFF · 1/8 SHEET.
FULL SIZE
DIHEDRAL BRACE AT WING SPAR CENTRE 2 OFF · 1/8 SHEET.
MAIN SPAR END TAPER · FULL SIZE.
1/8 x 1/16 AT BASE TAPERING TO 1/16 SQ. AT TIP.
L.E. 1/8 x 5/16 TAPERING TO 1/8 SQ.
NOTCH FOR SPAR.
PROP CARVED FROM 2 1/4 x 1 3/4 x 10 1/2
PITCH 30" (APPROX).
DIAMETER 18"
PROP FOLDS FLAT ON FUSELAGE.
WING MOUNTS
FUSELAGE OFFSETS ARE FROM CENTRELINE TO OUTSIDE OF LONGERONS AT MIDDLE OF UPRIGHT OR SPACER.
SPACE FOR TAILPLANE
LOCATING DOWELS
PAPER TUBE
BOBIN
1/8 SQ. HARD
1/8 SHEET GUSSET
1/8 SHEET (HARD).
1/8 SHEET (HARD).
NOTCH FOR SPAR
FULL SIZE FIN OUTLINES
34 5/8"
8/32 PAPER TUBE FOR FIN DOWEL.
LOCATING HOLE FOR FIN FIXING
1/8 DIA. BAMBOO DOWEL
2" DIA. BALSA WHEELS.
16 S.W.G.
WING MOUNT
HALF LAP JOINTS
NOTCH FOR MAIN SPAR
FULL SIZE WING TIPS 3/16 SHEET (HARD).
NOTCH FOR RIBS
1/8 SHEET GUSSET
BIND WITH COTTON
LANDING GEAR BRACE "A"
FULL SIZE TAILPLANE TIPS 3/16 SHEET.
STRONG PINS
L.EDGE 1/4 x 3/16 TO 3/16 SQ. AT TIPS
TAILPLANE 67 SQ.INS.
TRAILING EDGE 3/8 x 3/32.
19"
· POWER ·
12 STRANDS 1/4 x 1/24
14 YARDS LONG.
PLATE 1.
THE GUTTERIDGE TROPHY WINNER 1940.
15 MINS. 40 SECS.
DESIGNED BY NORMAN BLACKLOCK.

Jim Adams - Excaliber (U.S.A.) 1941.

One of the leading figures in the early SAM movement in the United States was Jim Adams, who in his later years lived in Santa Ana, California. Jim was in fact President of SAM during the early 1990's. In his working life Jim had been an engineer with North American Aviation, and one of the early projects he worked on was the B25 or Mitchell. Stability problems caused difficulties with the initial design, and Jim's design team recommended that the wing position be lowered, combined with a cranked wing as a temporary expedient. The new combination was immediately successful, and stayed with the design for the remainder of the production run.

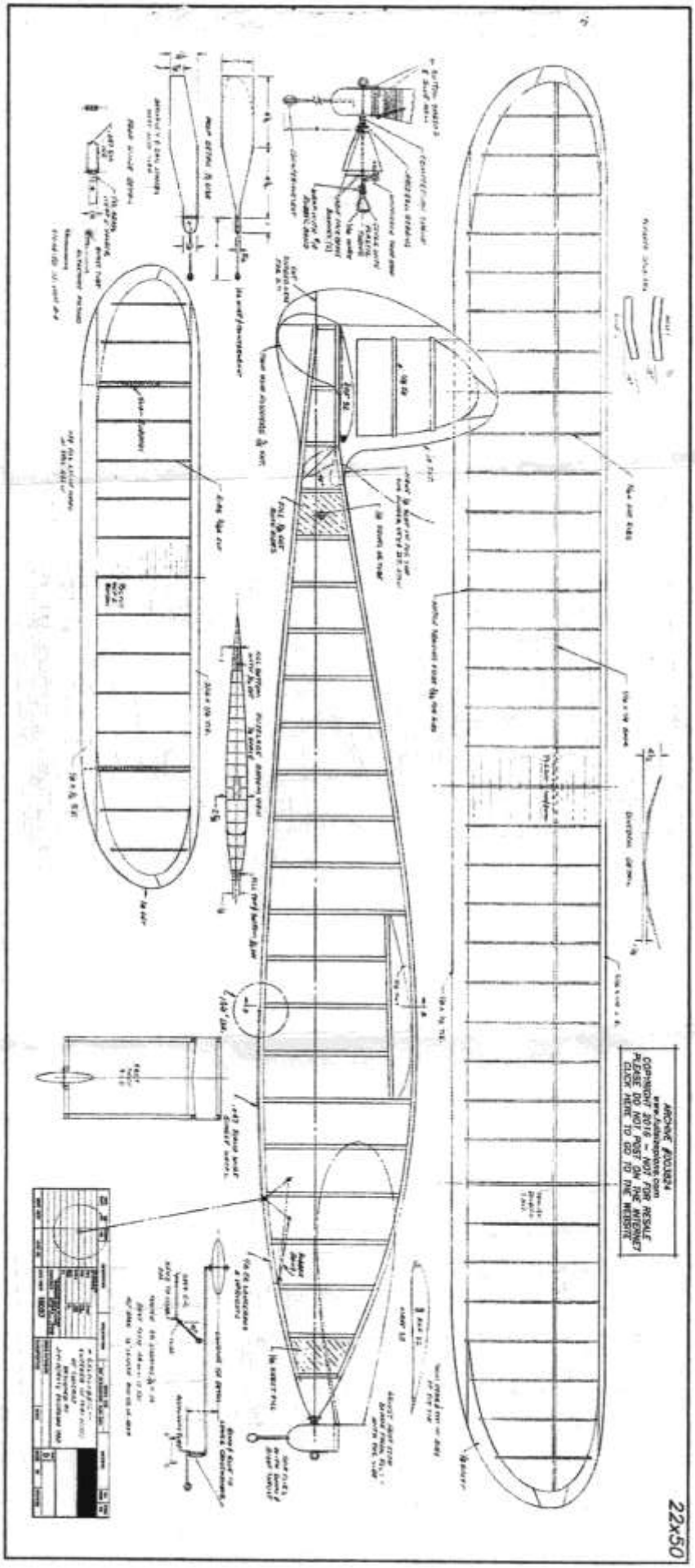
Jim modelled actively in the pre-war period, and in 1941 attended the Chicago Nationals. He took with him his own design Wakefield, the 'Excaliber' (sic), and while this design did not place high at the Nationals, the model had a pleasing performance and Jim was happy to redraw the plan nearly 50 years later. For its day the design was very advanced, but it has never attracted major attention, mainly because it has not been widely circulated. The fuselage was a straightforward rectangular box constructed entirely of 1/8" x 1/8". In an effort to gain as much advantage as possible from the then current rules, the wing was mounted in a shoulder position, and slotted through the fuselage. Although the wing centre section which slotted through the fuselage was covered with 1/32" sheet, the method adopted for the mounting would appear to be a weak point and a potential source of damage in the event of a heavy landing. The retracting undercarriage consisted of a single wire leg terminating in a 1 3/4" diameter wheel. This leg was of relatively light .047 piano wire, and obviously used pre-war quality wire. When retracted, half the wheel still protruded beneath the fuselage, and would have provided protection for the bottom of the fuselage when the model glided in.

The wing was of 200 square inches in area, with polyhedral, and had a span of 46", while the inner section constant chord was 4 7/8". Tips were semi-elliptical. An RAF 32 wing section was employed, utilizing 1/16" sheet ribs and a single internal spar of 1/16" x 1/4".

The tailplane was of similar planform to the wing tips, and was of sparless construction. An RAF 32 section was also employed for the tailplane, while two 1/16" sheet sub-rudders were attached to the undersurface at two-thirds chord. Ribs were of 3/64" sheet, and the necessity of using light wood for the tail assembly was stressed. A single fin of built-up flat-plate construction was employed, and this faired into an underfin, which combined with the twin sub-rudders on the tailplane to provide the three-point take-off requirement.

A single-bladed folding propeller of 18" diameter was carved from a 2" x 1 3/4" block, and this was powered by a motor consisting of 28 strands of 1/8", 34" long. No balance point was specified, but it was suggested that both side and down thrust would be required.

Apart from concerns about the wing mounting with its potential to cause damage, the remainder of the design is very practical, and merits consideration as a pre-1950 8oz Wakefield competitor.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Ron Warring – Elite No. 3 1944

During the 1940's, particularly during the Second World War, it was not uncommon because of building material scarcity, for modellers to design models with a dual purpose in mind. Generally, such designs could be flown as either a towline glider or as a rubber model. Conversion was relatively simple, with the propeller and rubber motor being removed, and a weighted noseblock used instead. A late example of such an approach was the GH27B, designed by G.W.W. Harris and published in the January 1948 *Aeromodeller,* which could be flown either as a Wakefield or as a towline glider. Such an approach would lead to inevitable compromise, in that neither configuration would be optimized, but as a solution to scarce resources, the approach had merit.

Another example of the genre came from R.H. Warring in the form of the 'Elite No. 3 Glider', from Elite Model Airplane Supplies, and described as a convertible Wakefield/Glider. The plan is not dated, but Elite advertised consistently in *Aeromodeller,* with the first advertisement being in April 1944 for the plan and cut out ribs at 5/6 post free.

The fuselage was only 32" overall in length, and circular in shape, with a maximum diameter of 3 !/2". It was constructed on circular cardboard formers, which were threaded on to a round rod and then arranged in the correct position. The actual formers were wound around the card formers, scarf jointed and then strongly cemented. Contemporary best practice among contest Wakefields of this era, was to wind layers of 1/8" x 1/32" balsa around cardboard formers, but in this kit the formers were 1/8' x 1/16" hardwood, which were soaked in water for about two hours before winding on the card. Next 16 g. wire wing mounts were added to formers 5 and 7. The wing was located in a shoulder position. These mounts were hexagonal in shape, and were thread bound at six points to the formers ensuring that the wing incidence was correct. Full size drawings of the formers were supplied, to ensure that the geometry of each mount was accurate. At this stage, sixteen equally spaced stringers of 1/16" x 1/16" were added, cemented to the outer faces of the formers. Finally, details such as undercarriage tubes, nose formers, rear rubber anchorage and root ribs were affixed. Twin bamboo legs with 2" wheels were specified, but there was no indication as to where they should be fitted.

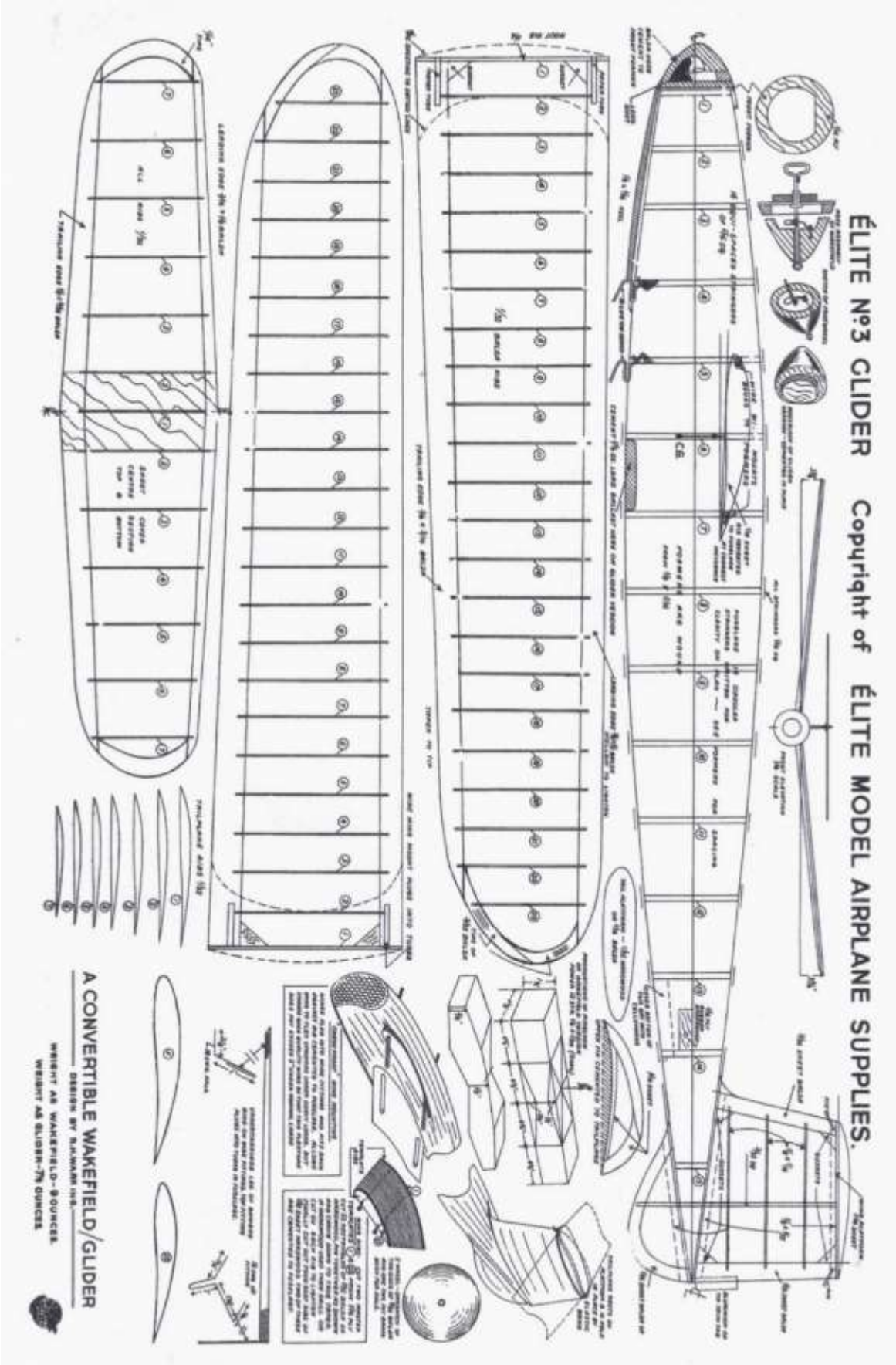
The wings were of a relatively high aspect ratio, with a span of 49", although advertised at 45", and with a root chord of 5". They were of a straight dihedral and tapered, with all the taper being on the trailing edge. Although not named, the wing section approximated a Davis, and the 1" spaced ribs were of 1/32" sheet balsa, constructed by the sandwich method. However, at the builder's discretion, hardwood could be employed. If that option was exercised, it was suggested that the ribs be drilled or cut out to lighten them. The trailing edge was 3/4" x 3/16" tapered to the tip, although the amount of taper was not specified. The leading edge was 5/8" x 1/2", hollowed to lighten. No spars were employed in the wing, which had rounded tips. Paper tubes were cemented to the top surfaces of the leading and trailing edges into which the wire wing mounts were plugged. Although a static dihedral of 3 ¾" was suggested, the 'crash-proof' wing mounting allowed the wing to flex up under heavy loads. Good quality wire was suggested to limit the flexure to under 2".

A single fin, 3 1/2" high at the mid-point, was shown. This was of a flat-plate structure, with ribs of 1/8" x 1/16". A platform was fitted on top of the fin, as a mounting for the tailplane, which like the wing, was of sparless construction. Both the leading and trailing edge of the tailplane were tapered, and the tips were rounded, with a flat-bottomed section being employed. There was also a small underfin.

An 18" double bladed freewheeling propeller was used, carved from a 1 3/4" x 1 7/8" block. The propeller faired into a spinner, with an internal freewheel mechanism. This propeller was driven by 3 ounces of 1/4" rubber, made up into 12 strands. Overall weight was quoted at 9 ounces, which implies a structural weight of 6 ounces. A balance point 2" aft of the leading edge was shown, which corresponded with about one third of the rubber model length, much further forward than usual and no doubt caused by the dual identity carried.

Photographs of the model as a glider in the *Aeromodeller* advertisements, indicate an attractive appearance. No mention was made in the advertisements that the model could be flown on rubber power. The design was a product of its times, and in 1944 supplies of balsa were very scarce, hence

the suggestion of alternatives. With a complete adoption of balsa construction, and a substitution of balsa wing boxes for the suggested wire mountings, a significant reduction in weight would have been possible.



*GH 20 – G.W.W. Harris (U.K.) 1944

The June 1944 issue of *Aeromodeller* carried its usual cover painting by C.Rupert Moore, and featured a rubber model climbing away from a grassy field, with few trees in sight. This model was the 'GH 20', designed by G.W.W. Harris, featured on pp.352-3, and the plan was published full size in the Aeromodeller Plans Service. As depicted in Moore's painting, the model was all white, save for the noseblock, wheels and a stripe down the fuselage side, which were all red. The painting itself was more realistic than some of Moore's earlier efforts, some of which could be almost classified as cartoons.

Harris built the original 'GH 20' in 1942, producing a simple and straightforward design which was strong and reliable. As 1942 was the middle of the Second World War, such an approach was not surprising, with modelling materials becoming progressively more difficult to obtain. After initial success in local contests, Harris won the national 1943 M.E. No. 2 Cup on two flights only, with the second being O.O.S. His time for the event was 624.6 seconds, and he was some 117 seconds ahead of the second-place getter.

The fuselage was a slabsider, with the basic structure being 32 1/4" long. This dimension included a separate, detachable tailboom, into which the tailplane and fin plugged. Longerons were an extremely uncommon dimension of 5/32" x 1/8". This was not a size which was normally available on a commercial basis, and would imply that Harris stripped the longerons himself from 1/8" sheet. Spacers were the more normal dimension of 1/8" x 1/8", and were pitched at 2" intervals, with additional diagonal bracing extending from the nose to the front wing mounting. A twin legged detachable 16g wire undercarriage was employed, the legs being 7 1/2" long, with a 9" tread. Balsa wheels of 2" diameter was fitted. The wing sat on top of the fuselage, and was held in place by rubber bands, which were fixed to 3/32" diameter birch dowels that plugged through the fuselage. Double covering of the fuselage was recommended as a good move, when flying in bad weather was contemplated.

The wing itself was straightforward, being of constant chord, with rounded tips constructed from 1/16" diameter reed. Total span was 40 1/2", while the constant chord section of the wing was 4 7/8". Ribs were of 1/32" sheet, and were pitched at 1 1/4". The section employed was a Harris -4, which bore a superficial resemblance to an RAF32. Harris stressed that the section be copied accurately. A leading edge of 3/16" x 3/16" was used, with two spars of 1/8" x 1/8" at one third chord, placed one above the other, while the trailing edge was 3/8" x 1/8". In keeping with the times, a two-piece wing was employed, splitting down the centre line. Two 1/8" diameter birch dowels plugged into paper tubes in the wing roots, and there was also a vertical cane peg adjacent to the front paper tube around which a rubber band was looped to hold the wings together. Straight dihedral was employed, set to 3.4" dihedral at each tip.

The tailplane sat on top of the rear fuselage, and adopted a similar planform to the wing. Total span was 19 3/4", and ribs were pitched at 1 1/4". Ribs were 1/32" sheet, and were of Harris-7 section. This section was slightly undercambered, and again, stress was placed on ensuring the accuracy of the section. The leading edge was 1/8" x 1/8", and the trailing edge 1/2" x 3/32", but the size of the sole spar was not stated. It was on the lower surface of the rib at approximately 50% chord, and appears to be 3/8" x 1/16". Tailplane tips were of 1/16" diameter reed.

The single fin sat on top of the tailplane, and had a swept back, straight leading edge which merged with a sheeted and curved trailing edge. A single spar tapered from 3/16" x 1/8" to 1/8" x 3/32", while there were no solid ribs as such. Instead, strips of 1/8" x 1/32" were placed over the spar to create an aerofoil section. The fin itself plugged into celluloid tubes located in the tailplane, to take 3/32" birch dowels. Because all the components dis-sembled, the whole model could be packed in a relatively small box. This must have been a major benefit under wartime conditions, when public transport was generally the only means of travelling around.

A single bladed folding propeller was employed, carved from a block measuring 8 3/4" x 2 1/4" x 1 5/8", which was set up on a balsa and wire hub to give a diameter of 19 1/4". The wire size in the hub was chosen to be flexible under load, so as to produce a variable pitch action. Under load, the blade assumed a coarse pitch position at the beginning of the flight, and gradually returned to its original fully

fine position as the torque diminished. Harris thought that this approach gave a better climb than a fully fixed pitch propeller.

Suggested power of 14 strands 1/4” x 1/24” rubber, 45” long was recommended for normal flying, but 16 strands 1/4” x 1/24” 53” long had been used, which generated a ‘truly terrific’ climb.

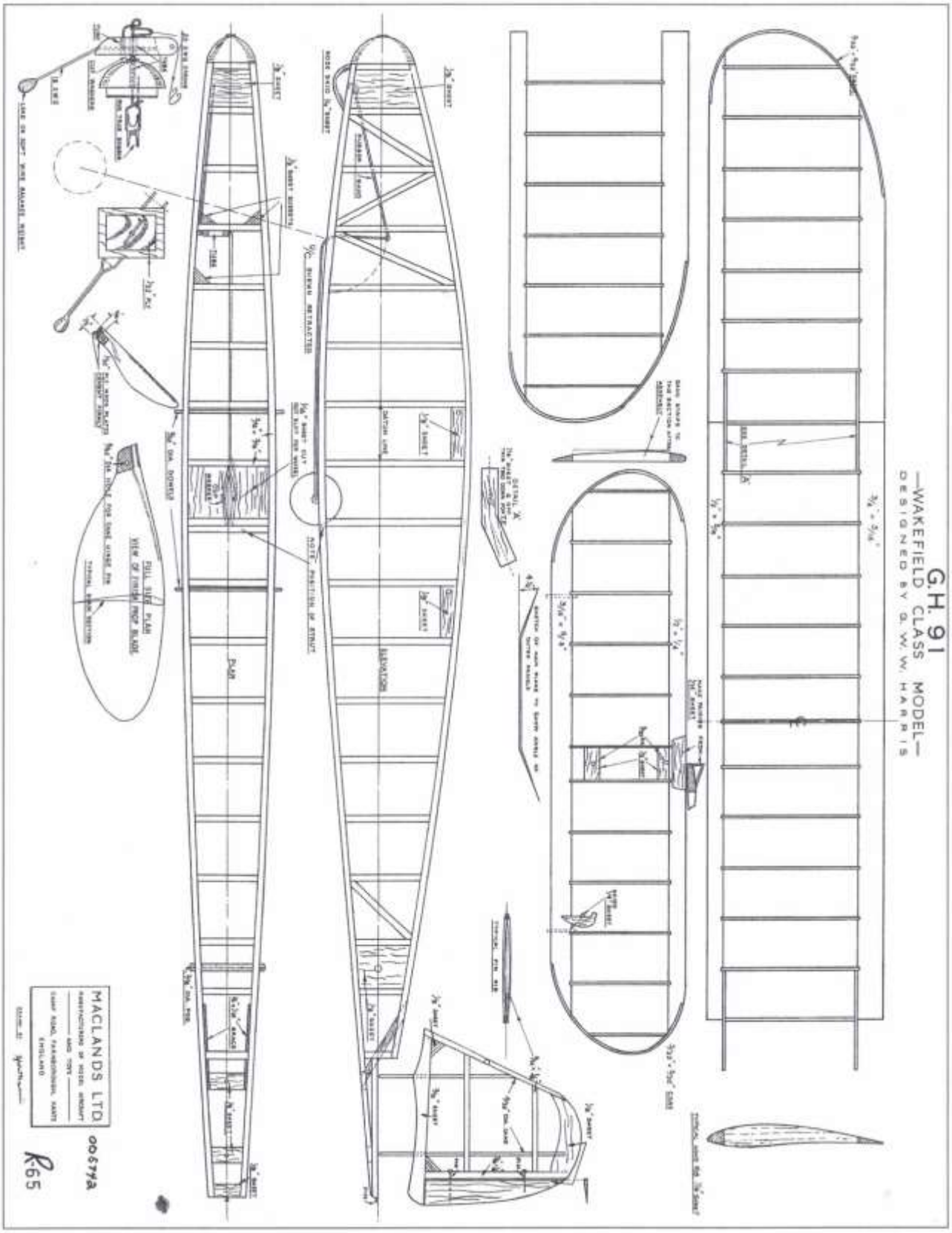
No weights for the finished model were quoted, although the structural weight could probably have been reduced to under 5oz. However, the design is functional, and it probably flew very well under typical contest conditions, as the layout appears stable and carried a lot of rubber driving a relatively large propeller.

At the same time as the ‘GH20’ was published, another Harris Wakefield was being featured in the *1944 Model Aeronautical Digest.* This was the ‘Red Rumpus”, which in most respects was almost identical to the ‘GH 20’. However, it differs in one significant respect. ‘Red Rumpus’ was basically a Wakefield, and presented as such, but the three-view provided details for a larger wing of 240 square inches area, as opposed to the Wakefield wing of 205 square inches. The additional area was obtained by the simple expedient of lengthening the wing tip. In order to assist with the wing changeover, a flat inner section was employed in conjunction with tip dihedral, and the same dihedral was used for each wing.

‘Red Rumpus’ used the same recommended power as the ‘GH 20’, and while no component weights were quoted, the total flying weight was approximately 8 1/2oz. Average flights were also quoted as being 180-240 seconds, and in view of the design similarity, would probably apply to the ‘GH 20’ as well.

At this time Harris was a prolific contributor to the modelling press, and during the period 1944-8 had designs published in the rubber, power and glider categories. His next published Wakefield was the ‘GH 27B’, in the January 1948 *Aeromodeller.* This design is an anomaly, described in the text as being a test bed, as it could be flown either as a Wakefield or a towline glider. Performance as a Wakefield was described as being in the 2 1/2 to 2 3/4-minute category, which was low by contemporary standards. In a potted biography in the December 1947 *Aeromodeller,* Harris was described as having built hundreds of models, so the numbering of the design would indicate that it was built shortly after the ‘GH 20’. Why it was published at all some four years later is perhaps a better question, but it may have been needed as a page filler.

Some confirmation of Harris’s output may be gleaned from an advertisement at p.630 of the October 1947 *Aeromodeller.* This advertisement, from Gamages, is for a kit of the ‘GH 91’ Wakefield model by G.W.W. Harris. The model had won the 1947 Flight Cup, and placed 4th in the 1947 Gamage Cup. It featured a single bladed folder, and retracting undercarriage complete with a single fin and a slabsider fuselage. For its time it was ‘state of the art’. Many years later it was published in *Aeromodeller* as a full-size plan. Because the ‘GH 91’ was so sophisticated, the publication of ‘GH 27B’ remains a mystery. Plans for the ’GH 20’ are available through Outerzone**‘**


G.H. 91
—WAKEFIELD CLASS MODEL—
DESIGNED BY G. W. W. HARRIS
MACLANDS LTD.
MANUFACTURERS OF MODEL AIRCRAFT AND TOYS
CLAMP ROAD, FARNBOROUGH, HANTS ENGLAND
00577A
R65

Master by Ron Calvert (England)

During the early part of 1948, with the revival of the Wakefield Trophy to international competition, advertisements in the modelling press featured Wakefield models to a greater extent than had been the case in the preceding nine years. A typical example was Watkins Model Store, at p.44 of the January 1948 *Aeromodeller.* This featured Ron Calvert's 'Master', an Airyda kit, which was offered for 22/6. In the advertisement was a line drawing of the model, measuring approximately 1" x 1", which showed what appeared to be a typical English streamliner of the period, with a built-up fuselage, tapered wings with straight dihedral set on a wire parasol, and a twin- legged wire undercarriage. The model looked both attractive and purposeful, so I added it to my 'bucket list' of future possible acquisitions.

It took me a long time (about 40 years) to obtain a plan, which revealed a number of mis-conceptions which I held about the model. The kit had been produced by National Modellers Supply at their Airyda Works in Huddersfield, where they were the manufacturers of 'Airyda Model Aircraft Constructional Kits'. No issue date was quoted on the plan, but reference was made to success in many competitions, including the Western (sic) Cup in 1942, and another event in 1944. This would indicate a possible production date of 1945.

At this time Calvert was a member of the Bradford Club, with fellow members being Len Stott and Norman Lees, who were co-designers of the 'Flying Minutes' Wakefield which qualified for both the 1939 and 1948 Wakefield Finals. It was kitted by Halfax Models, and influence from this design can be seen in the 'Master'. Lees moved on from the 'Flying Minutes', and designed a successor which was published in the 1944 *Model Aeronautical Digest* at pp.36-7. This three-view lists contest successes dating back to 1941, and would indicate that the design precedes the 'Master'.

The basic fuselage of the 'Master' was 34 1/2" long. It was of oval cross-section, with the main cross-section measuring 5" x 3 1/4", built up from laminated formers consisting of four layers of 3/32" x 1/32" wound around cardboard templates, which were jig mounted. There were four 'basic' stringers of 1/8" x 1/16", located at the top, bottom and maximum width positions; while twenty 1/16" x 1/16" stringers were located equidistant around the perimeter of the formers, with five stringers being located between each 'basic' stringer. The wing was mounted on a 18g. wire parasol, with runners of 1/8"x 3/16" bamboo, which cleared the fuselage by barely 1/8". Downthrust of 1/16", with an equal amount of right sidethrust, were built into the front former. The undercarriage consisted of two 16g. wire legs 7 1/2" long, with a 10" track, and equipped with 2 1/4" diameter wheels. In a modern touch, the undercarriage plugged into a single, flattened aluminium tube attached to a former which was suitably strengthened. This undercarriage layout was identical with the Lees design in the *Model Aeronautical Digest,* while the rear rubber anchorage was also identical.

Another area of similarity lay in the wing planform. Whereas most English streamliners of this period were fitted with double tapered wings, and I assumed from the line drawing in the *Aeromodeller* advertisement that the 'Master' would be the same, but this was not the case. The wings had a span of 45", with a constant chord inner section of 10", while the outer section of 12 1/2" was tapered on the trailing edge only. Chord of the inner section was 5 1/8", with the tip chord prior to the rounded tip, being 3 1/4". Straight dihedral was only 3". All these dimensions were nearly identical with the Lees design. Save for the leading edge, other structural components were the same in size and position, while the Eiffel 400 wing section was also the same. The leading edge was 3/16" x 3/16", while at approximately one third chord, 1/8" x 1/16" spars were placed on the top and bottom surfaces, with a further 1/16" x 1/16" spar on the top surface only at two thirds chord, while the trailing edge was 1/8" x 1/2". Ribs were of 1/32" sheet and were pitched at 1" intervals. A two-piece wing was employed, joined by 1/8" diameter dowels located in paper tubes. To strengthen the wing at the centre, the two inner ribs were covered by 1/32" sheet, top and bottom.

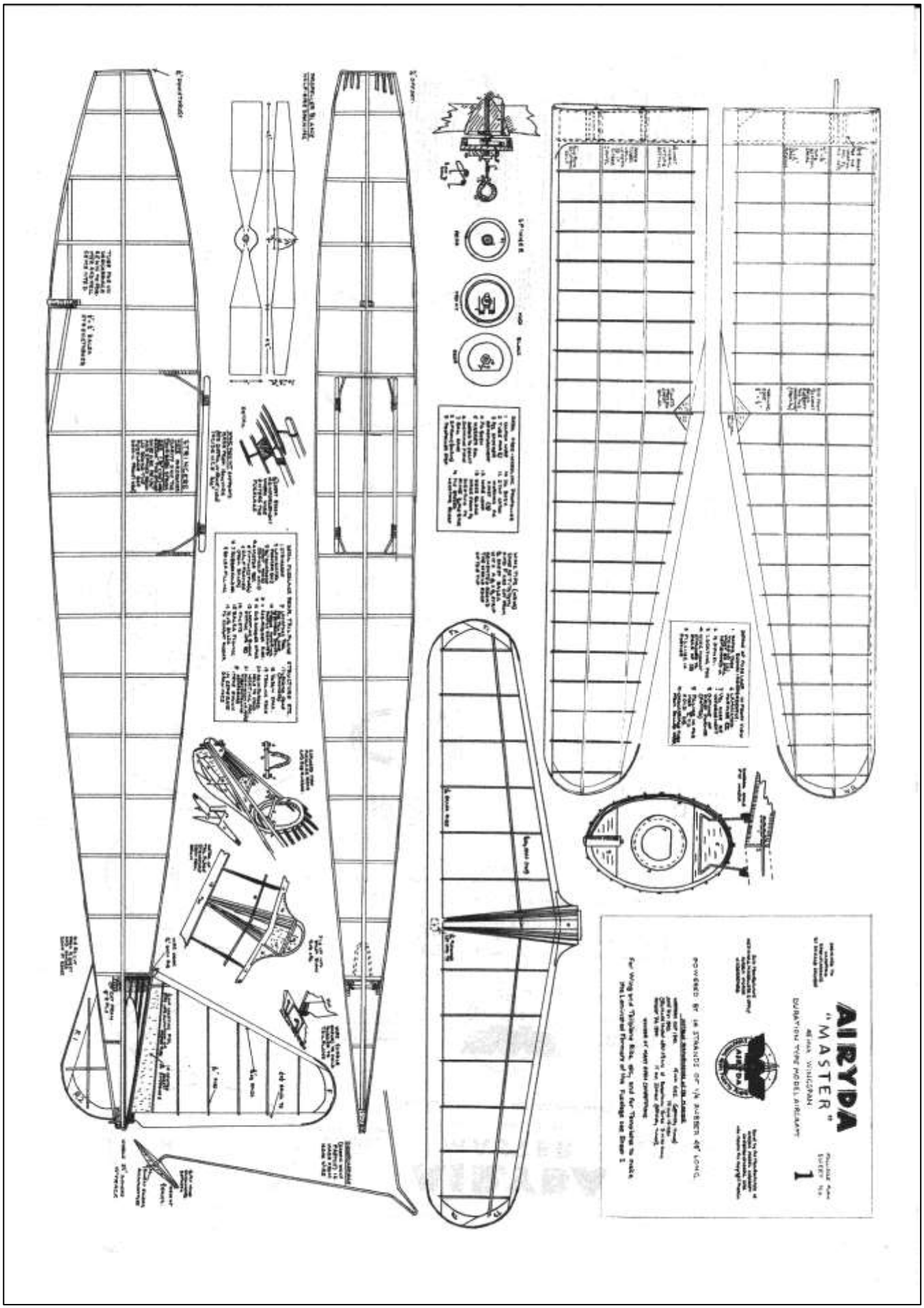
The planform for the tailplane again followed the Lees approach, with a span of 20", and tapered on the leading edge only from 4 1/2" at the centre to 3" at the tips, which were rounded. Both the wing and tailplane tips were of sheet, and were reinforced by a 1/32" strip around the edge. A Clark Y type section was employed, with a 1/4" x 1/4" tapered leading edge, a single swept back upper surface spar of 1/16" x 1/16" and a 1/8" x 1/2" trailing edge. Ribs were again of 1/32" sheet, pitched at 1 1/2".

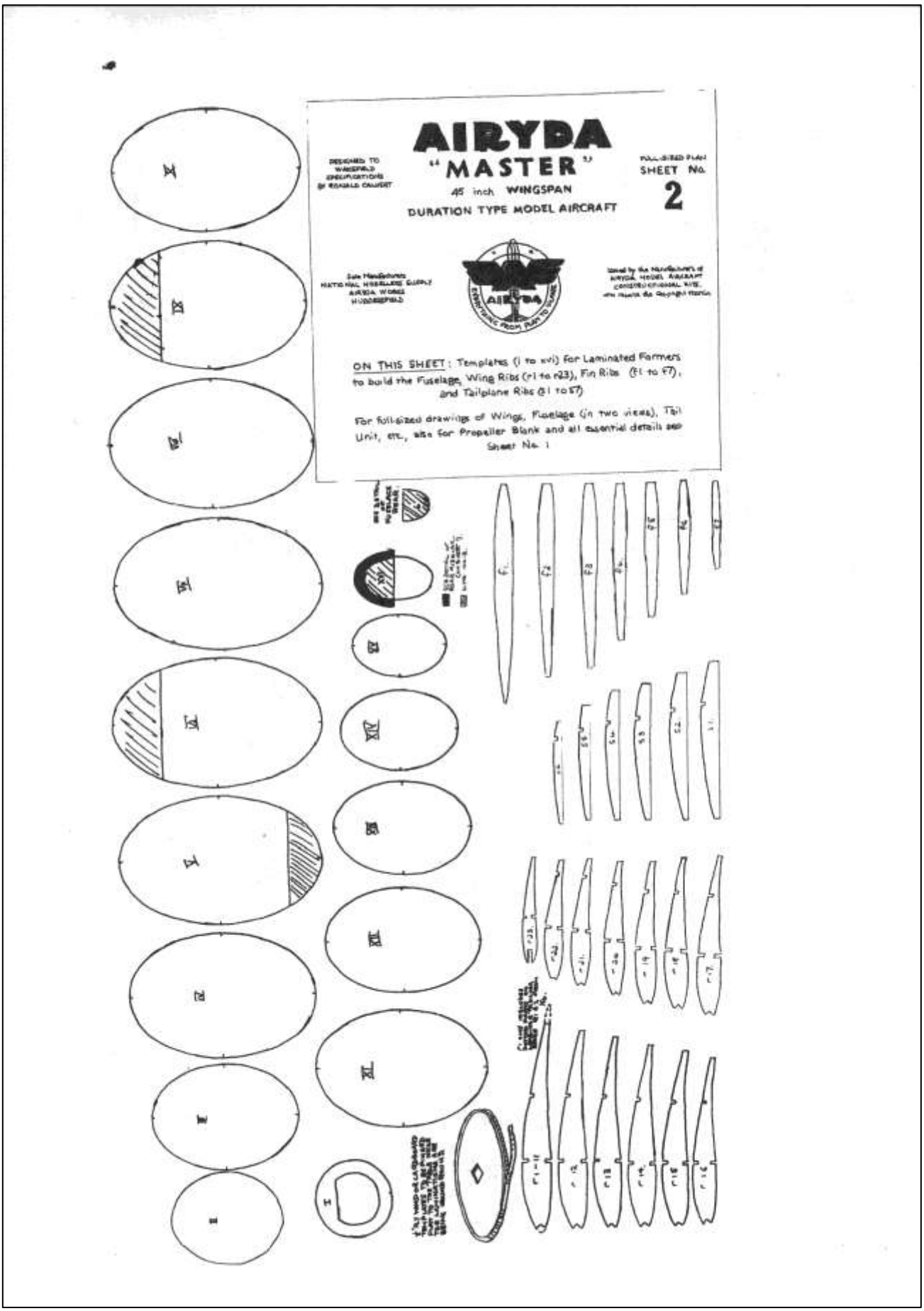
Calvert employed a fin and underfin which in profile were almost identical to the ‘Flying Minutes’. Sparless construction was used for the fin, although a spar was employed on the underfin for reinforcement. Ribs were of symmetrical section, and were made from 1/32” sheet, being pitched at 1” intervals.

Covering materials were not quoted, but probably followed the ‘Flying Minutes’ approach of bamboo paper for the fuselage, with Jap tissue for the wings, tailplane and fin.

An 18” diameter freewheeling propeller was fitted, carved from a 2” x 1 1/2” block. It was faired into the fuselage by a spinner. Power was 14 strands 1/4” rubber, probably 1/30” thick, 48” long, which would have required cording. No balance point was indicated on the plan, nor was any weight quoted, but Lees’ model had a structural weight of 5oz.

In most respects the model was a typical streamliner of the period, save for the wing which had a ‘Northern’ approach. Probably not many kits were sold, as the market would have been relatively small at this time for streamlined Wakefields, and kits for the ‘GB3’ and ‘Flying Minutes’ already existed. Both these models had a more distinguished contest pedigree as well. However, the ‘Master’ would have been a worthy addition to these models and should have performed capably for an accurate builder.


AIRYDA
"MASTER"
1


AIRYDA
"MASTER"
45 inch WINGSPAN
DURATION TYPE MODEL AIRCRAFT
SHEET No.
2
ON THIS SHEET: Templates (i to xvi) for Laminated Formers to build the Fuselage, Wing Ribs (r1 to r23), Fin Ribs (f1 to f7), and Tailplane Ribs (t1 to t7)
For full-sized drawings of Wings, Fuselage (in two views), Tail Unit, etc., also for Propeller Blank and all essential details see Sheet No. 1

Ron Warring 1946

To the best of my research, a plan of this model has never been published in any modelling publication. Photographs of the model have appeared, as evidenced by two shots on p.24 of the December 1948 *Aeromodeller.*

Genesis of this design originated in the model published as 'Warring's Lightweight' and featured on pp.418-9 of the July 1948 *Aeromodeller.* It was quoted as having a 38 1/2" wingspan, the wings themselves being tapered, and were fitted to the fuselage in a shoulder mounting, utilising a tongue and box fitting. The fuselage was rectangular, and faired into a spinner at the nose, while a monowheel undercarriage was employed.

Thousands of plans for this model were sold, and it was popular all around the world. In New Zealand it held the Open Rubber record for a period in the late 1940's when records were based on a single flight. While called a 'Lightweight', it was really in the medium weight category, being quoted as having an airframe weight of 3.187 oz while the rubber weight was only 2.0 oz. This gave a long, slow climb by comparison with the more common single bladed propeller lightweights of the era, but it was perhaps more consistent.

The accompanying article to the 'Lightweight' plan in the *Aeromodeller* (written by Bill Dean), was not specific as to dates in the development of the design, although an obvious predecessor is published in the 1944 *Model Aeronautical Digest* at pp.30-1.This 1943 design foreshadowed the 'Lightweight', although it did not feature a streamlined and spinnered nose to the fuselage. It was slightly smaller in size than the 'Lightweight', and apart from the fuselage nose and shoulder wing fixing, followed the same general configuration. The fin shape was consistent with pre-war practice, but in most other respects the design represented a mid-point in development between the pre and post-war approaches. In one respect it was more advanced than the 'Lightweight', having a structural weight of only 2 9/16 oz.

In his article on the 'Zombie' in the April 1949 *Aeromodeller*, Warring stated that the first Wakefield was completed at the end of 1945 and prepared for the 1946 competition season. The model was first flown in the 1946 Gamage Cup, and produced flights of 1,368.5, 988.0 and 450.2 seconds for an aggregate of 2,806.7 seconds and first place. Other places in that season were 4th in the Irish Nationals, 2nd in the Northern Heights Gala, 1st in the Caton Trophy and 3rd in the Gutteridge Trophy.

Despite these successes, Warring concluded that the still air performance was not outstanding. The sinking speed on the glide was high, which Warring attributed to the Davis wing section employed. He also considered that the design was spirally stable to the point of excess, and additionally there were a number of structural shortcomings.

However, these perceived faults did not prevent Warring from arranging for Paramount Model Aviation to produce a kit for the design in 1946. The plan, in two sheets, was drawn by Warring himself, and in general followed the structural approach of the 'Lightweight', although simplifications were adopted for kitting purposes. It would appear that no ready-cut or printed ribs were supplied with the kit. Wing ribs were constructed by the sandwich method from blanks of ¾" x 1/32" sheet, after tracing and cutting out the master ribs from ply. A single tapered internal wing spar was used, differing from the top and bottom spars utilised on the 'Lightweight', but in advance of this form of construction being used on the subsequent 'Voo Doo' and 'Zombie'.

In keeping with the 'Lightweight', fuselage structure was 1/8" x 1/8" longerons, as were the spacers. As a result, the Wakefield version was relatively less strong, but the larger size resulted in more balsa being required, thus adding weight, with the Wakefield version being nearly 1/2oz. heavier.

Templates for the fin, wing and tailplane tips had to be traced and cut from 1/8" card. The propeller was supplied as a block, on to which the layout was traced and cut out. The layout drawing suggested a more pointed spinner than that employed on the 'Lightweight'. No formed ribs were supplied foe the

tailplane, only 1/16”x 5/16” strips which were sanded to shape after assembly. The fin ribs were also cut from 1/16” x 5/16” strips and sanded down after assembly. The plan recommended that the tailplane be sanded down to the specified weight before covering. This specified weight was 1/4 oz.

Other uncovered weights quoted were:

Wings	1.25
Fuselage	1.25
Undercarriage	0.25
Fin	0.125
Nose Assembly	1.125
	4.0 oz

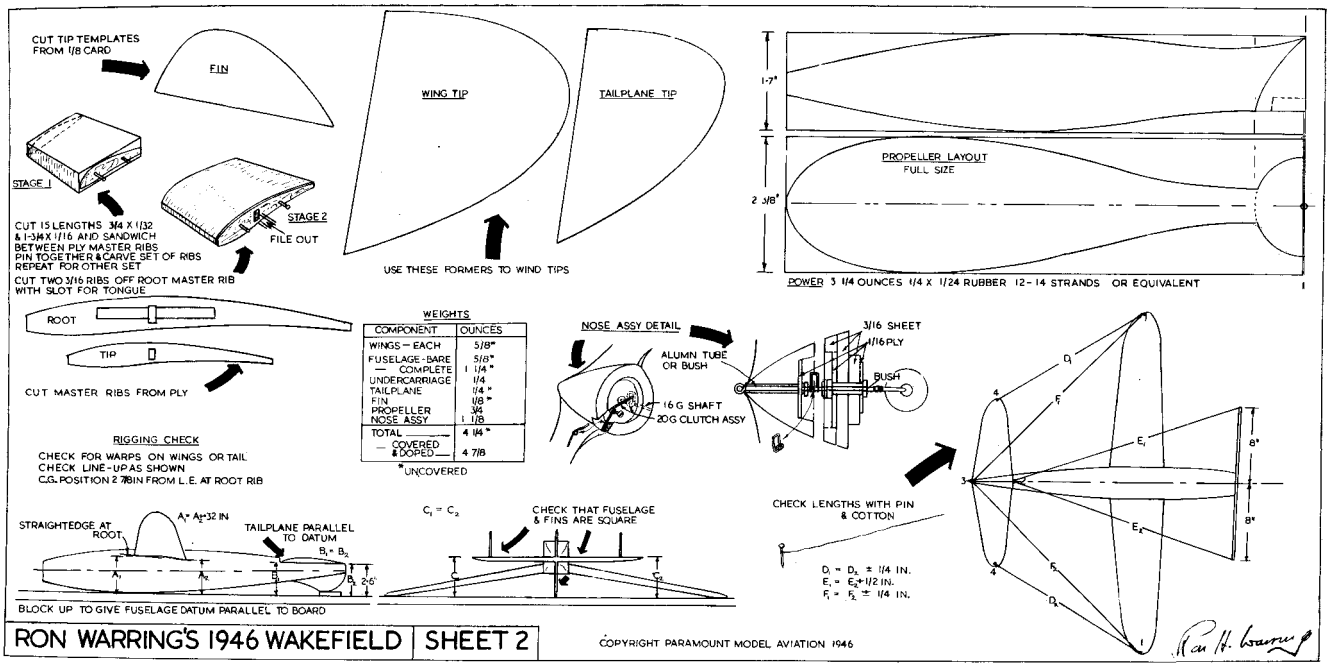
Total covered and doped weight was 4.875 oz.

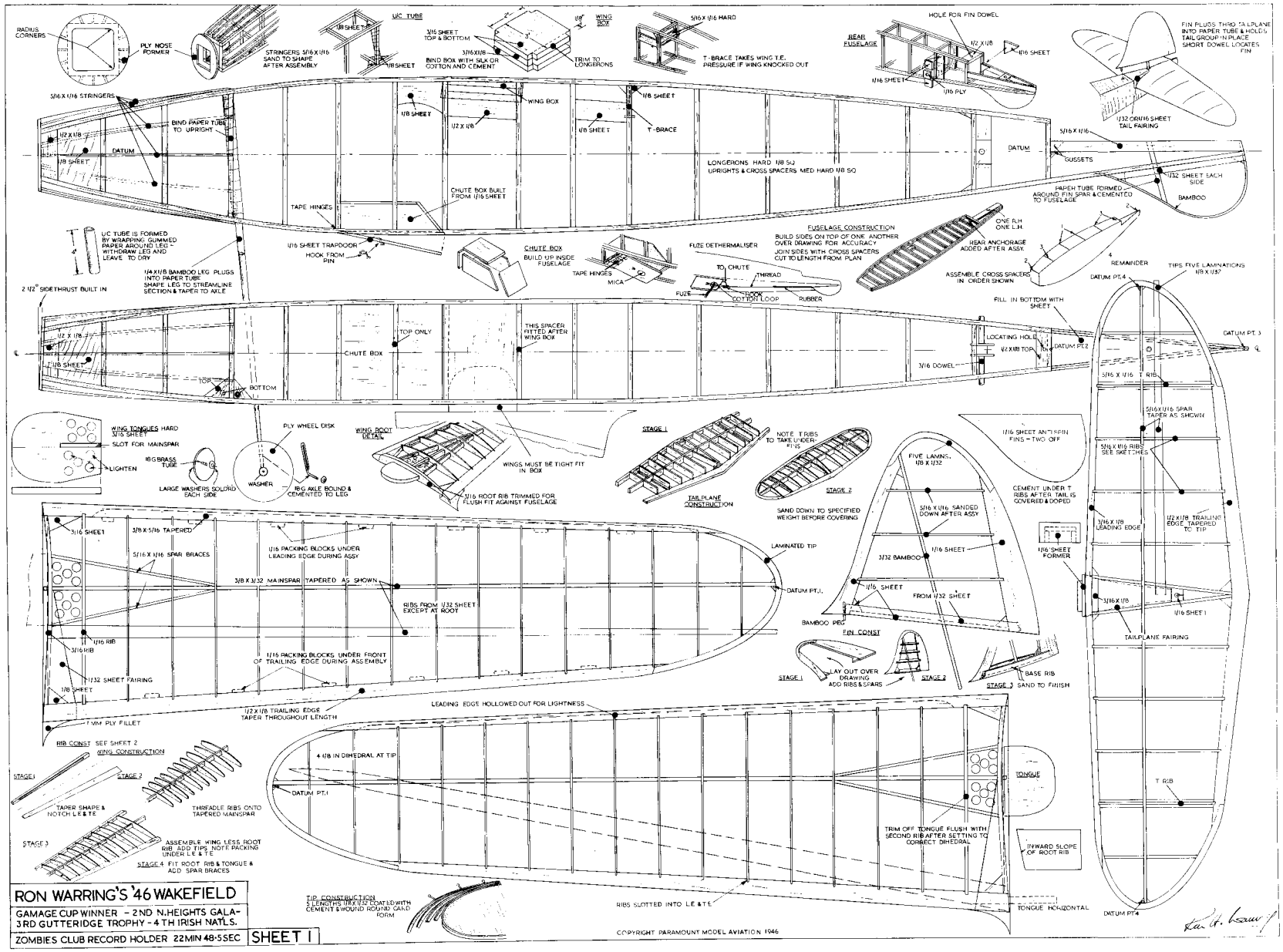
Power was specified as 3 1/4 oz of 1/4”x 1/24” rubber, made up into 12-14 strands. With this motor the C.G. position was indicated as being 2 7/8” from the leading edge at the root rib.

One of the distinctive features of the plan was a series of sketches illustrating how the model should be rigged, setting up the fuselage so that all surfaces were true. Warring was suggesting an approach followed by full size aircraft practice, and it was unusual to see this recommended for models.

Paramount was still advertising the kitset for the model as late as March 1948, with their advertisement on p.206 of the *Aeromodeller.* Price was quoted at 29/6.

Warring’s 1946 Wakefield was the start of a series which he developed over the next five years, culminating in the ‘VooDoo’ and the ‘Zombie'.




RADIUS CORNERS
PLY NOSE FORMER
STRINGERS 5/16 X 1/16 SAND TO SHAPE AFTER ASSEMBLY
1/8 SHEET
U/C TUBE
3/16 SHEET TOP & BOTTOM
3/16 X 1/8
BIND BOX WITH SILK OR COTTON AND CEMENT
TRIM TO LONGERONS
1/8" WING BOX
5/16 X 1/16 HARD
T-BRACE TAKES WING T.E. PRESSURE IF WING KNOCKED OUT
REAR FUSELAGE
HOLE FOR FIN DOWEL
1/2 X 1/8
1/16 SHEET
1/16 PLY
FIN PLUGS THRO' TAILPLANE INTO PAPER TUBE & HOLDS TAIL GROUP IN PLACE SHORT DOWEL LOCATES FIN
1/32 OR 1/16 SHEET TAIL FAIRING
5/16 X 1/16 STRINGERS
BIND PAPER TUBE TO UPRIGHT
1/2 X 1/8
DATUM
1/8 SHEET
WING BOX
T-BRACE
LONGERONS HARD 1/8 SQ UPRIGHTS & CROSS SPACERS MED HARD 1/8 SQ
GUSSETS
1/32 SHEET EACH SIDE
BAMBOO
PAPER TUBE FORMED AROUND FIN SPAR & CEMENTED TO FUSELAGE
TAPE HINGES
CHUTE BOX BUILT FROM 1/16 SHEET
U/C TUBE IS FORMED BY WRAPPING GUMMED PAPER AROUND LEG - WITHDRAW LEG AND LEAVE TO DRY
1/16 SHEET TRAPDOOR
HOOK FROM PIN
1/4 X 1/8 BAMBOO LEG PLUGS INTO PAPER TUBE SHAPE LEG TO STREAMLINE SECTION & TAPER TO AXLE
2 1/2" SIDETHRUST BUILT IN
CHUTE BOX
BUILD UP INSIDE FUSELAGE
TAPE HINGES
MICA
FUZE DETHERMALISER
TO CHUTE
THREAD
FUZE
HOOK
COTTON LOOP
RUBBER
FUSELAGE CONSTRUCTION
BUILD SIDES ON TOP OF ONE ANOTHER OVER DRAWING FOR ACCURACY
JOIN SIDES WITH CROSS SPACERS CUT TO LENGTH FROM PLAN
REAR ANCHORAGE ADDED AFTER ASSY.
ONE R.H. ONE L.H.
ASSEMBLE CROSS SPACERS IN ORDER SHOWN
REMAINDER
TIPS FIVE LAMINATIONS 1/8 X 1/32
DATUM PT.4
FILL IN BOTTOM WITH SHEET
TOP ONLY
THIS SPACER FITTED AFTER WING BOX
LOCATING HOLE
1/2 X 1/8 TOP
DATUM PT.2
DATUM PT.3
3/16 DOWEL
TOP
BOTTOM
5/16 X 1/16 T RIB
5/16 X 1/16 SPAR TAPER AS SHOWN
5/16 X 1/16 RIBS SEE SKETCHES
WING TONGUES HARD 3/16 SHEET
SLOT FOR MAINSPAR
LIGHTEN
18G BRASS TUBE
LARGE WASHERS SOLDRD EACH SIDE
PLY WHEEL DISK
WASHER
18G AXLE BOUND & CEMENTED TO LEG
WING ROOT DETAIL
WINGS MUST BE TIGHT FIT IN BOX
3/16 ROOT RIB TRIMMED FOR FLUSH FIT AGAINST FUSELAGE
STAGE 1
TAILPLANE CONSTRUCTION
NOTE T RIBS TO TAKE UNDER-FINS
STAGE 2
SAND DOWN TO SPECIFIED WEIGHT BEFORE COVERING
1/16 SHEET ANTI SPIN FINS - TWO OFF
FIVE LAMINS. 1/8 X 1/32
5/16 X 1/16 SANDED DOWN AFTER ASSY
1/16 SHEET
3/32 BAMBOO
1/16 SHEET
FROM 1/32 SHEET
BAMBOO PEG
CEMENT UNDER T RIBS AFTER TAIL IS COVERED & DOPED
1/16 SHEET FORMER
3/16 X 1/8 LEADING EDGE
1/2 X 1/8 TRAILING EDGE TAPERED TO TIP
3/16 X 1/8
1/16 SHEET
TAILPLANE FAIRING
3/16 SHEET
3/8 X 5/16 TAPERED
5/16 X 1/16 SPAR BRACES
1/16 PACKING BLOCKS UNDER LEADING EDGE DURING ASSY
3/8 X 3/32 MAINSPAR TAPERED AS SHOWN
RIBS FROM 1/32 SHEET EXCEPT AT ROOT
LAMINATED TIP
DATUM PT.1
3/16 RIB
1/16 RIB
1/32 SHEET FAIRING
1/8 SHEET
1/16 PACKING BLOCKS UNDER FRONT OF TRAILING EDGE DURING ASSEMBLY
1/2 X 1/8 TRAILING EDGE TAPER THROUGHOUT LENGTH
1 MM PLY FILLET
FIN CONST
STAGE 1
LAY OUT OVER DRAWING ADD RIBS & SPARS
STAGE 2
BASE RIB
STAGE 3 SAND TO FINISH
LEADING EDGE HOLLOWED OUT FOR LIGHTNESS
RIB CONST SEE SHEET 2
WING CONSTRUCTION
STAGE 1
STAGE 2
TAPER SHAPE & NOTCH L.E. & T.E.
THREADLE RIBS ONTO TAPERED MAINSPAR
STAGE 3
ASSEMBLE WING LESS ROOT RIB. ADD TIPS NOTE PACKING UNDER L.E. & T.E.
STAGE 4 FIT ROOT RIB & TONGUE & ADD SPAR BRACES
4 1/8 IN DIHEDRAL AT TIP
DATUM PT.1
TONGUE
TRIM OFF TONGUE FLUSH WITH SECOND RIB AFTER SETTING TO CORRECT DIHEDRAL
INWARD SLOPE OF ROOT RIB
T RIB
TIP CONSTRUCTION 5 LENGTHS 1/8 X 1/32 COATED WITH CEMENT & WOUND ROUND CARD FORM
RIBS SLOTTED INTO L.E. & T.E.
TONGUE HORIZONTAL
DATUM PT.4
RON WARRING'S '46 WAKEFIELD
GAMAGE CUP WINNER - 2ND N.HEIGHTS GALA-
3RD GUTTERIDGE TROPHY - 4TH IRISH NATL'S.
ZOMBIES CLUB RECORD HOLDER 22MIN 48·5SEC
SHEET 1
COPYRIGHT PARAMOUNT MODEL AVIATION 1946

Bob Copland (1946)

Probably the best-known English Wakefield flier in the 1930's, 1940's and early 1950's was Bob Copland of the Northern Heights MFC. After starting with a slabsided fuselage approach combined with constant chord wings, he moved progressively to streamlined fuselages used in association with tapered wings, and his name became synonymous with this approach.

Bob's first foray into International competition was the 1936 Wakefield Finals, held at Wayne County Airport, Detroit, Michigan on 1 July 1936. Although various references differ, it appears that he was aged 19 at the time of the contest, and this seems consistent with contemporary photographs. Bob put up flights of 275.2, 130.9 and 205.2 seconds, for an average of 203.8 seconds, and 3rd place. A three-view of this model was published in the *1937 Frank Zaic Yearbook*, with full size plan spin-offs being produced by Terry Rose and Aerodyne. The design was straightforward, with a simple rectangular fuselage, combined with parallel chord wings that were slightly swept back. The tailplane featured a straight trailing edge, with a swept leading edge. A 16" diameter freewheeling propeller was employed, with the motor being retained by means of a spring tensioner.

In 1937 Bob made the first step toward his eventual streamlined approach, by changing his design to incorporate a sheeted streamlined fuselage but retaining the wing and tailplane outlines from his 1936 model. The 1937 model was published in the *1938 Frank Zaic Yearbook.*

However, 1938 saw Bob adopt the full traditional streamlined Wakefield approach with a spinnered nose and freewheeling propeller; built up fuselage with multiple small section stringers, and tapered sparless wing and tailplane. His first design to this formula was the 'GB3', winner of the King Peter Cup, and later kitted by Premier. The Premier plan was later re-drawn by Terry King in the early 1980's, shortly after Bob built a new version which was subsequently displayed in the Science Museum. Plans of the re-drawn version are available through Aerodyne.

Around 1938 Bob also designed the 'Northern Star' and 'Parastar'. Although the latter was described as a Wakefield, it was too small in wing area to meet the Wakefield specification, and really was a medium-weight design in keeping with the approach of the 'Northern Star', which was subsequently kitted by Premier.

The year 1940 saw the publication of two Copland Wakefields. First was in the April 1940 *Air Trails*, which featured the model he flew at the 1939 Wakefield Finals. This model was generally similar to the 'GB3', but featured fuselage boxes to accommodate the wing leading and trailing edges, rather than the tongue and box system adopted on the 'GB3'. Also, there were no outlying fins on the tailplane, as utilised by the 'GB3'. Performance of this model was very high, and *Air Trails* reported that all flights made in testing on the night before the Finals had exceeded four minutes. At the Finals themselves, held at Aviation Golf Course, Bendix, N.J., on 6 August 1939, Bob had flights of 165.4, 308.5, and 160.0 seconds, for an average of 211.3 seconds, and 4th place. Plans and a short kit for this model are available from Bob Holman Plans.

Published almost contemporaneously was another Wakefield by Bob, which was featured in *Aeromodeller.* Bob himself was the draughtsman for the plan, drawn in February 1940, which featured a generally similar model to the *Air Trails* version. However, there was one significant difference, in that a single blade folder, housed in a spinner, was adopted in place of a freewheeling propeller. The fuselage was also slightly different in construction, using fully circular laminated formers with 1/16" x 1/16" stringers as opposed to the *Air Trails* version which used formers cut from sheet with a short straight section and 3/32' x 3/32" stringers. Both versions used an RAF 32 wing section, in keeping with Bob's previously published designs.

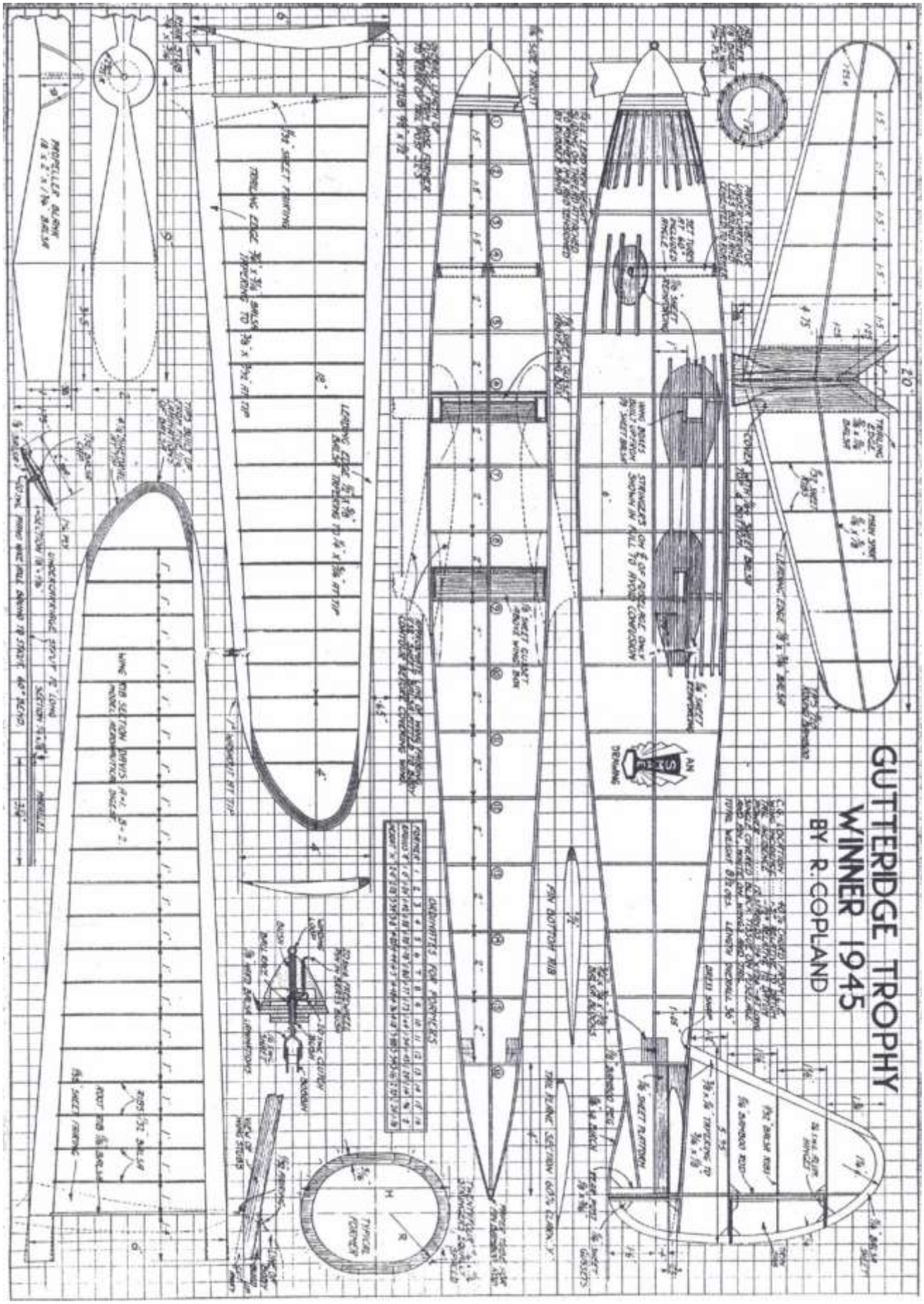
With the demands of war, no further Copland Wakefield designs were published until the *Model Aeronautical Digest* of 1944, of which Bob was co-author with Ron Warring. This publication featured the '1943 Wakefield Class Duration Model', which placed 3rd in the 1943 Gutteridge Trophy and was reported to have a performance of 3 1/2 - 4 minutes in still air. This design was an amalgam of various features which had been used previously. Formers reverted to the flat-sided approach of the 'GB3', but with 1/16" x 1/16" stringers, while the formers were wound from four layers of 3/32" x 1/32". The RAF 32 wing section continued to be employed, but the greatest change related to the tailplane, where a double taper was used in place of the familiar swept back leading edge. As a foretaste of things to come, the *Digest* contained an article on aerofoil sections, which included data on the Davis section. Full size plans for this model are available through Aerodyne.

Because of the war, no further Copland Wakefields were published, but in 1946 no less than three new designs were revealed. Completely different was the 'Masterplane', announced in the November 1946 *Aeromodeller* as the winner of the 1946 Model Engineer Cup. The model was described as a streamlined slabsider, but employed the standard Copland approach of tapered wings, although this time a spar was used, together with a swept leading edge tailplane complete with outlying fins, and the traditional fin shape.

In the December 1946 *Aeromodeller,* an article was published 'Notes on my latest Wakefield' by Bob Copland. The feature was an update on the 1940 *Aeromodeller* plan, and covered a number of detailed improvements. Of these, the major change related to the wing where the root chord had been reduced from 6 1/2" to 6", compensated by an increase in span from 43 1/2" to 47". The wing section was also changed from RAF 32 to a Davis. A completely circular fuselage section was retained, with built up laminated formers. But perhaps the most noticeable change was the reversion to a double-bladed freewheeling propeller in place of the single bladed folder. Copland felt that the freewheeler assisted glide stability, as the model was not so readily upset by small gusts of wind. Also, for the first time, a parachute dethermaliser was incorporated, with the parachute housed in a small box on the underside of the fuselage. Structural weight was quoted as 5.5 oz., which was combined with a 3.0 oz. motor. Very complete trimming notes were supplied, and illustrate the care which Bob took in adjusting his models.

In many respects the Wakefield published in the January 1946 *Model Aircraft,* as 'The Gutteridge Trophy Winner 1945', is the most interesting and captures several strands of an evolving process. The wing was of sparless construction, to the dimensions of the 1943 model, but employed the Davis A=1, B=2 wing section from the *Model Aeronautical Digest.* The fuselage used oval-shaped formers cut from sheet, although wound formers were suggested as a better alternative, notwithstanding the greater degree of constructional complexity involved. With the tailplane there was a reversion to the standard shape involving a swept back leading edge, combined with a straight trailing edge. Tailplane section was a 60% Clark Y. No dethermaliser was fitted. Other standard features were an 18" diameter freewheeling propeller, driven by 12 strands of 1/4" x 1/24" rubber 47" long, together with single covered black tissue on the fuselage and fin, and white tissue on the wings and tail. Bob had adopted this colour scheme in 1939, and retained it on all his subsequent Wakefields.

After the war, Bob was selected for two more Wakefield Teams. The first was in 1948, where at Akron, Ohio he placed 6th with flights of 4:9.3, 3:8.3 and 2:31.9. His final team place was in 1953, where at Cranfield he placed 25th with flights of 4:05, 4:33 and 3:10, for an aggregate of 11:48. Superficially there was not much change between the 1939 and 1953 streamliners, but incremental alterations improved consistency and boosted overall performance. Placings of 3rd, 4th, 6th and 25th at Wakefield Finals confirm the high regard in which he was held as a Wakefield flier.


GUTTERIDGE TROPHY
WINNER 1945
BY R. COPLAND

Les DeWitt (1948)

At the 1993 Taft SAM Champs, I was most impressed by the performance of a Wakefield, which was wound in the car park, then transported by chase cycle to the flying area, followed by a prompt release. It took me a while to locate the flier, who turned out to be Les DeWitt, of Wichita, Kansas.

I had corresponded with Les some years previously, so I introduced myself to him. Accompanying Les was his flying companion Ernie Linn, designer of the much published '1938 Kansas Wakefield'. I had a most enjoyable discussion with them, and Les promised me a reduced scale three-view of the Wakefield which had impressed me. The three-view was at Les's motel, but, true to his word, he delivered it to me the following day.

The three-view turned out to be a photocopy from a July 1948 newsletter, the Midwestern Modeler, which contained advertisements from firms located in Kansas and Oklahoma. The three-view was quarter scale, and was accompanied by a construction article, which also covered the development of the model. This had taken place over a number of years, with numerous models having been built in an effort to improve performance. Les was an engineer in his working life, and was willing to pursue any approach which he deemed worthwhile. One example related to the tip plates on the wing, which had a positive impact on performance. Another factor was the drooped wing section, which generated a flap effect, again assisting performance.

In general, the construction followed conventional lines, although there were detail areas of sophistication. The wing was built up of hollow ribs, with the 1/16" spars then being threaded through the ribs, followed by the riblets and stringers. Tip plates of 1/16" sheet were added after covering. The wing span was 45", while the chord was 4 5/8".

The fuselage was a diamond, built of 1/8" square, with the cabin and wing mount superstructure being added later to the basic structure. To accept a folding single leg undercarriage, the lower longeron was cut away and a sheet wheel-well inserted in place. The first three sections of the fuselage were covered with 1/16" sheet, and faired into the cabin structure with 1/16" square stringers.

By contrast with the wing, a conventional structure was adopted for the tailplane, with a 1/8" square upper spar. Tip fins were of 1/16" sheet. In a very progressive suggestion for the era, it was recommended that the wing and tailplane be keyed in place.

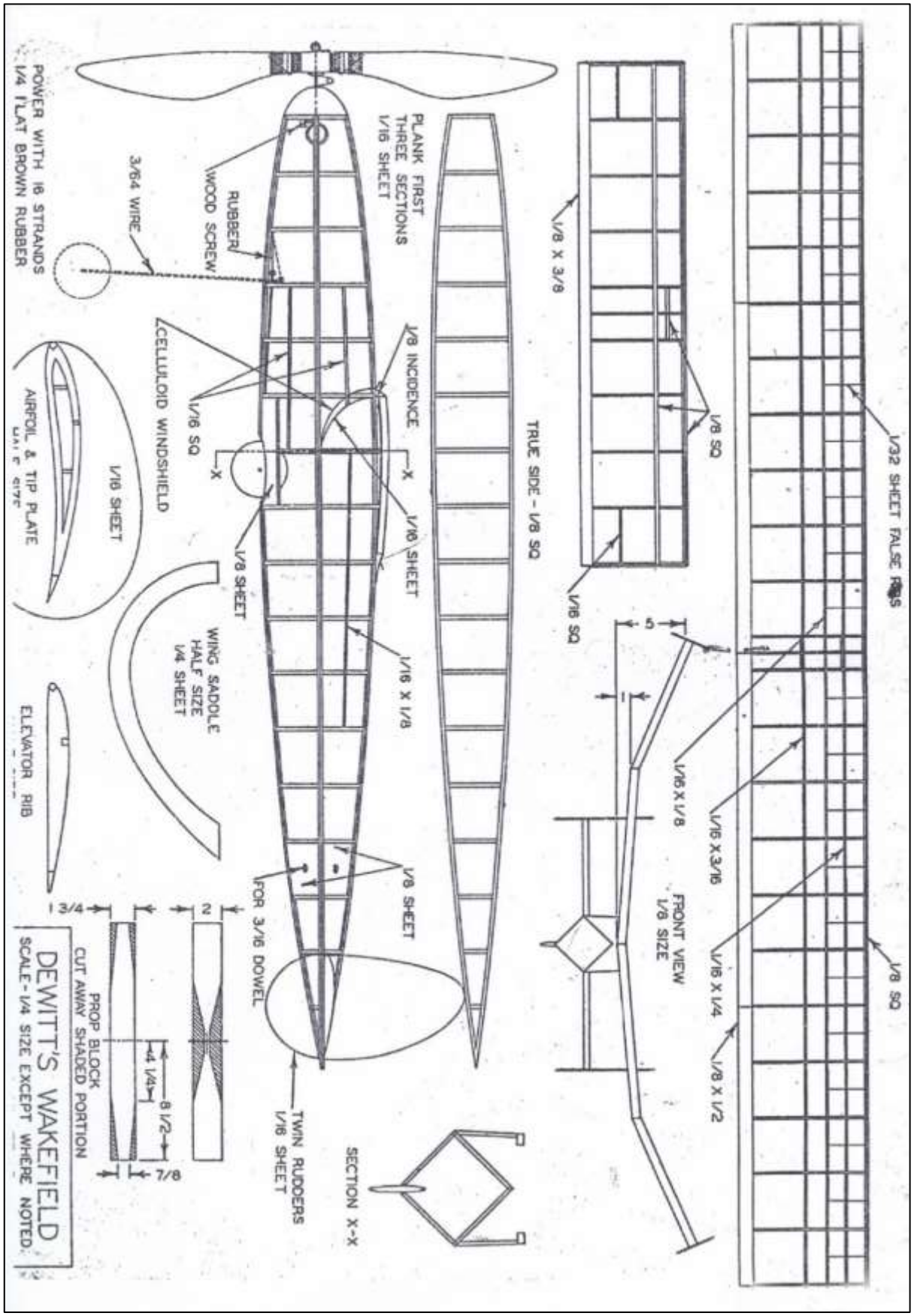
A 17" diameter double bladed folder was stipulated, powered by 16 strands of 1/4" brown rubber. No rubber length was stated, nor was a balance point indicated as 'The model should balance correctly as built if a uniform grade of wood is used throughout the length of the fuselage'. In this respect, the wing saddle was long enough to permit moving the wing back and forth for windy day adjustments.

Conventional adjustments were used to trim the model, with a final exhortation of 'We hope you don't lose it on its first flight'. This was despite the earlier advice that a dethermaliser be fitted to the tailplane.

Jim O'Reilly offers a full-size plan for what he describes as' Les DeWitt's 1946 Wakefield'. This plan is for a slightly earlier version than the model in the adjacent three-view, and features straight dihedral, rather than the polyhedral of the later version.

Les DeWitt did not limit himself to Wakefields, as the same issue of the Midwestern Modeler contained an advertisement for his 'Whirlaway' a Class C or D pylon model, with 724 square inches of wing area. Performance was quoted as 6 minutes or better in dead air, on a 20 second motor run, at an all up weight of 60 oz. with .60 power. The quoted price was $8.95, and the kit was available from DeWitt Industries, Wichita, Kansas complete with a formed aluminium cowl.

Les DeWitt continued to fly Wakefields with considerable success, especially during the 1970's and 80's. His 'Iconoclast' F1B was chosen as one of the NFFS Models of the Year, with his successor design the 'Eureka' being even more innovative. But his 1948 design was very much state of the art for its time, and deserves wider recognition for its quality.



Jim Cahill (U.S.A.) 1948

One of the most prominent American rubber modellers in the years before the Second World War was Jim Cahill, who together with his elder brother Bob, grew up in Indianapolis, and were responsible for many technical innovations. Jim's first Nationals was the 1931 Dayton meet, and in 1934 he won the Stout Outdoor Trophy at the Akron Nationals. The following year Bob developed a folding propeller, and the concept was refined by Jim when he used a single bladed folder on his 'Clodhopper II' to win the 1937 Moffett Trophy at the Detroit Nationals, the first successful folder.

'Clodhopper II' featured an elliptical cross section, planked, semi-pod fuselage in conjunction with a two-wheel single strut 1/16" music wire landing gear. This was another new innovation, and became a standard feature on fuselage models until the development of the single strut retractable landing gear. The model utilized a shoulder wing mounting, and Jim used built-up box spars on the wing and tailplane in an effort to keep the extremities light, so that the model would be more responsive in thermal conditions.

On its winning flight in the 1937 Moffett, the model was lost, and spent four months in a cornfield, where it was eaten by grasshoppers. Jim had a difficult restoration project, but carried this out in his dormitory at Purdue University, while reducing the tailplane to a 33% Wakefield requirement from the 40% hitherto employed. Following restoration, Jim qualified for the United States team at the 1938 Detroit Nationals. He went on to win the Wakefield Trophy at Caudron Aerodrome in Guyancourt near Paris with a 32-minute flight.

After his Wakefield victory in 1938, Jim again qualified for the United States team in 1939 at the Detroit Nationals, but did not attend. However, he continued to produce innovative rubber designs. In 1940 *Model Airplane News* published 'Jasper', a 150 square inch shoulder wing diamond fuselage, complete with a single-bladed folder. This was followed by the 'Super Clodhopper' in 1941, published in *Air Trails,* a shoulder wing Wakefield which used a stringer on each side of a deep rectangular frame to create a hexagonal cross-section. Jim's final published design was the 1944 'Boxcar" in *Air Trails,* which was a 150 square inch high wing square body cabin, complete with single bladed propeller and a retracting wheel.

Following the announcement in 1948 of the resumption of competition for the Wakefield Trophy, the United States Wakefield Team Trials were held at the National Air Station at Olathe, Kansas during July. The event formed part of the Nationals, and Jim drove from his home in Connersville, Indiana to compete in the single event.

His 1948 entry was called the 'Ultra Clodhopper', and was an attempt to obtain the maximum possible aerodynamic advantage from the current Wakefield specification. The fuselage was long by contemporary standards at 39", which dictated a significant cross section under the $L^2/100$ requirement. The fuselage was of Clark Y shape, and was built of 1/8" square, with diagonal braces reinforcing the conventional uprights back to the rear rubber peg. The vertical rubber peg was set off centre in order to favour right thrust. A shoulder wing mounting was adopted, and combined with a single leg retracting undercarriage. With the cross section demands, the fuselage width was 3 1/2", and this width was constant for the rear 27 1/2" of the fuselage. Because projected wing area did not apply, the wide body used the then Wakefield actual area rule to gain in span and theoretical area

A similar approach was employed for the tailplane, which slotted through the fuselage to take advantage of the 33% tailplane size limitation.

The wing was polyhedral, in conjunction with a constant chord inner section and semi-elliptical tips. There were no spars, but relatively solid leading and trailing edge sections were enhanced by 1/32" sheet on the top surface, extending back 1 1/2" from the leading edge. The wing section was NACA 6409, and the balance point was located at approximately 50% of the chord. Once the balance point had been located, slots were cut in the reinforcing sheet on the fuselage sides to accommodate the

leading and trailing edge stubs. Rubber bands passing through the fuselage kept the wings in place under flight loads, assisted by wire struts anchored on the bottom longerons.

The tailplane was of simple rectangular shape and of sparless construction. It employed a thinned NACA 6409 section, and elliptically shaped asymmetric twin fins were used. The larger right fin on the inside of the turn was cambered, and incorporated a hinged trailing edge for adjustment. The smaller left fin was in effect a tip plate to enhance tailplane efficiency.

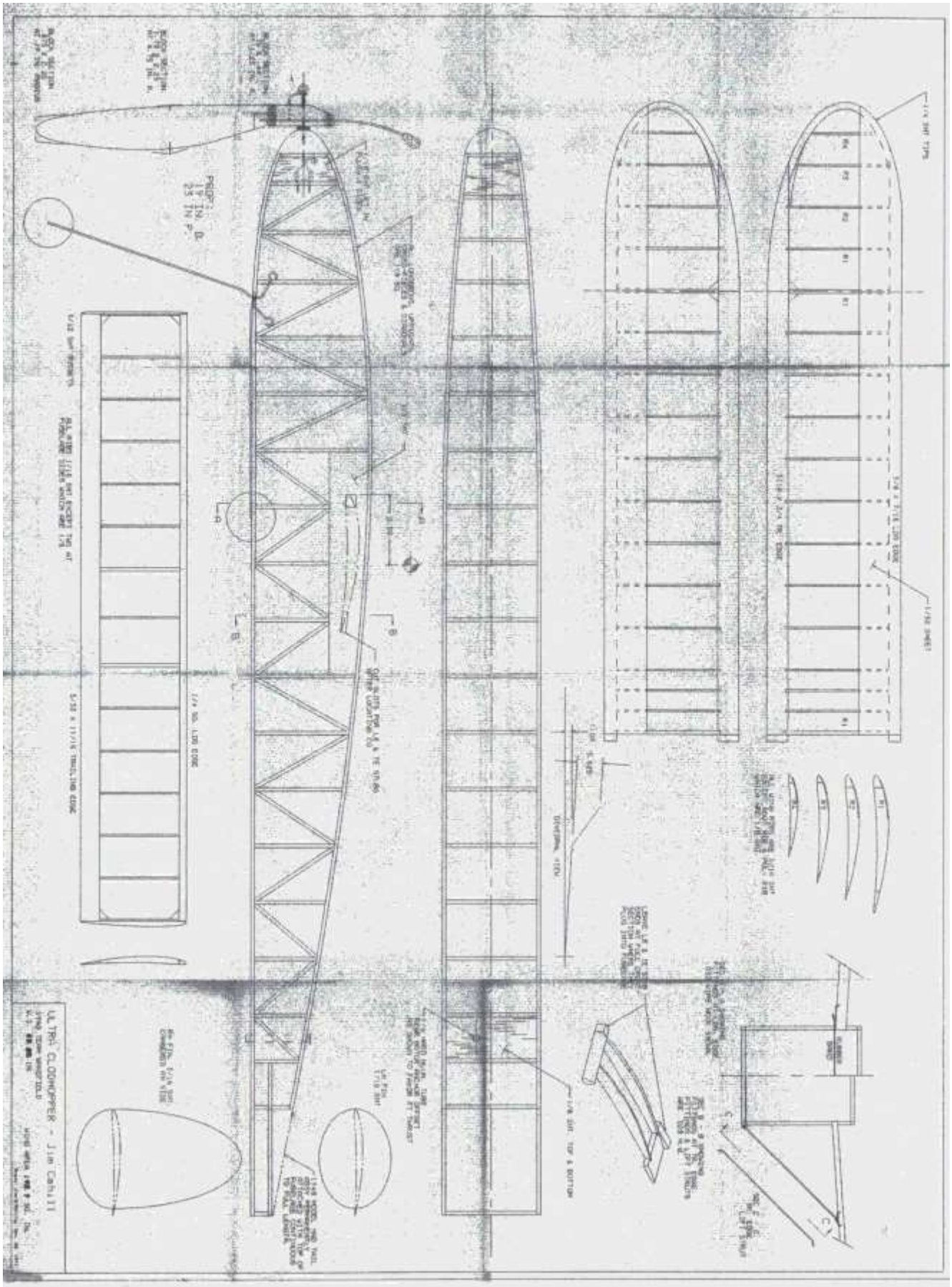
A single bladed 19” diameter folding propeller was used, covered with silk. It was driven by 24 strands of 3/16” U.S. rubber, 59” long, which weighed 5.0 oz. This motor was tensioned to fit taut between the hooks. It could take over 1400 turns which resulted in a two-minute motor run.

The fuselage was covered in yellow silk, while the wing and tailplane were covered in red tissue. Total airframe weight was 5.3 oz. to produce a solid, reliable model, and gave a flying weight of 10.3 oz., well in excess of the Wakefield minimum of 8 ounces.

Cahill had qualified for the United States team with an 11 minutes, 15 second, three flight total in 15-20 m.p.h. winds. The finals were held at Akron Airport, Ohio, on 27 August 1948, under very hot and calm conditions. Cahill’s first flight was 1:48.5, but he caught lift on the second flight to record 7:44.2. The model was not recovered, and a third flight could not be attempted, so an average of 3:10.9 resulted in an eventual 7th place.

This was Cahill’s last attempt at international competition, and he retired from competitive aeromodelling. Plans for the ‘Ultra Clodhopper’ were never published, but Jim O’Reilly drew up the design in CAD and drawings are available from him.

Jim Cahill was inducted into the National Free Flight Society Hall of Fame in 1980, and later into the Model Aviation Hall of Fame. Born on 24 March 1918, he died on 30 November 1990, at the age of 72.


ULTRI CLODHOPPER - Jim Cahill

Noel Hewitson - New Zealand

In the early post-war years one of the most active New Zealand modellers was Noel Hewitson, who flew with the Auckland MAC. He was active in all free flight classes, including indoor, and embraced control line as well. Generally, he flew own design models, and after each Nationals he would construct a fresh fleet of models ready for the next Nationals. Because he flew in most classes, and generally placed high, he was Nationals Champion on a number of occasions. An illustration of his success may be seen in *Aeromodeller,* May 1953, pp.284-5.

Noel was a keen Wakefield flier, and was chosen to represent New Zealand in the first post-war Wakefield Finals in 1948. Although his model reached the United States of America, and was flown extensively in testing, just prior to the actual event it was badly damaged and his entry had to be withdrawn, being replaced by E.H. Harold.

Noel's model was a rather attractive orthodox slabsider with a cabin. Longerons and spacers were 1/8" x 1/8" with formers of 1/8" sheet in the cabin area. The front of the fuselage back to the cabin was reinforced with 1/32" sheet. The polyhedral wing was rubber banded to the top of the fuselage, and utilised a constant chord centre section and inner panels, with elliptical tips. An own design wing section was used on a 5 1/2" chord, with a single spar of 3/8" x 3/16", in conjunction with a 1/8" x 1/8" leading edge and a 1/2" x 3/16" trailing edge. The tailplane was elliptical with a thin Clark Y section. The leading edge was 1/8'x1/8", as was the spar, and the trailing edge was 1/2" x 1/8". The undercarriage consisted of two 14g wire legs, with 2" wheels, and did not retract. Propeller was an 18" two bladed folder. The whole model was covered with Jap tissue. Power was 16 strands of 1/4" x 1/30" rubber 42" long, and the usual maximum turns in New Zealand were 600/700. The model flew right/left and the proxy flier was getting durations of 1:50 to 2:00 minutes after 7:00 p.m. Noel felt that the model had the potential to do very well, and it was considered quite a potent model for its day. The model was wrecked on take-off on the morning of the contest, when it spiralled into the concrete tarmac on full power. Noel thought that his proxy, Robert G. Schmidt decided to try an 18-strand motor to get the skyrocket climb much favoured by American modellers.

In 1949 Noel Hewitson qualified for the New Zealand Team and the Finals at Cranfield. His proxy was the famous English Wakefield flier Bob Copland. This was the second time that Copland had acted as the proxy for a New Zealand model, the first being the 1937 Wakefield Finals when he flew W.G. Alexander's model to 24th place with an average of 71.3 seconds. Noel's model bore a family resemblance to his 1948 design, in that a cabin was used on a slab-sided fuselage with a streamlined nose. The fuselage structure was 1/8" x 1/8", as were the spacers, faired into nose formers of 1/8" sheet. The wings were polyhedral, set above the cabin, with a constant chord centre section and inner panels, together with elliptical tips. No wing sheeting was used, only a lower surface spar with a 1/8" x 1/8" leading edge and a trailing edge of 3/8" x 3/16". An own design wing section was employed. The tailplane was of constant chord with end plates, utilising a 1/8" x 1/8" leading edge, a 1/8" x 1/2" trailing edge and a lower 1/8" x 1/8" centre spar. The section was a thinned Clark Y. Overall the model was covered in Jap tissue. A twin legged undercarriage of 14g wire was used in conjunction with 2" wheels. A single fin and underfin were used, with a straight leading edge and an elliptical trailing edge. Propeller was an 18" double bladed folder, powered by 16 strands of 1/4" x 1/30' Dunlop. Noel estimated the performance in evening air as 2 minutes plus.

On a day of generally low flight scores, at the finals Copland was only able to achieve flights of 57.7, 43.2 and 71.6 for an aggregate of 172.5 seconds and 50th place.

Hewitson's next team placing was for the 1953 Wakefield Finals, again at Cranfield. He had qualified at the 1952/3 New Zealand Nationals with an aggregate of 8:02.9 to place 3rd under very windy conditions. The 1953 model differed from his previous Wakefields in that the fuselage was

predominantly of diamond section, fairing into a circular nose, and employing a cabin as the wing mount. Noel said that he used a cabin on all his Wakefields to this point, and the same wing tip shape as well. The wings were a constant 5” chord fairing into the traditional shape. A significant change was the employment of straight v-dihedral, rather than polyhedral which had been used previously. Straight, closely spaced ribs were used, with a 1/8” x !/8” leading edge set on the diagonal, an inset centre spar of 5/16” x 1/8” and a trailing edge of 1/2” x 1/8”. Wing section was a modified NACA 6409.

The tailplane section was a thinned Clark Y, and geodetic ribs were used in conjunction with a single 1/8” x 1/8” upper spar. The tailplane shape also changed, with a straight leading edge being used in conjunction with a swept forward trailing edge. Tailplane tip fins assisted a single fin set in front of the tailplane. The fin had a small cut-out at the rear for D/T angle limitations, and there was a small underfin as well. Two legs of 16g wire were used with 2” wheels. The propeller was also a change, being a 20” diameter freewheeler, which faired into a spinner. The whole model was covered with Jap tissue. Sixteen strands of 1/4” x 1/30” Dunlop was used, pre-tensioned. Unusually for a freewheeler, the model was flown right/left and Noel said that it had an evening air performance in excess of four minutes. Noel also mentioned that he sent two wings and tails, but only one fuselage and propeller.

Immediately after the contest, Harry Hundleby, editor of the *Aeromodeller,* wrote to Les Mayn, Secretary of the New Zealand Model Aeronautical Association, with a report on the performance of the New Zealand models at the contest. Hundleby had acted as the New Zealand Team Manager. The report covered all aspects of the contest, especially the late arrival of the New Zealand models and the difficulties in uplifting them and getting them to the contest venue. The models were transported from New Zealand in an RNZAF Hastings, which had been delayed by magneto problems at Malta, and resulted in the models’ arrival only the day before the contest opened. Hundleby advised that the weather over the whole period of the meeting was absolutely perfect: just a light breeze, scattered cumulus cloud, and a fair amount of thermal activity, with temperatures in the region of 75 to 80 degrees.

As an aside, the contest was held on the College of Aeronautics field at Cranfield in Bedfordshire. At the time the Principal of the College was Air Marshal Sir Victor Goddard. He was a recently retired senior Royal Air Force officer, but in the period 1941-3 he had been seconded to the RNZAF, where he had held the position of Chief of the Air Staff.

With the late arrival of the New Zealand models, the proxy fliers had little time to become acquainted with their models, and had to test them on the morning of the Wakefield event. Journeying through the tropics had caused a few warps on most of the models, and the rubber appeared to have suffered. Hundleby reported; ‘Johnny Knight had two motors go and carried out quite a bit of repair work on Hewitson’s fuselage. Fortunately, Hewitson builds a tough model and even after a motor had gone on the contest field (incidentally while I was holding the model!) the fuselage was still quite repairable, and went on to fly quite successfully as you will see from the final results.’

In the first round – ‘Then out came Johnny Knight and myself with Hewitson’s model, only for the motor to break for the third time running, and we had to retire for repairs. Repairs consisted of replacing several spacers at the rear end of the fuselage and we completed the job in the nick of time, the model actually taking off as the bell rang for the end of the time period. The model flew very well and put up a time of 4:13. Incidentally, a point for Hewitson that I expect Johnny Knight will bring to his attention – there was insufficient room for the motor at the rear end of his fuselage, and it did tend to bunch if not closely watched.’

In round two –‘ Hewitson’s model was slightly out of trim… and only managed 1:34.’ Round three – ‘Johnny Knight, in spite of more turns, hit a very bad patch of weather indeed for only 1:30’. Hewitson’s final total was 7:17 and an eventual 49th place.

It was not until 1961 that Hewitson again formed part of the New Zealand Wakefield Team. He had qualified for the team at the 1960/61 Nationals held at New Plymouth. His model reflected the reduction in rubber allowance to 50 grams, and resulted in a design with conventional proportions, based around a sheet diamond fuselage with a low pylon. Practical realities meant that the cabin approach had been discarded. The fuselage was a 3/32” sheet box, with 1 1/2” parallel sides, which allowed plenty of room for the rubber motor. However, the tail boom was different, in that it was rigged so that the top was a straight-line continuation of the motor tube in the side view, but the bottom was swept up. This gave a most unusual visual impression when the model was in the air, with the tail boom appearing to be canted up at an extreme angle.

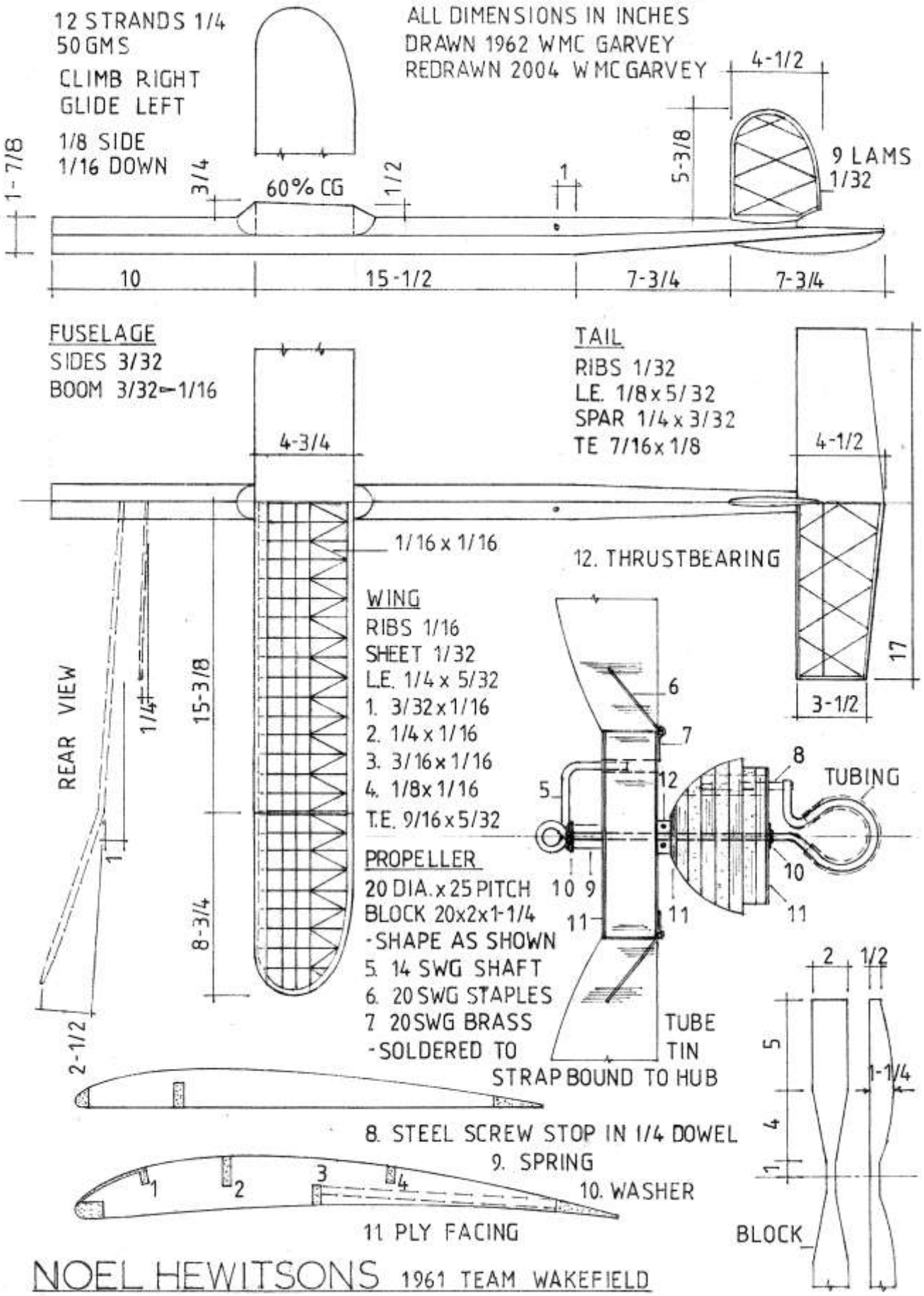
The wing was particularly strong, being of multi-spar construction, with a sheeted leading edge, and diagonal bracing extending from the rear upper spar to the trailing edge. Noel used the same wing tip shape as on his earlier designs, while the tailplane was similar in shape to his 1953 model, with a straight leading edge, diagonal ribs and a tapered trailing edge. The wing section was again modified NACA 6409, and the tailplane thin Clark Y.

Noel reverted to a double-bladed folding propeller of 20” diameter and 25” pitch. He had two versions of the model; one powered by 12 strands of 1/4” Pirelli, with the other using 14 strands. The model flew right/left assisted by slight tailplane tilt.

At the 1961 Finals, Noel placed 52nd, with his model being flown by Waldhauser. Noel’s flights were 108, 91, 146, 150 and 179 seconds for an aggregate of 672 seconds.

Noel continued to fly this model for the remainder of the decade, and placed highly in provincial and national contests. It proved to be his last Wakefield as deteriorating health prevented him from flying actively. He suffered from a genetic disorder of brittle bones, and this created increasing problems of mobility, reducing his ability to retrieve models.

Noel died in 1998, after a lifetime devoted to modelling, but hampered in later years by his health issues.


12 STRANDS 1/4
50 GMS
CLIMB RIGHT
GLIDE LEFT
1/8 SIDE
1/16 DOWN
ALL DIMENSIONS IN INCHES
DRAWN 1962 W MC GARVEY
REDRAWN 2004 W MC GARVEY
4-1/2
9 LAMS
1/32
5-3/8
1-7/8
3/4
60% CG
1/2
1
10
15-1/2
7-3/4
7-3/4
FUSELAGE
SIDES 3/32
BOOM 3/32-1/16
4-3/4
TAIL
RIBS 1/32
L.E. 1/8x5/32
SPAR 1/4x3/32
TE 7/16x1/8
4-1/2
17
3-1/2
1/16 x 1/16
12. THRUSTBEARING
WING
RIBS 1/16
SHEET 1/32
L.E. 1/4 x 5/32
1. 3/32x1/16
2. 1/4x1/16
3. 3/16x1/16
4. 1/8x1/16
T.E. 9/16x5/32
REAR VIEW
1/4
15-3/8
1
8-3/4
2-1/2
PROPELLER
20 DIA.x25 PITCH
BLOCK 20x2x1-1/4
-SHAPE AS SHOWN
5. 14 SWG SHAFT
6. 20 SWG STAPLES
7. 20 SWG BRASS
-SOLDERED TO
TUBE
TIN
STRAP BOUND TO HUB
TUBING
8. STEEL SCREW STOP IN 1/4 DOWEL
9. SPRING
10. WASHER
11 PLY FACING
BLOCK
2
1/2
5
1-1/4
4
1
NOEL HEWITSONS 1961 TEAM WAKEFIELD

Bryan Marsh – Silver Eagle series 1948-53.

During the period 1948-53, the most widely known New Zealand Wakefield modeller was Bryan Marsh, as his models placed consistently high in Wakefield Finals, all in the hands of proxy fliers. He placed 2nd in 1948, 6th in 1949, 42nd in 1950, 18th in 1952 and 19th in 1953. His series of models were all named 'Silver Eagle', and illustrated progressive development over a period of time. He used a common wing planform, and apart from the Mark V version, a common wing section, the Eiffel 400, as well. Marsh was an aeronautical engineer, working for Tasman Empire Airways Ltd (TEAL), which later became the nucleus of Air New Zealand, and all his models illustrated a sound engineering approach.

Silver Eagle I- 1948

In 1948, when the first post-war Wakefield Finals were announced, the New Zealand Model Aeronautical Association, which was then based in Auckland, called for expressions of interest from New Zealand modellers wishing to participate in trials. These trials were held in Auckland, and eventuated in a full team of six being selected, with all members being from the Auckland MAC. The models were airfreighted to Chicago, where proxy fliers were selected. Among the proxy fliers were Otto Curth, Ed Lidgard and one J. Ritzenthaler (who later shortened his name to Ritz and became the 1959 World A2 Champion.)

The proxy fliers attempted to sort out their charges with numerous test flying sessions, and made modifications to most of the New Zealand models. Generally, these modifications were to increase dihedral, but in Marsh's case the undercarriage was also changed from a twin-leg to a rubber loaded single leg.

At the Finals, held at Akron, Ohio on 27 August 1948, Otto Curth flew Marsh's model to second place with flights of 2:58.2, 12:11.1 and 2:26.3, for an average of 5:52.5. The model featured a diamond fuselage, which faired into a spinnered nose, with a single bladed folding propeller. The sparless wing had constant chord inner panels, while the tips were Plecan's ellipse in outline. Small fins mounted underneath the tailplane provided the three point take-off attitude in conjunction with the undercarriage leg.

As befits its name, the fuselage was silver in colour, as was the fin, while the wing and tailplane were red. The fuselage was covered in a light grade of silk, while Jap tissue was used on the wing and tailplane.

Following the return of the model to New Zealand after the Wakefield Finals, I saw the 'Silver Eagle I' fly at a major provincial contest a few months later. As an experiment, Marsh had substituted twin fins for the single fin flown at Akron. I held the model for winding, and on its only flight the model raced around in tight circles not climbing, with its motor vibrating badly. Marsh did not fly the model again, and I was most disappointed as I was looking forward to seeing a top-class Wakefield perform.

Plans for the 'Silver Eagle I' have never been published, but sufficient building plan remnants still exist from which a plan could be generated with the assistance of photographs. Bill McGarvey has listed this plan as a long-term project, and should be able to produce an authentic re-creation.

There is a postscript to the story of this model. A few years ago, I was in touch with Otto Curth, then living in retirement in Florida. Fifty years after the event, Otto regarded his second placing in the 1948 Wakefield Finals flying proxy for Bryan Marsh as the highlight of his modelling career.

Silver Eagle II - 1949

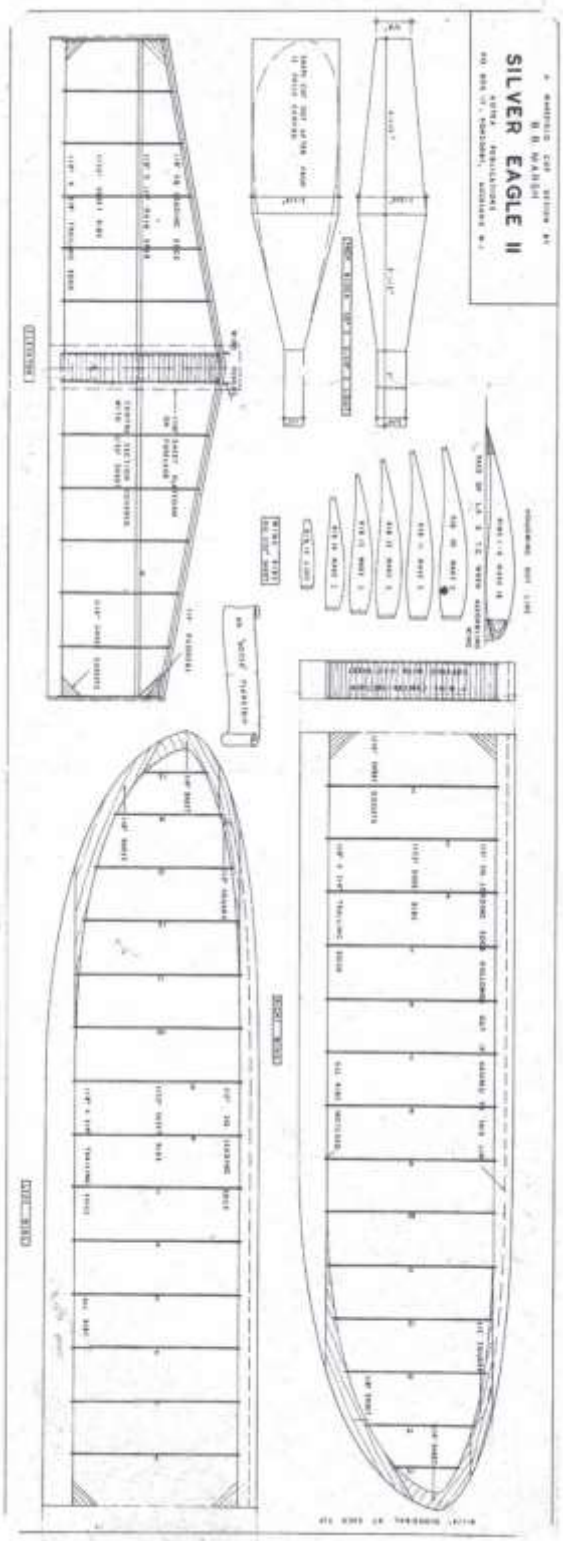
'Silver Eagle II' was an attempt to clean up and improve the initial approach adopted in 'Silver Eagle I.' A diamond fuselage, built from 1/8" x 1/8" was retained, but external stringers were deleted, as was any streamlining around the nose. A single fin was also retained, while the tailplane had tip fins for use in conjunction with the monowheel undercarriage, retaining the Chicago modification to the Mark I. The most significant change was to the wing, which, while retaining the same shape and wing section, was converted from polyhedral to straight dihedral, with a short, flat centre section. The wing was mounted on a sheet pylon. Power was 16 strands of 1/4" x 1/30" Dunlop 42" long, with suggested maximum turns of 850. Weight of rubber was 3oz, with an airframe weight of 5 1/2 oz., as follows:

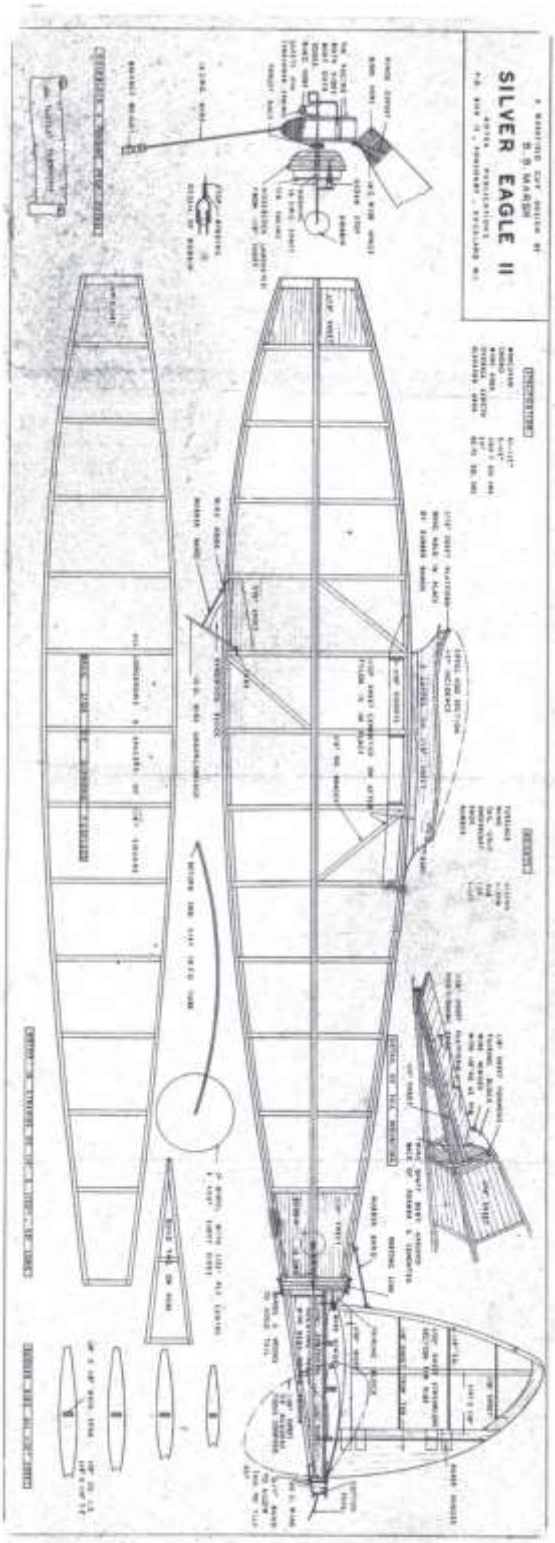
Fuselage	1.69
Wing	1.19
Tail Unit	0. 87
Undercarriage	0.25
Propeller	1.50
	5 5 oz.

At the 1949 Wakefield Finals held at Cranfield, weather conditions were not good, with high winds of 20-25 knots marring the event. Marsh's model was proxy flown by P.T. Taylor, who produced flights of 290.4, 12.5 and 166.2 seconds, for an aggregate of 469.1 seconds and 7th place. The excellent first flight of 290.4 seconds gave a second placing at the end of the first round, but the disastrous second flight reduced the position to 9th in the second round, while the final flight assisted in bolstering the position to a final seventh. A photograph of the model at the contest appears in Model Miscellany at p.572 of the September 1949 *Aeromodeller.*

In 1950 a New Zealand firm called Aotea Publications started offering plans for this design, and even advertised in *Aeromodeller* (August 1950, p.544). Aotea Publications was the brainchild of Les Mayn, the then Honorary Secretary of the New Zealand Model Aeronautical Association. Years later Mayn admitted to me that he 'hoped to make a few bob' from producing the design, but demand was low and advertising soon ceased. The plan was on two sheets, and included three pages of duplicated building instructions which were very detailed. I only ever saw one example flying in New Zealand, but Russ Hansen of Palmerstone North built one and was selected for the 1950 New Zealand Wakefield team. Hansen was a superb builder, and a noted speed flier, but his venture into Wakefield flying was an aberration. A photograph of Hansen's all-red 'Silver Eagle II' is shown on p.639 of the October 1950 *Aeromodeller.* In the 1950 Wakefield Finals, the model had only one flight of 3 seconds to place 61st.

The Achilles heel of this model was the flat centre section to the wing, which allowed the wing to rock in gusty conditions, leading to take-off difficulties. That aside, the design was otherwise sound and conservative, with the potential to achieve a reasonable performance.





Silver Eagle III- 1949

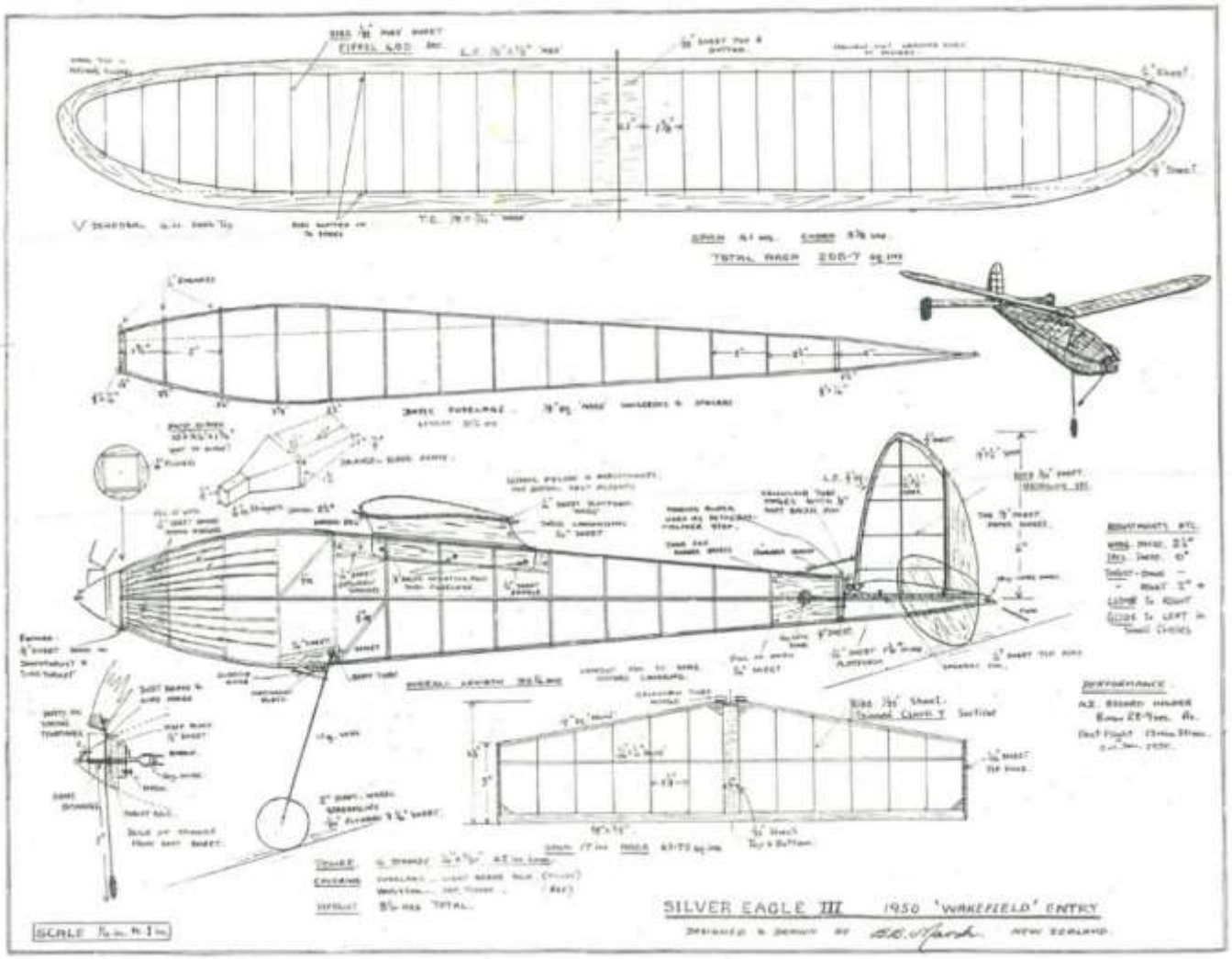
Marsh was quick off the mark with his new version of the ‘Silver Eagle’, and by late 1949 had produced the Mark III which he flew in the 1949/50 New Zealand Nationals. This model followed the same general approach as the Mark Ii with the wings, tailplane and fin being identical, apart from the elimination of the flat centre section on the wing, which was replaced by a straight V-dihedral to overcome the weakness of the earlier model. However, the fuselage was significantly different in shape, essentially being changed from a symmetrical view in profile to where the maximum cross-section occurred within 6” of the nose and the fuselage then tapered in a straight line to the tail. Additionally, 1/16” x 1/16” stringers on the basic fuselage structure to fair the shape from a circular spinner at the nose to a square

at the maximum cross section. In all other respects the new model used the same structural approach as the Mark II, including the same single bladed propeller block size, and a motor of 16 strands 1/4” x 1/30”, 42” long. But an innovation was making the pylon placement adjustable for early test flights, marking a departure from the fixed position on Silver Eagle II. The fuselage was covered with silk (silver), with the wing and tailplane in Jap tissue (red). All up weight was 8 1/4oz.

The model was immediately successful and won the Wakefield event at the 1949-50 New Zealand Nationals with flights of 13:12, 2:26 and 9 minutes. I can recall seeing these flights which were made in strong thermal conditions. The climb of the model was excellent, but the glide was stally, resulting in the short second flight, while thermals on the first and third flights were sufficiently strong to offset the stalling glide. Marsh flew right/left and used about 1/4” left rudder to obtain a tight glide circle. A photograph of the model is on p.215 of the April 1950 *Aeromodeller.*

Later in the year the model was proxy flown in the 1950 Wakefield Finals at Jamijarvi, Finland. The model was proxy flown by S. Sandberg of Sweden, and placed 42nd with flights of 163.5, 6.8 and 73.9 seconds. After the model’s return to New Zealand, Marsh won the Wakefield event at the 1950/51 Nationals, and placed consistently high in domestic competitions. He thought the design sufficiently promising to send a three-view to Frank Zaic, and it was published in the *1951-52 Yearbook.* A copy of this three-view accompanies this article.

The *Frank Zaic Yearbook* drawing inspired Terry Rose to produce a full-size plan, and also to build a number of examples of the design. He found that it flew beautifully, being easy to trim and having a good performance.



Silver Eagle IV – 1952.

After his disappointing result in the 1950 Wakefield Finals, Marsh realised that a fresh approach was necessary. New Zealand did not send a team to the 1951 Wakefield Finals, but the 1951-52 Nationals were used as Trials for the 1952 Finals. Marsh placed second in these Trials, flying 'Silver Eagle III' and averaging nearly three minutes per flight.

His first version of 'Silver Eagle IV' was flying by March 1952, and was a further step in the development process. It was basically a stretched 'Silver Eagle III', but with the adoption of a double-bladed propeller for the first time. The fuselage was the same basic shape as the Mark III, but looked at least 10" longer. I witnessed an early test flight on low turns, which resulted in a smooth climb, followed by a floating glide. Needless to say, I was most impressed, and looked forward to a good result at the 1952 Finals.

However, by the time the New Zealand models came to be despatched for the competition, Marsh had substituted a new fuselage. This was more akin in outline to the Mark II, and was completely different from the Mark III derivative I had seen flying in March. At the finals, Marsh's model was again flown by proxy, and he placed 18th to top the New Zealand team. Flights were 90, 170 and 296 seconds for an aggregate of 556 seconds.

The 1952 'Silver Eagle IV' is the one design in the series which has not been documented. No plans exist, nor any fragments of the model.

Silver Eagle V – 1953.

The final development in the 'Silver Eagle' series continued with a significant advance in complexity and sophistication. While the same basic approach of a diamond fuselage, with a straight dihedral wing and single fin was adhered to, every part of the design was reviewed.

Marsh continued with a double-bladed folding propeller of 18" diameter and 20" pitch. The basic fuselage was approximately 37" long, with 1/8" x 1/8" longerons, but warren girder 1/8" x 1/16" spacers were employed in place of parallel 1/8" square spacers, which had been used exclusively until now. The wing was mounted on a wire parasol joined by circular bamboo runners, in place of a balsa sheet pylon. While the traditional wing plan form continued to be used, sparless construction was shelved in favour of a single tapered upper spar, used in conjunction with 1/32" sheet to the leading edge. A single detachable fin was employed, but the tailplane tip fins were reduced in size, although still giving a three-point attitude for ROG take-offs, with the single leg undercarriage and wheel.

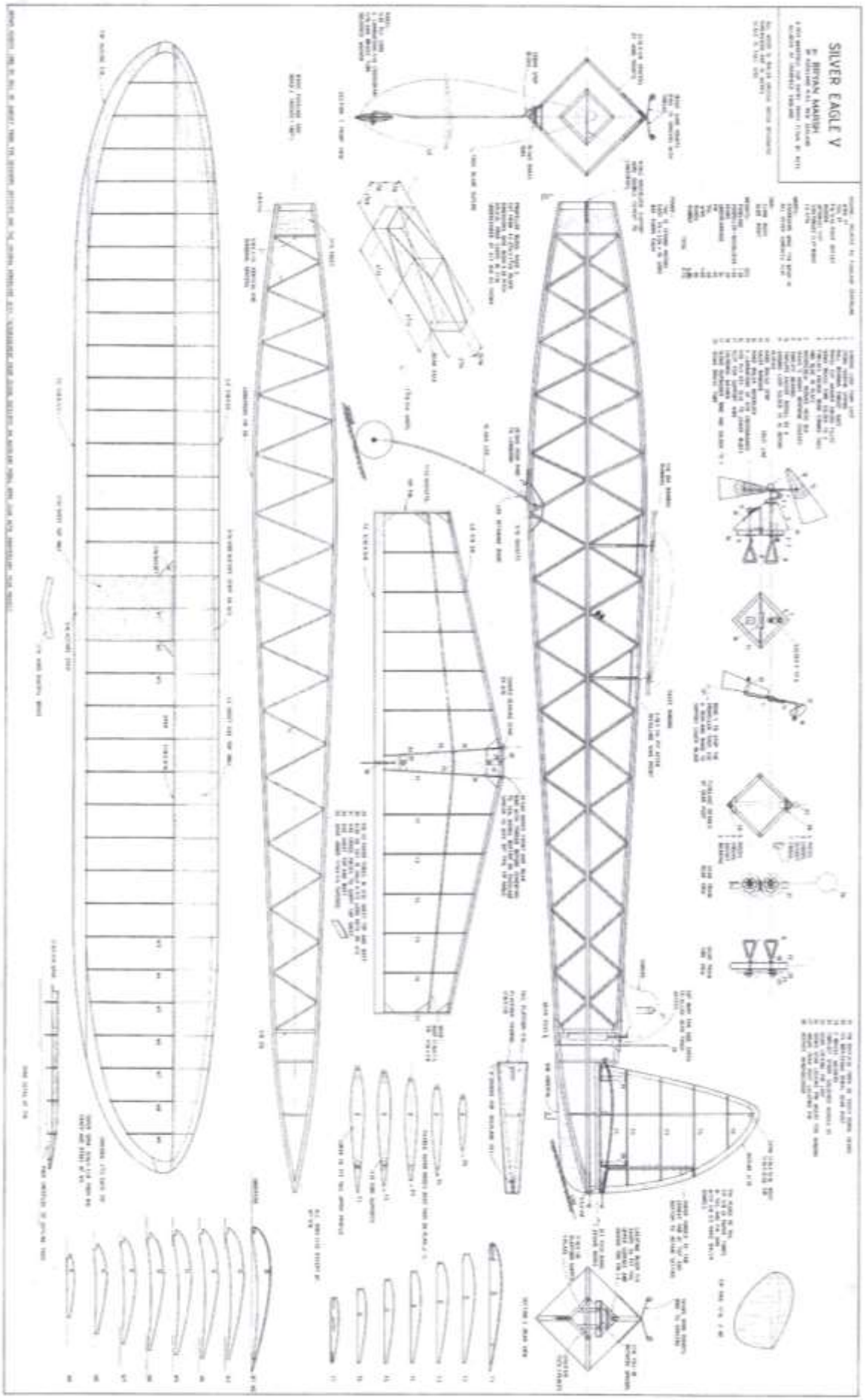
But the big change was the adoption of gears, driven by two motors of 12 strands 1/4" x 1/24" 36" long, which gave an estimated maximum turns of 820 for each motor. The flight pattern was also changed to right/right from the right/left approach used previously. To assist this pattern 1/16" wash-in was used on the right wing in conjunction with 1/16" right offset on the rudder.

The total airframe weight was down, coming in at 4.35 oz., which together with a rubber weight of 4.80 oz. gave a flying weight of 9.15oz. These two figures were a considerable improvement in power/weight ratio over previous models, with a significant reduction in structural weight being compensated by an increase in rubber weight.

At the 1953 Wakefield Finals held at Cranfield, 'Silver Eagle V' was proxy flown by Peter Allaker of the Surbiton club, and a photograph of the two appears on p.596 of the October 1953 *Aeromodeller.* Contest flights were 5:00, 2:47 and 5:00 for an aggregate of 13:47 and 19th place, which was the top position on the New Zealand team.

As a sequel to this event, the New Zealand Wakefield models were mistakenly stored in the loft of the *Aeromodeller* offices, and were not discovered for some twenty-five years, after which they were returned to New Zealand. The 'Silver Eagle V' was in good condition, and Bill McGarvey was able to produce a full-size drawing for the Auckland MAC 60th Anniversary celebrations in 1988. Copies of this drawing are available through Mike Woodhouse at Free Flight Supplies. After a delay of a further twenty-five years, Bill is currently building a version with the objective of flying it at the 2015 New Zealand Nationals.

At the 50th New Zealand Nationals in 1998/99, Bryan Marsh produced the original 'Silver Eagle V' and made some demonstration flights in gusty conditions. The model flew well and was a perfect commemoration for the occasion.


SILVER EAGLE V

Ed Lidgard (U.S.A.) – 1949

Another prominent American modeller was Ed Lidgard, who grew up in the Chicago area and joined the Chicago Aeronuts club. Born in 1919, he became an accomplished rubber flier from an early age, and had his first published Wakefield, the 'Hi-Ho', featured in the February 1941 *Air Trails,* and re-published in the January 1982 issue of *Model Builder.* A Class C Fuselage model had been published earlier in the 1940 *The National Model Airplane Meet in Pictures,* with a plan available from Jim O'Reilly. This was followed by the 1941 'My Sparky', a design that was simplified and kitted by Comet post-war, which has remained in production ever since. 'My Sparky' was published by *Model Builder* in its original form, in May 1981.

Ed's next published Wakefield was the 'Eugene II', which appeared in the April 1948 *Flying Models.* Various versions of the 'Eugene' were produced, with 'Eugene I' being slightly smaller than Wakefield size, and 'Eugene III' slightly larger. Jim O'Reilly lists a 'Eugene' plan in his Old Time Rubber section, together with a 'Eugene III' in the Nostalgia Rubber section. *Model Builder* published a plan for the 'Eugene II' in their October 1977 issue.

Some ten years ago I was corresponding with a modeller who lived in the Los Angeles area, searching for plans of an elusive Wakefield. This modeller not only had the plan I was seeking, but he also offered the plans for Ed Lidgard's 1949 Wakefield. After a lifetime in Chicago, Lidgard had retired to Los Angeles, and it was during this period that my correspondent had obtained the plan. Ed was an accomplished draughtsman, first at Comet, and later at Midwest, where among other designs he was responsible for the plan of the 'Fubar'. The 1949 Wakefield plan had been drawn up while he was in Los Angeles, where he used to fly regularly at Mile Square. On my first visit to this site, I missed him by a matter of moments, much to my regret.

Lidgard qualified for his first team place representing the United States in 1949 at the Wakefield Finals held at Cranfield. On an extremely windy day he had flights of 72.0, 77.1 and 159.2 seconds for an aggregate of 308.3 seconds and 20th place. In the September 1949 *Aeromodeller* report at p.559 is the only comment about his flights – 'Lidgard provided a diversion by producing a pukka rugby tackle to catch his model as it was blown down the runway, but he finally got the model away for a flight of 72 seconds, the dethermaliser coming into operation too soon.'

Photographs of Lidgard in the same *Aeromodeller* issue show him in the processing queue (p.560); the classic 'Talk about tortured T56' with Lidgard winding, assisted by Naudzius and Tangney (p.562); and a shot of his model under 'Model Miscellany' at p.573.

The model itself was quite small, with a span of 38". Effective wing area was only 176 square inches, although the projected area was 195 square inches. The wing was set on top of a rectangular fuselage, which featured considerable forward side area. A retractable single leg undercarriage was employed, with a 2" wheel. The tailplane was double tapered, and was fitted with an undercambered section, in either an anhedralled or flat mode. A single fin was used. An 18" double bladed folder was powered by a series of options, all 52" long. Lidgard suggested 14 strands 1/4" x 1/24", but alternates were 20 strands 1/4" x 1/30", or 42 strands 1/8" x 1/30", or 30 strands of 3/16" x 1/30". The maximum turns for all these motors were quoted as 1450.

The most interesting aspect of the design affected the wing section. Lidgard felt the original section had a leading edge that was too sharp, which caused excessive centre of pressure travel and resulted in longitudinal sensitivity. This produced a high sinking speed on the glide, and confused the *Aeromodeller* reporter into thinking that the D/T had operated on the first official flight at Cranfield. Lidgard swiftly changed the wing section, and future versions reflected this change. Jim O'Reilly has produced a CAD plan and short kit for the revised version, and lists it in his plans service.

Ed must have been happy with the general layout, as the design was featured in an article 'Four to Five', by Wally Fromm in the May 1951 *Air Trails'.* Fromm said that at Cranfield, Lidgard's model was climbing 75' higher than Ellila's, but the poor glide resulted in low overall flight times. With the changed wing section, flight times had improved markedly, and were now in the 4:15 to 4:30 range. Lidgard had increased the power to 48 strands of 1/8" T56, weighing 5 ounces, which on 1450 turns gave a motor run of 65 seconds through an 18" x 25" propeller. Component weights were as follows:

Wing	0.85
Fuselage	1.75
Tailplane and Fin	0.40
Propeller	0.95
	3.95 oz.

In the *Air Trails* article, the design is called the 'Airwick II'. Jim O'Reilly, who knew Lidgard well, cannot accept that he would have used the name seriously. To Jim, the name is out of character, but he accepts that it may have been suggested facetiously.

Lidgard was famous for his ability to wind rubber motors, and to obtain more turns than most modellers would contemplate. In the *1953 International Competition Handbook,* compiled by modellers from the Chicago area, Lidgard contributed an article entitled 'Rubber Care and Winding' at p.9. This article illustrates the care he took with his motors, which in many respects was years ahead of the contemporary practice, and explained why he could achieve the results he accomplished.

Lidgard was also a member of the United States 1952 Wakefield Team. He placed 27th with flights of 2:33, 3:32 and 1:45 for an aggregate of 7:48. His 1952 design was published in the *1953 Frank Zaic Yearbook,* and was regarded as an example of a 'minimum size' Wakefield.

Ed Lidgard died in 2002, at the age of 83.

Alan Lim Joon (Australia) - 1949

One of the better-known Australian fliers has been Alan Lim Joon, who took up modelling in the late 1930's, and designed the model with whom his name has been associated in 1941. From 1942 he won numerous Victorian state contests, and at the 1948 Australian Nationals he won the Wakefield event against fierce competition, which included his contemporary Alan King, later the winner of the 1954 Wakefield Trophy. This success enabled Lim Joon to represent Australia at the 1949 Wakefield Finals held at Cranfield. His proxy flier was Jim Tangney of the Croydon club, and on a very blustery day Tangney achieved flights of 154, 147 and 68.8 for an aggregate of 369.8 seconds, and 15th place. In a letter to Lim Joon, Tangney advised that 'Your model out-glided the English models by far, and I would not be frightened to fly the model in any contest. It was only that terrific downdraft on the last flight that kept us out of the first few places.'

Lim Joon's design was straightforward, with an approach which was followed by the majority of Australian designs for that period. The fuselage was slab-sided, being rectangular in shape, utilizing 1/8" x 1/8" longerons and 1/8" x 1/16" spacers. A single strut, rubber-actuated, wire undercarriage was employed, and a detachable tail plug fitted.

The wing was of constant chord, with rounded tips and was very robust as three spars were employed together with a 1/32" top sheeted leading edge. Ribs were 1/32" sheet, but 1/32" x 3/32" cap strips were used on the top surface. No name was supplied for the conventional, undercambered wing section.

The tailplane was straightforward, being of constant chord with a Clark Y type section, utilizing a single upper spar and 1/32" sheet ribs. Twin fins of 1/16" sheet completed the tailplane assembly.

An 18" diameter single blade folder powered the design. The whole combination produced a very reliable, stable model.

Weights were as follows:

Wing	1.00
Fuselage	1.75
Tail Plug/Tailplane/Fins	0.37
Propeller	1.50
	4.675
Rubber	3.50 - 8 strands 1/4"x 1/30" 46" long.
	8.17ozs.

The model balanced at 50% chord, and employed a right/left flight pattern. Lim Joon said that on 850 turns, the resulting motor run was 50-55 seconds, which produced a flight of 2.30-2.45 without assistance. No doubt on modern rubber this conservative flight estimate could be enhanced.

Lim Joon also entered the model in the 1951 Wakefield Finals at Jami-Jarvi in Finland. It was proxy flown by Leo Santala of Finland, and recorded flights of 186.0, 66.1 and 146.3 for an aggregate of 396.4 seconds and 25th place.

Seventeen examples of this design were built by Alan and they have proven very popular in SAM competitions, both in Australia and the U.K. Part of this popularity related to the availability of a full size plan from Terry Rose, which made the design more widely available beyond its initial Australian publication in the March 1950 *Australian Model Hobbies.*

With the reduction in the rubber allowance to 80 grams in 1954, Lim Joon updated his design to reflect the reduced quantity of rubber. While he retained the same general approach of his earlier design, the biggest change was to the fuselage. This was considerably longer at 45 1/2", up from the original 37 5/8" overall length. The rectangular shape was discarded for a diamond section, and Warren girder

spacers of 1/16” x 3/16” were adopted. However, the diamond section was not symmetrical, with the upper portion being extended to provide a wing mount. This required the fuselage to be built on a jig, with the upper portion being constructed first on a flat board, then lifting and adding the lower portion. Longerons of 1/8” square were used, but whereas the centre longerons were built flat on the board, the upper and lower longerons were rotated through 45°. A separate tail cone allowed the tailplane to pivot for D.T. purposes. The single leg retracting undercarriage was retained, but was made of spruce instead of wire, and pivoted off the lower longeron.

The tailplane itself was slightly larger, although still of rectangular form, with a span of 19” and a chord of 4”. A geodetic structure was adopted for the ribs, which were of 1/32” sheet, and 1/32” sheet was employed on the upper surface, extending forward to the leading edge from the single upper spar of 3/16” x 1/16”. A Clark Y type flat section was used, while the 1/16” sheet twin rudders were retained.

The wing used the same basic plan form and tip shape, and retained the same chord of 4 3/4”, but the inner panel was extended from 13 1/2” to 15”, with a slight reduction in the tip panel from 9” to 8 1/2”. The total dihedral was also reduced from 4 5/8” to 3 7/8”. But the biggest change came in the structure, where the multi-spars were replaced by a single 1/8” spar on the upper surface, which tapered from 3/8” to 1/8”. This spar was enhanced by 1/32” sheet on the top surface, with the sheet extending from the spar to the leading edge. The same wing section was retained, but the ribs were now of 1/16”, without any upper surface cap strips.

Lim Joon must have been happy with his original propeller, as he utilised the same shape on his new design. However, he increased the diameter to 21” from 18”. The model was taken to the 1954 Wakefield Finals at Long Island, New York by Alan King. There it was proxy flown by Manuel Andrade (U.S.A.) to third place with flights of 180, 143, 180, 180 and 180 for an aggregate of 863 seconds, 37 seconds behind the winner King, who had a perfect score.

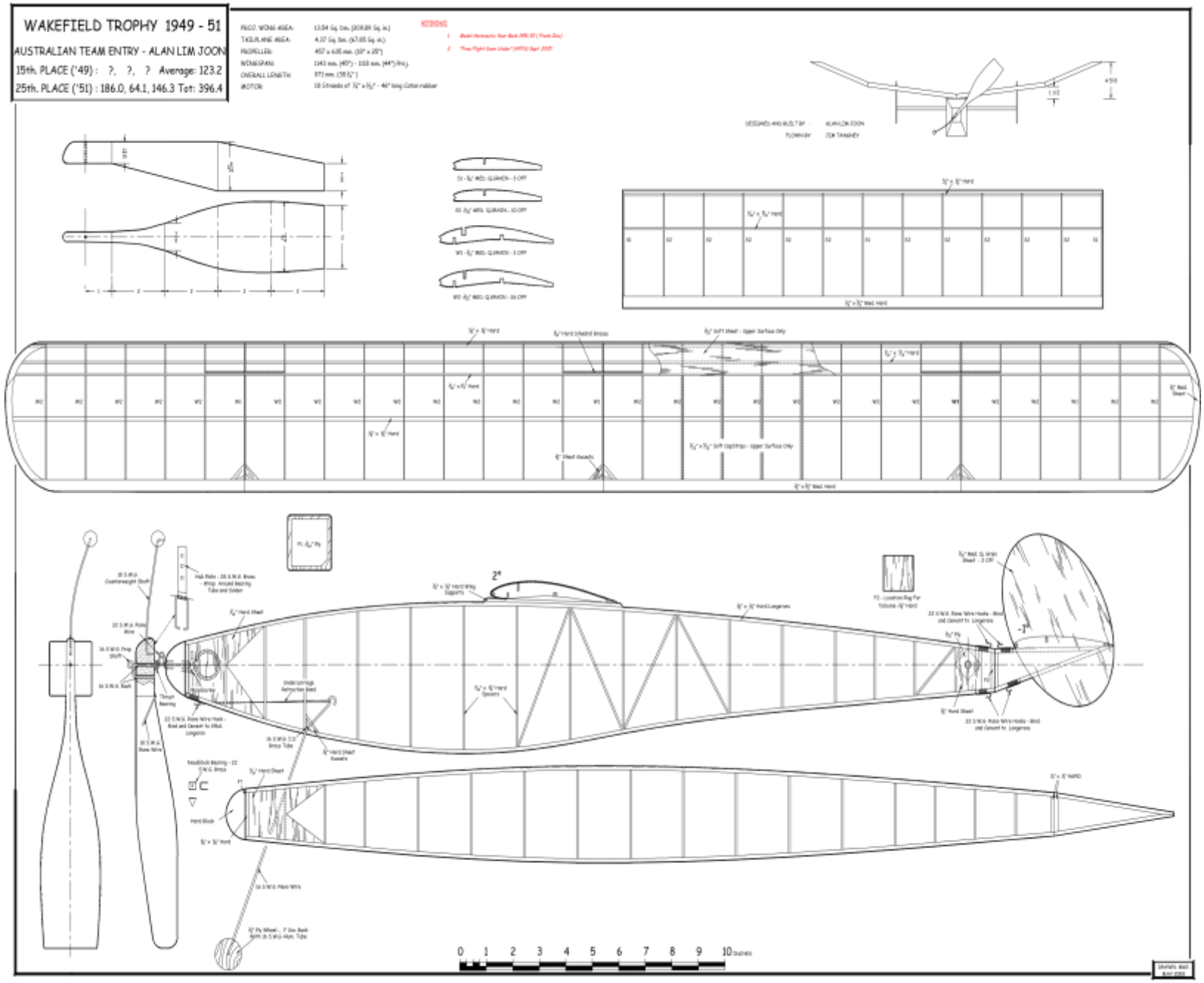
Weights were as follows:

Fuselage	2.30
Wing	1.25
Tail and Fins	0.70
Propeller	1.25
	5.50
Rubber	2.75
	8.25 oz.

Plans for this model were published in the June 1954 issue of *Aircraft.* The balance point for this design was considerably further aft than the earlier model, being at 60%. On the plan no details of the flight trim were suggested, nor was the size of the motor specified, but these items could have been covered in an accompanying article.

Mike Glaister has drawn up both plans in CAD, and his plans accompany this article.

After the 1954 Wakefield Finals, Alan Lim Joon dropped out of modelling for some 40 years, to reappear again in the 1990’s. He was a fine all-round modeller, and his two published Wakefield designs are of the highest standard.


WAKEFIELD TROPHY 1949 - 51
AUSTRALIAN TEAM ENTRY - ALAN LIM JOON
15th. PLACE ('49) : ?, ?, ? Average: 123.2
25th. PLACE ('51) : 186.0, 64.1, 146.3 Tot: 396.4
PROJ. WING AREA: 12.04 Sq. Dm. (809.89 Sq. in.)
TAILPLANE AREA: 4.37 Sq. Dm. (67.05 Sq. in.)
PROPELLER: 457 x 635 mm. (18" x 25")
WINGSPAN: 1143 mm. (45") - 1118 mm. (44") (Pro.)
OVERALL LENGTH: 971 mm. (38 ½")
MOTOR: 18 Strands of ½" x ½" - 46" long Cotton rubber
DESIGNED AND BUILT BY - ALAN LIM JOON
FLOWN BY - ZEK TANNEY
0 1 2 3 4 5 6 7 8 9 10 INCHES

Sancho Pepe – G. Janni (Italy) 1949

Although he represented Italy only once at a Wakefield Finals, G. Janni continued to exert an influence over Italian aeromodelling for some years, as he was a very capable draftsman, and drew up plans for many Italian models during the 1960's.

His 1949 model 'Sancho Pepe' was a straightforward design, described as a shoulder wing slabsider with a single fin and double bladed freewheeler. The fuselage was 920mm in length, with a maximum cross section of 113 x 75mm. Longerons were 4 x 4mm, and the parallel spacers 4 x 2mm, with an average pitch of 63mm, which were enhanced by diagonals at the nose, in front of the rear motor peg and at the wing mounting. At the latter site 3mm sheet balsa was let inside the longerons, and reinforced with ply, to provide a mount for a 2.5mm wire let into the wing. Incidence was maintained by a short tongue of 1mm ply protruding from the root rib just in front of the trailing edge. The wing was held in place by an internal rubber band. A twin legged wire undercarriage was employed, with the main strut being 1.5mm, assisted by a bracing strut of 1.0mm, and equipped with wheels.

The wing was of 1235mm span, with a chord of 125mm. In planform it was rectangular to the polyhedral break, with the tip shape being a pleasing blunt ellipse. Dihedral was 15mm at the inner break and 70mm at the tips. While this appears to be relatively conservative, the model seemed to handle the turbulent conditions at Cranfield without too much difficulty. No name was attributed to the wing section, but it bears a resemblance to an RAF 32. The thickness of the ribs was not stated, but would appear to be 0.8mm sheet. There was a single mainspar of 2 x 4mm on the top surface of the rib, with a very solid leading edge of 6 x 6mm, and a trailing edge of 2 x 12mm. Superimposed on the leading and trailing edge top surface was 0.8mm sheet, respectively 13mm and 18mm wide. This would have given a stiff, but relatively light, wing.

The tailplane was of constant chord, with rounded tips, and featured a thin Clark Y type section. An internal mainspar of 2 x 4mm was employed to provide a balanced structure. A single removable fin fitted on top of the tailplane, which was tipped to dethermalise. There was also a short rounded underfin of 5mm balsa sheet.

A double-bladed freewheeling propeller of 500mm diameter and 700mm pitch was fitted, carved from a 50 x 40mm block. This diameter was larger than contemporary English practice, and reflected a common approach adopted by Italian modellers. A motor of 12 strands 6 x 1mm rubber was used, but no mention was made of the length, but E. Sadorin's third placing in the 1949 Finals used 14 strands of 6 x 1mm rubber, which was 1200mm in length, and Janni could have adopted a similar approach, as he employed an 80% balance point on the model.

Janni's own flights in the Finals were 81.2 and 165.6 for an aggregate of 246.8 seconds and 34th place. He was unable to execute a third flight, and it is unclear from contemporary reports if his model was lost or damaged during the second round. Two photographs of the model appear in the September 1949 issue of *Aeromodeller,* at p.563 and p.572.

Full size plans for the 'Sancho Pepe' are available from Mike Woodhouse at Free Flight Supplies.

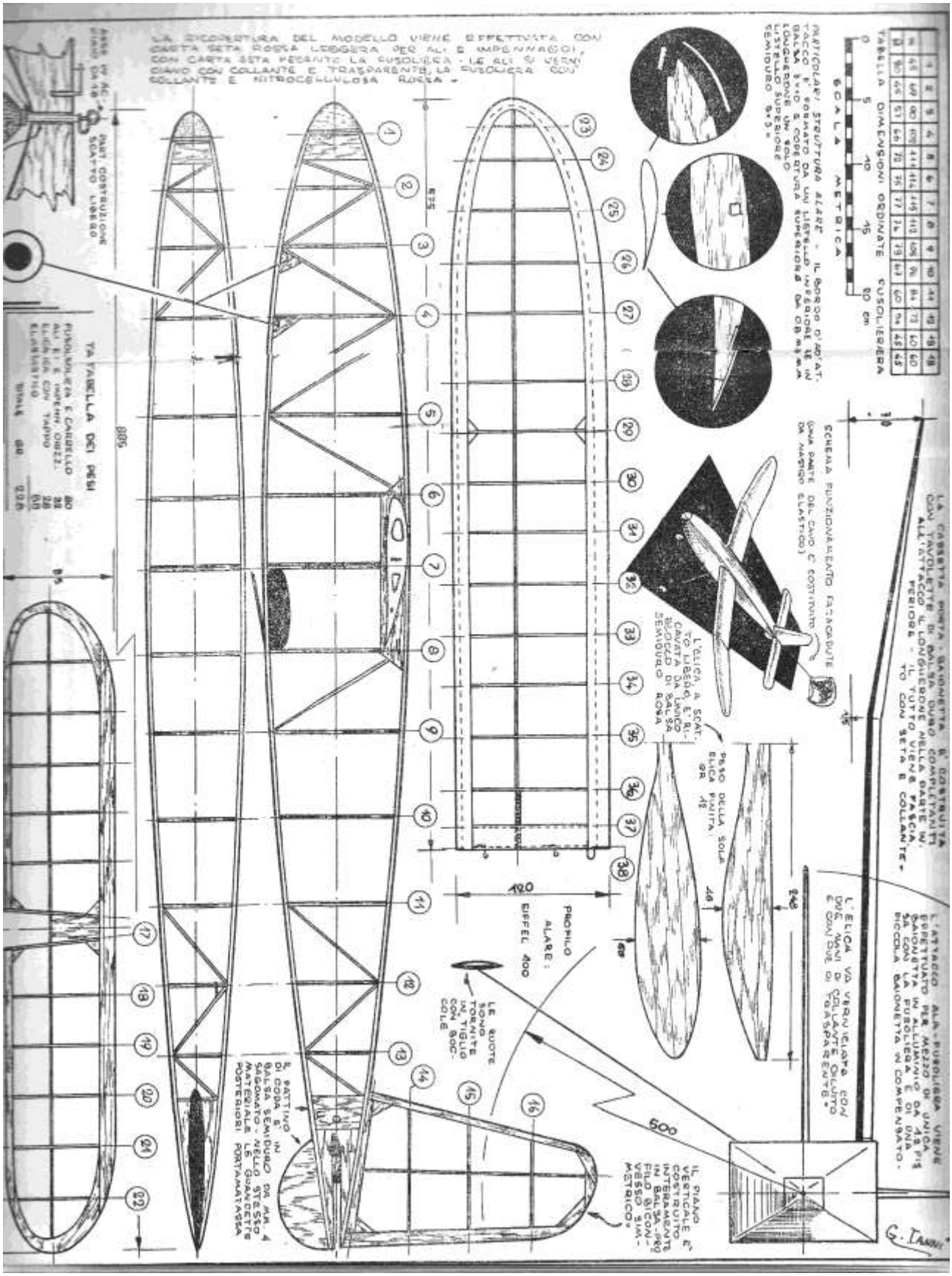


TABELLA DIMENSIONI ORDINATE FUSOLIERA
SCALA METRICA
LA COPERTURA DEL MODELLO VIENE EFFETTUATA CON CARTA SETA ROSSA LEGGERA PER ALI E IMPENNAGGI, CON CARTA SETA PESANTE LA FUSOLIERA - LE ALI SI VERNICIANO CON COLLANTE E TRASPARENTE, LA FUSOLIERA CON COLLANTE E NITROCELLULOSA ROSSA -
TABELLA DEI PESI
PROFILO ALARE: EIFFEL 400
IL PIANO VERTICALE È COSTRUITO INTERAMENTE IN FILO DI CONVESSO SIMMETRICO.
G. TAMMI

‘49er’ Colin Williamson (Australia) 1949

Colin Williamson was a keen rubber modeller who flew at a national level in Australian competitions in the late 1940’s. However, his competition activities were restricted by his joining the RAAF, where he undertook pilot training and eventually became a Qantas captain. After retiring from active flying, he returned to modelling, and after fifty years recreated the design he had flown at the 1949 Wakefield Eliminations in Melbourne. On that occasion he did not have sufficient time to trim the model properly, and an overwound motor reduced the model to matchwood. Fifty years later the basic design principles were shown to be sound, with the modern replica flying very successfully.

In the late 1940’s, most Wakefield models in Australia were designed to a common formula. Ostensibly, they were of original design, but the layout was the same. They were built with rectangular slabsider fuselages, polyhedral wings mounted on top of the fuselage, single bladed folders, retractable undercarriages and twin fins located at the tailplane tips. Designs by Fullarton, Lim Joon, Marsden, King and Lonergan fall neatly into this classification.

The ‘49er’ was no exception, with the fuselage being a rectangular slabsider. Overall, it was 39 1/2” long, with the cross-section being enhanced by a bubble which enclosed the box for the wing tongue. In this respect it was not dissimilar to the contemporary approach adopted by Ron Warring (England) for his ‘Voodoo’. In general, the fuselage was constructed of 1/8” x 1/8” for the longerons and spacer, but three sets of spacers aft of the wing utilised 1/8” x 1/16” in an effort to reduce weight. A single solid leg without a wheel was used for the retracting undercarriage, being located on the left-hand side of the lower fuselage with an internal rubber band effecting the retraction. To offer damage protection when gliding in, a 1/8” x 1/8” strip was affixed to the exterior of the lower longeron, around the undercarriage location. For a typical Australian flying field, this would have been a sensible precaution.

The wing had a span of 45”, while the centre chord was 5”. It was polyhedral, with a constant chord inner section, while the tip section faired into a curve, with sheeted tips. Tip dihedral total was 4 1/2”, with 1 1/4” being applied to the inner section. No name for the wing section was stated, but it bears a close resemblance to the NACA 6409. Ribs were generally of 1/32” sheet, with those around the wing tongue being 1/16” sheet. Three spars were used, two being on the upper surface, while the third spar was on the lower surface. The front spar was 1/16” X 3/16”, the centre 1/16” X 1/8” and the rear spar was 1/16” X 1/16”. Perhaps the most unconventional feature of the wing was the adoption of a two-piece wing located by a tongue which plugged into a box attached to the top fuselage longerons in a high wing position. At the penalty of increased weight, it would have assisted in the transport of the model as well as providing some degree of protection if the model encountered an obstacle when landing.

The tailplane was a straightforward rectangular planform, and tipped for D/T purposes. A thinned Clark Y section was employed, with 1/32” sheet ribs. There were three spars, two of 1/16” x 1/16”, with the front spar being 1/8” x 1/16”. Twin fins of elliptical shape, and constructed of 1/16” sheet, were attached to the tailplane tips. The left-hand tip rib was offset 1/16” to give a left turn.

A single bladed folding propeller of 18” diameter, with 27” pitch, was employed, carved from a 2 1/4” x 13/4” block. In an unusual use for the period, the mechanism was constructed solely from wire. Power was 16 strands of 1/4” x 1/24”, with the length adjusted to meet an overall weight of 8oz. Component weights were as follows:

Fuselage	44
Wing.	38
Tailplane.	14
Propeller	32
	128 grams = 4.57oz.

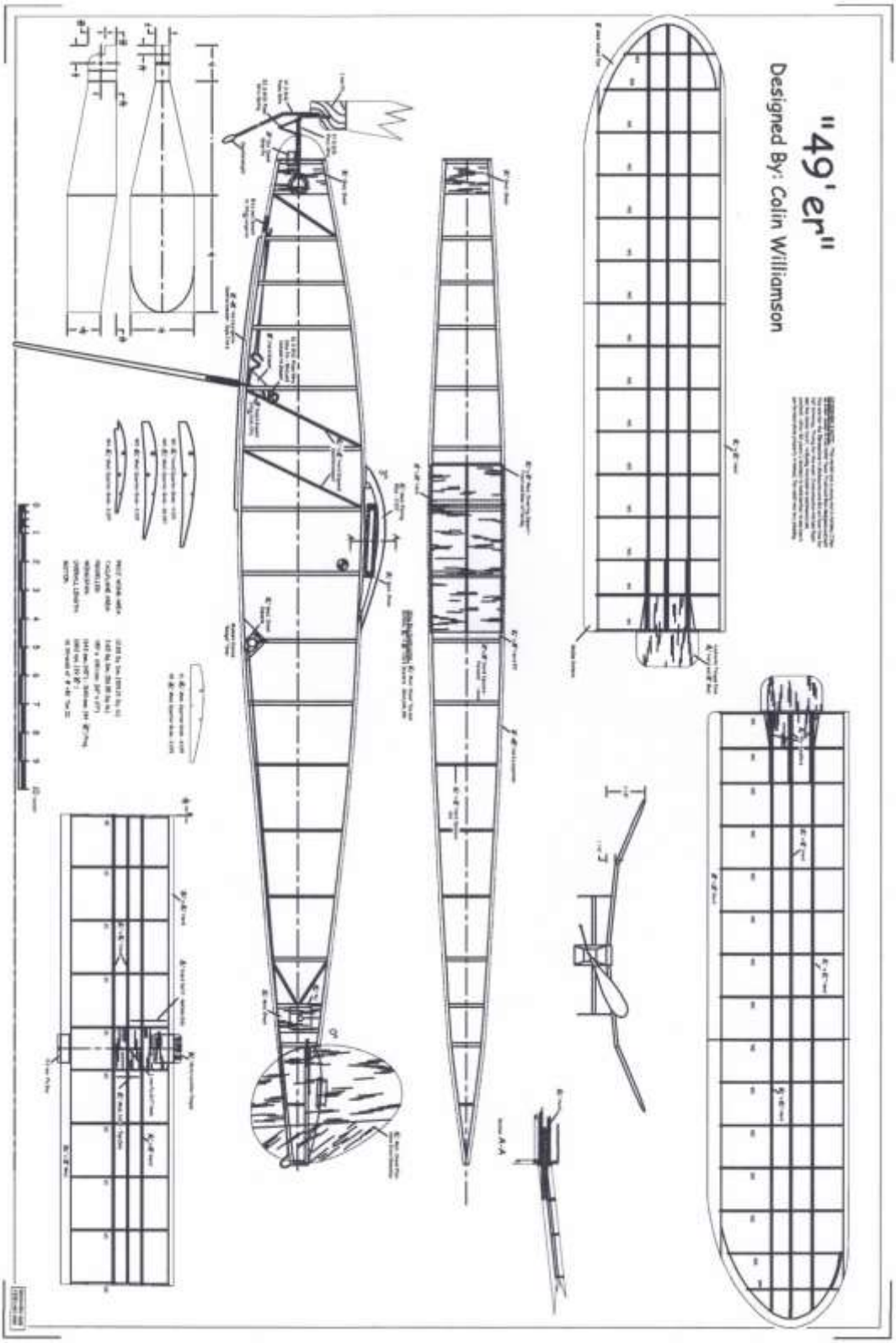
This would have allowed a motor of approximately 3.5oz.

The balance point was 60%, and the model was flown right/left, which required 1/8” right thrust but no downthrust.

The design falls into the sensible category, with conventional proportions, and bears a resemblance to the slightly later American design ‘Yankee IV’. The latter has been particularly successful in SAM competitions, and there appears no reason why the ‘49er’ should not emulate its performance.

Mike Glaister has produced another excellent CAD plan for this excellent Australian design.

Colin Williamson died in 2006 after living overseas for many years, including a spell in England, before returning to Australia for his final years.



Per Hoff's 'Colibri' 1949

Sometimes quite innocent actions can result in serendipitous consequences. Back in 2010 the Swedish Oldtimer Magazine published in their Issue No.1, a cover photograph of a Wakefield. The design was unfamiliar to me, but looked interesting, so I wrote to one of my Swedish colleagues to see if he could offer any more information.

A few months later a package dropped through my mailbox which contained plans and photographs of the design. The model turned out to be called the 'Colibri', which was designed by Per Hoff of Norway in 1949, while the model photographed in Oldtimer had been built by Boris Borotinskij of Finland, and was held in the photograph by his daughter.

Conceptually the model was straightforward in design, with a slabsided fuselage of Warren girder construction; a wing mounted on top of the fuselage; twin legged wire undercarriage and a single fin.

The fuselage had an overall length of 840mm, with a maximum cross-section of 110mm x 60mm. Longerons were 4mm x 4mm, while the Warren girder spacers were 4mm x 2mm. A twin undercarriage of 1.5mm wire was employed, complete with 50mm diameter wheels. Although swept forward, the undercarriage was attached relatively far back in the fuselage, at the point of maximum depth. The fuselage shape also merged from rectangular to a circular section at the nose, in order to fair into a balsa spinner built into the propeller. A single fin was employed in conjunction with a relatively large underfin.

The wing sat on top of the fuselage, and had a flat constant chord inner section, while the tips were curved, with a dihedral of 90mm. The wing section was a hybrid, consisting of SI 63010 on the top camber, and SI 63008 on the lower chamber. Thickness of the ribs was not stated, but would appear to be 1.5mm. Hoff had originally planned to use .8mm balsa sheet on the top camber of the wing back to the front spar, but changed his approach, and employed three spars of 3mm x 3mm only. The total wing span was 1080mm, with the centre section chord being 130mm.

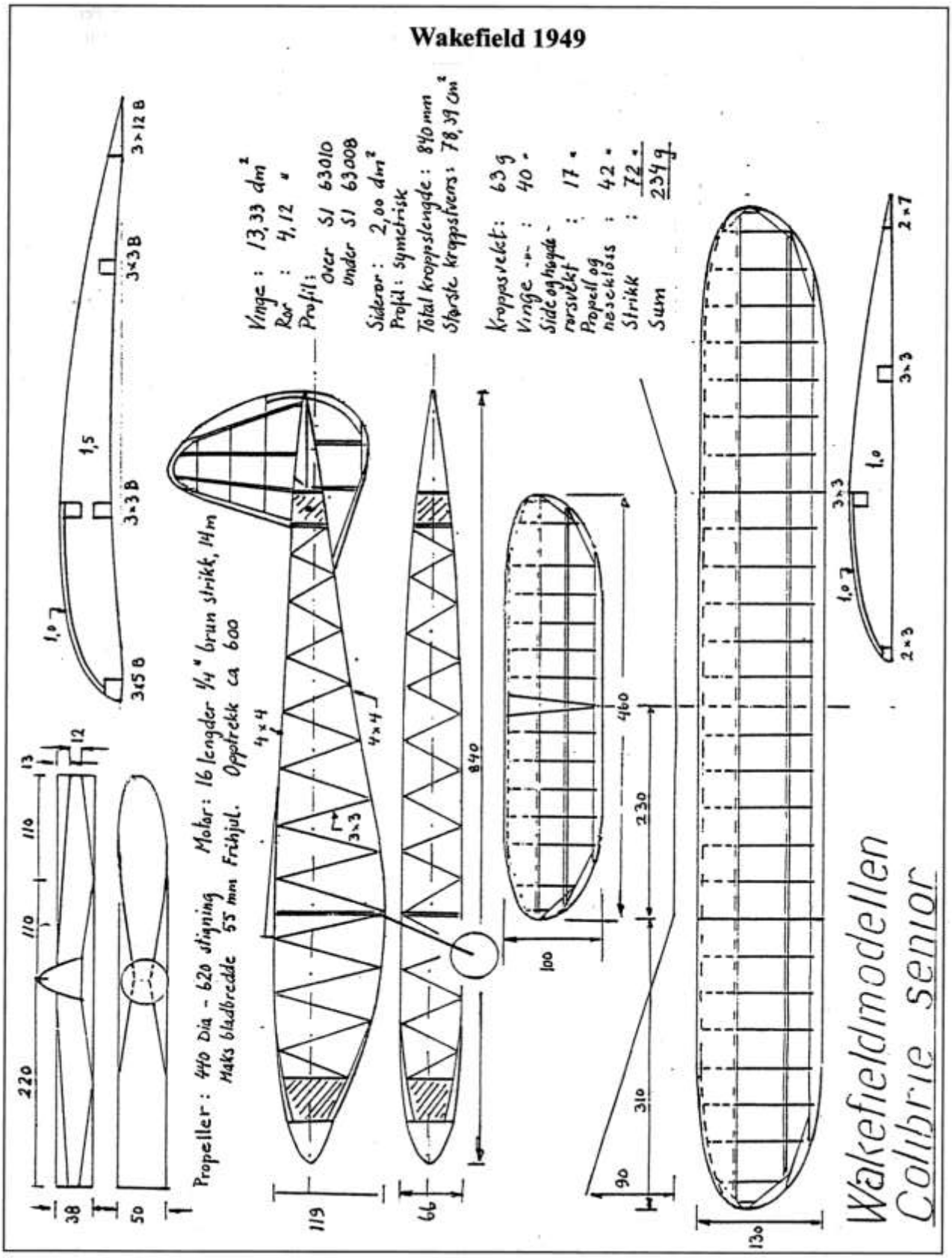
The tailplane planform followed the same layout as the wing, with a span of 480mm and a centre chord of 100mm. Hoff also intended to sheet the upper surface of the tailplane back to the upper spar, but deleted this feature, and relied on two spars of 3mm x 3mm. He also considered using another SI section on the tailplane, but adopted a 60% Clark Y in the final version. The tailplane was set to tip 40% for DT purposes.

A double-bladed freewheeling propeller of 440mm diameter was chosen, carved from a 50mm X 38mm block. Power was 16 strands of 1/4" Dunlop rubber, with a total length of 14 metres, which produced a strand length of 875mm. Suggested maximum turns were in the order of 600, although this appears to be a relatively conservative figure in order to allow for cording turns. The model was covered in lightweight Modelspan.

Weights of the various components were as follows:

Fuselage	63
Wing.	40
Tailplane.	17
Propeller Assembly.	42
	162
Rubber.	72
	234 grams

This three-view shows an early version but otherwise is accurate to the final model produced by Hoff. As such it is worth remembering, rather than let it fade into the mists of oblivion.


Wakefield 1949
Vinge : 13,33 dm²
Ror : 4,12 "
Profil: over SI 63010
under SI 63008
Sideror : 2,00 dm²
Profil : symetrisk
Total kroppslengde : 840 mm
Største kroppstverrs : 78,39 cm²
Kroppsvekt: 63 g
Vinge -"- : 40 "
Sideoghøyde-rorsvekt : 17 "
Propell og haleskliss : 42 "
Strikk : 72 "
Sum 234 g
Motor: 16 lengder 1/4" brun strikk, 14m
Oppstrekk ca 600
Frihjul.
Propeller : 440 Dia - 620 stigning
Maks bladbredde 55 mm
Wakefeldmodellen
Colibrie senior

Anders Deurell's Wakefields

By Devon Sutcliffe, Andrew Longhurst & Sten Perrson

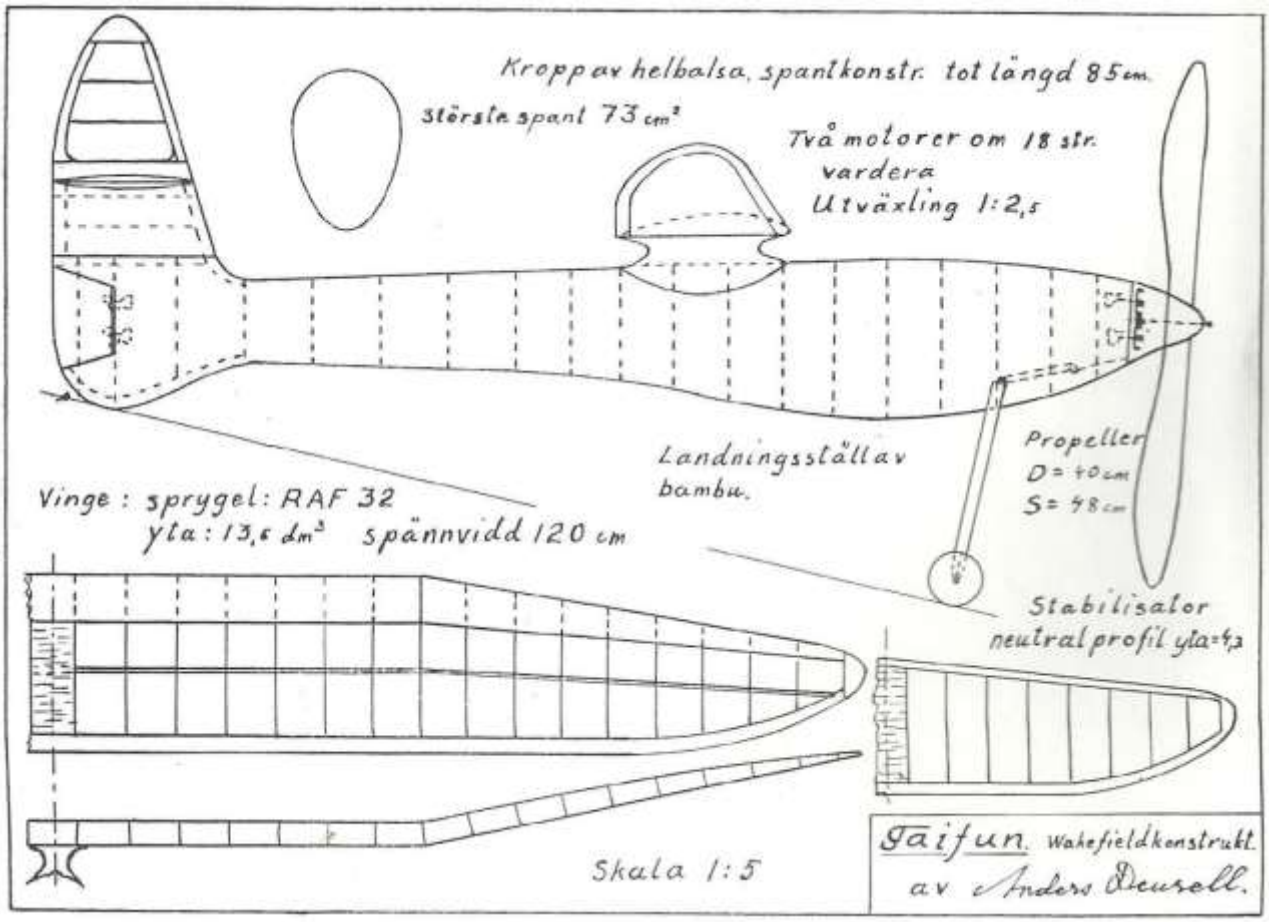
Anders Deurell was a Swedish Wakefield flyer competing throughout the golden period of the 8oz Wake formula. He was overshadowed by the great Swedish Wake flyers of the period particularly the double World Champion Arne Ellila. Unlike his Swedish contemporaries he rejected the light boxy fuselage in favour of something more complex. He created wonderful original models which flew well enough but were perhaps hampered by their weight. Deurell only ever represented Sweden once at a Wakefield Finals, but he did fly proxy for Leftwich (U.S.A.) in the 1950 Finals.

We have three plans to remember him by, the Taifun, the Monsun and his un-named 1950 model.

My thanks go to Sten Perrsson in Sweden for providing very rare plans and articles, Mrs Google for translating them and Devon Sutcliffe in NZ for his critique on The Monsun and for originally highlighting this talented modeler. Of necessity, the articles have had to be heavily edited to fit in the yearbook but full text is available from me. *Andrewlonghurst@yahoo.com*

The 1939 Taifun Wake

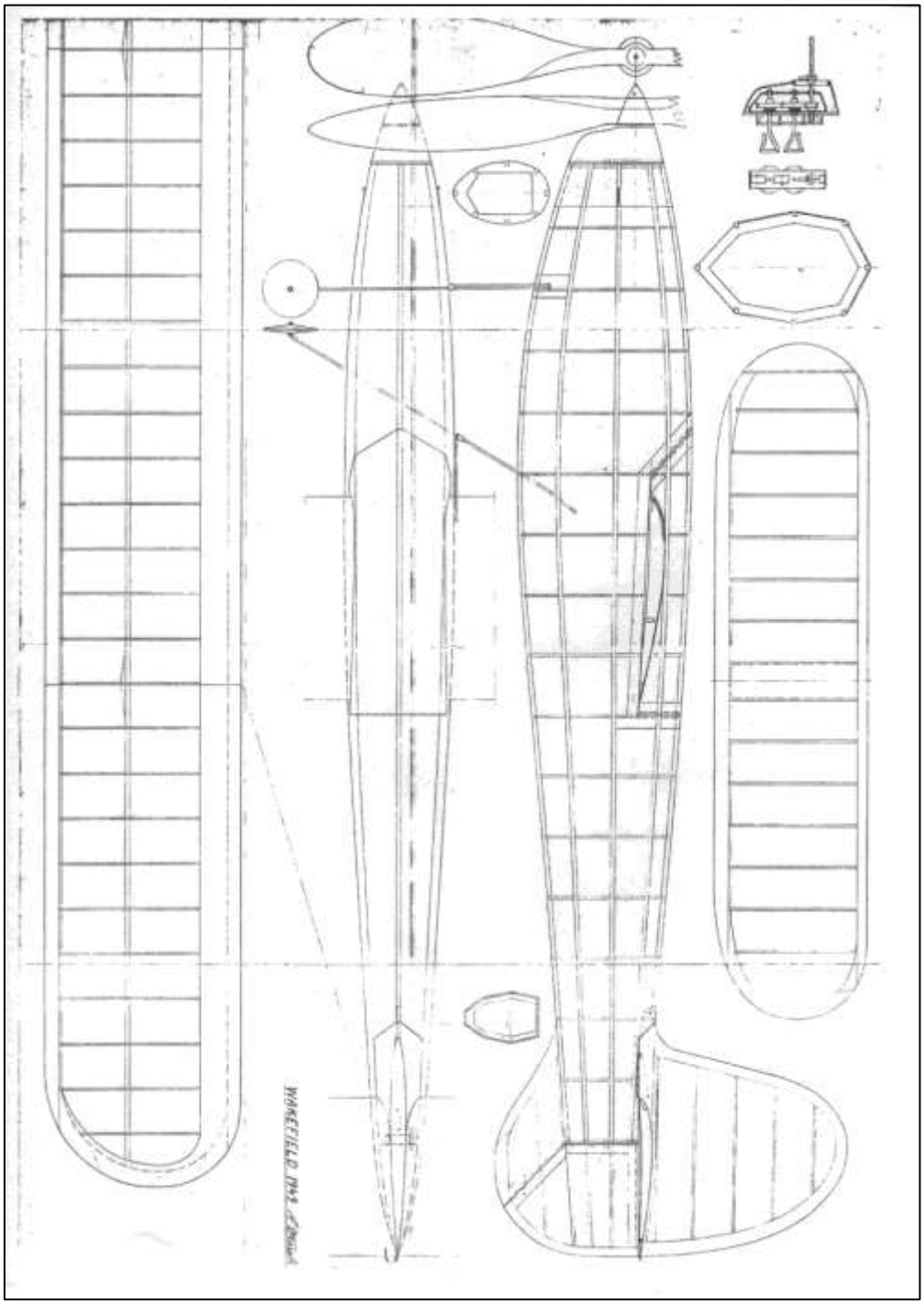
Anders built this original model in the spring of 1939, a streamlined Wake with full-body planking and a gearbox in the nose. The model was quite well documented in the magazine Flying. The photo features Anders Deurell launching at the Vingernes Winter Contest in March 1939. He made the best of the day, an impressive 5 min 10 sec.



The Monsun Wake of 1946 and 1949

Now over to Devon Sutcliffe to describe the Monsun Wake:

The September 1949 issue of *Aeromodeller*, in their report on the Wakefield Finals, contains two interesting photographs. The first shows ‘a beautiful straight takeoff by Deurell’, while the second shows the same model in closer detail, as it was being prepared for flight. Unfortunately for Deurell, the great takeoff was not converted into a substantial flight, and his times were only 7.4 and 20 seconds, for an aggregate of 27.4 seconds and 76th place. No third flight time was recorded.



His model departed from the traditional Scandinavian boxy rectangular fuselage and instead utilised a basic tissue covered octagonal section with 1.5mm sheet formers and eight stringers of 3mm X 3mm. Overall length of the fuselage was 780mm, and it was probably assembled on an internal jig. The shoulder wing was mounted just above the thrust line, and extended right through the fuselage with a

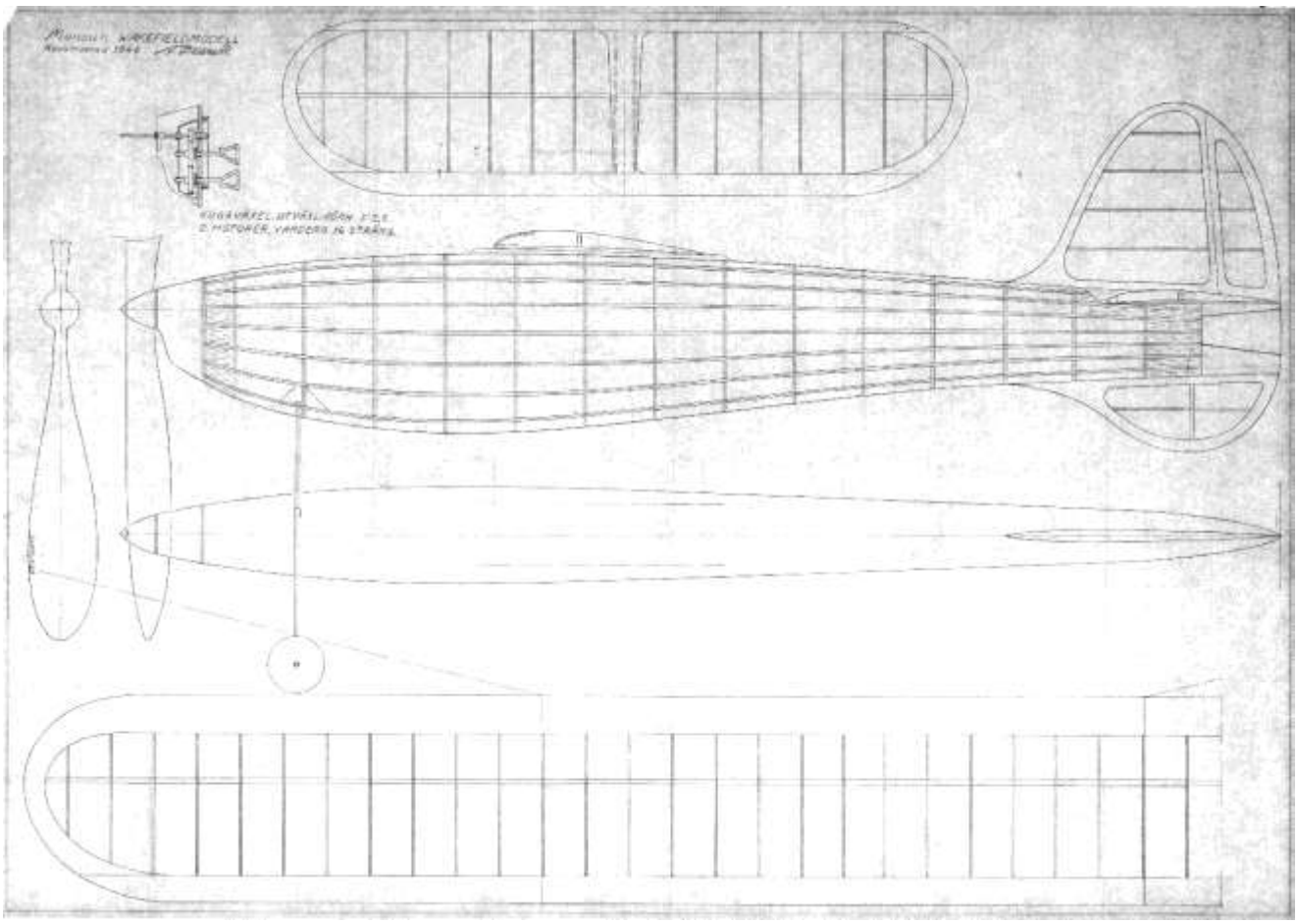
removeable fairing. In profile, the fuselage was quite deep at the rear, as the two rubber motors were mounted vertically and were spaced well apart. A twin undercarriage of 1.5mm wire plugged into tubes located in the fuselage, and were complemented by 37.5mm wheels. The single fin was relatively large, but of low aspect ratio. It was of symmetrical section and merged into an underfin which formed part of the rear fuselage structure.

The wing was a one-piece structure with a span of 1080mm, and a chord of 135mm. It featured a flat centre section and employed a constant chord with almost semi-circular tips. Tip dihedral was 100mm. Although the wing section was not named, it obviously was one of the SI range being thin and featuring slight undercamber. 1mm leading edge sheeting extended rearward on the top surface for 30mm. There was one internal spar of 4mm X 3mm, situated at 60% of the chord. Ribs appear to be of 1.5mm sheet, and were pitched at 30mm.

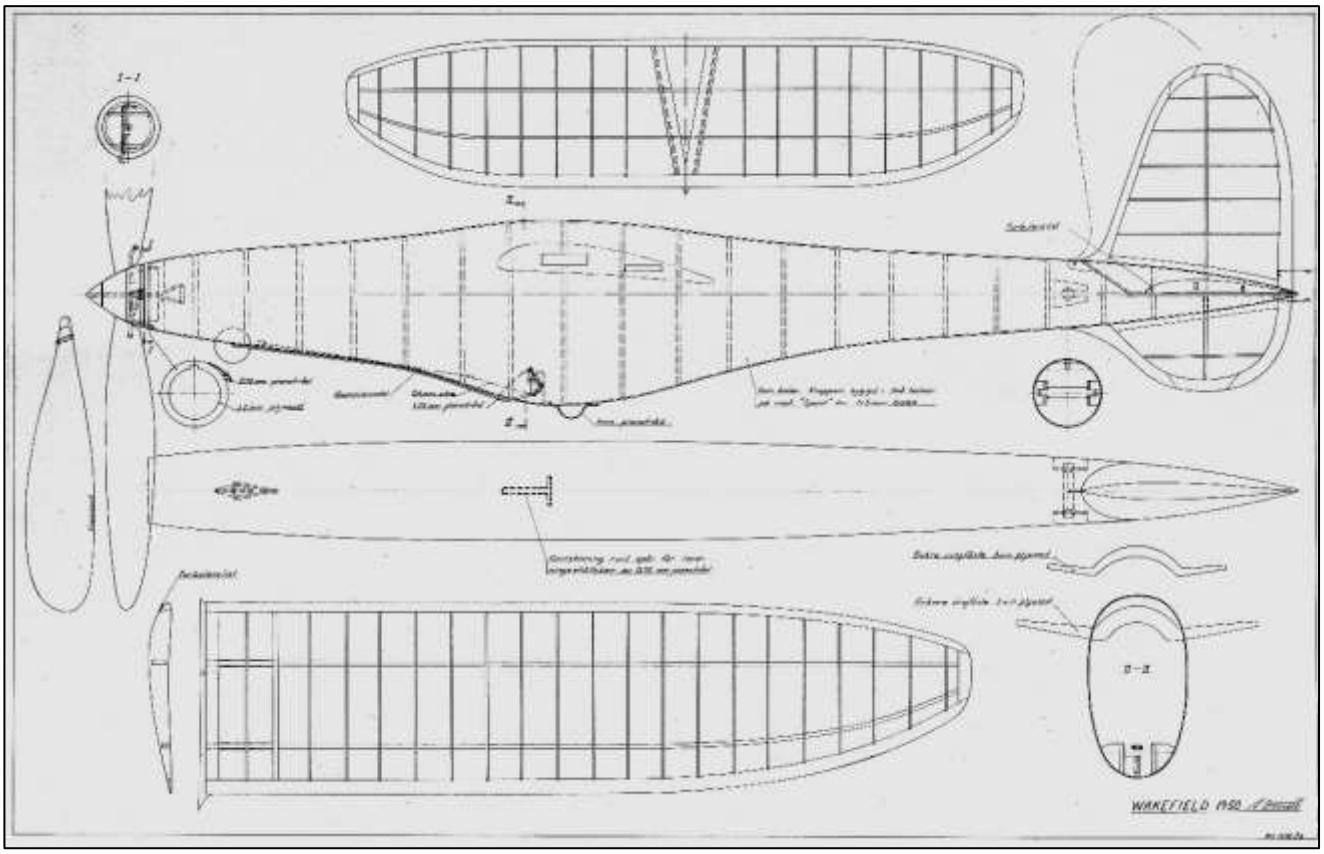
The tailplane was of sparless construction, with a similar planform to the wing. Span was 440mm and the chord 105mm. The section was not named, but it was thin and undercambered, and probably also from the SI series. Ribs were also pitched at 30mm. A tipping tail DT was fitted.

The double blade freewheeling propeller of 440mm diameter was` carved from a 55mm X 35mm block. Twin motors were employed, operating through gears in the noseblock. However, they were not return gears, as they fed into a smaller gear mounted on the propeller shaft. No motor size was quoted.

The 1949 model was similar layout to the 1946 model, save that the wing was located on top of the fuselage rather than in a shoulder position. It featured a 430mm diameter propeller, and this was driven by gears stepped down 1:2.5, and powered by two motors of 16 strands, presumably 6mm in width. Performance was said to be in the 3 to 4-minute range.



The 1950 Wake



In 1950 Deurell made a quantum change with his new design. This continued the use of a streamlined fuselage, but he combined this with a retractable undercarriage and a folding propeller, and changed from a geared motor to a straight motor. With the elimination of the gears, the fuselage was lengthened by 75mm to 850mm, and the structure changed to a fully sheeted oval section. The shape was also changed, with a distinct bulge being created on the lower profile. This was the location point for the single 1.25mm wire leg undercarriage, which retracted forwards. A twin-bladed folding propeller was built into a spinner with a diameter of 440mm. *Devon Sutcliffe*

Anders Deurell wrote a rather quirky article for the Hobby-People mag in February 1951 entitled, "This is not how to do it!" which suggests he was not completely satisfied with his new model.

He writes:

Are you going to build in solid balsa?

Behind the dark glasses hides Anders Deurell's face. This, by the way, is a very beautiful picture snapped by Rune "Bananen" Andersson. If the interesting building challenge tells you, “Yes, I should build one” I recommend hanging it on the wall as soon as it’s finished. Once it has crashed and smashed you will no longer be able to

enjoy those beautiful shapes! I fully agree with myself and have not built another creature like it.

If we start from the nose, I had (whilst it existed) a folding propeller organized to stop so that the blades would fold as well as possible along the body and thus not cause an unnecessary swirl. And then we bend down to have a look below the fuselage, where two small wheels are tenderly pressed together and half lost in the fuselage. Each wheel is mounted on a piano wire leg. If you pull them out they obediently follow, but still they hang together – they don’t part until they have come out so far that their legs are perpendicular to the fuselage. When you put down the model you must keep its legs apart until it stands firmly on the ground. Later we may want to lift up the model and then – lo and behold – the legs close again and retract forward halfway into the fuselage….

If we go back down the body we get to the stomach, as required by Rule L2/100 and my endeavours to keep the weight down as much as possible. On its back, we pass the wings, which have dowels that cross the body. An internal rubber band tied between the wing halves holds these tight against the body. No outdoor rubber boots needed.

If we look outwards, we see that the 10% thick wing section is rather cambered, though not enough, I will come to that, and then the wing ends with a rounded ellipse. If we keep going back, we will come to the stabilizer and the fin, which are built into a cut out part of the body's upper side. The front of this is detachably attached to the body so that it can fold up 45° when the fuse burns through.

Perhaps I should describe how the fuselage is constructed. It is oval having a 45 mm diameter at the front former as well as at the rear motor anchorage. The fuselage is built in two halves on a wooden board. The formers are 1 x 3 mm balsa with their broad sides facing outwards, making them less vulnerable in case of motor breakage. They are placed at 3 cm intervals. The fuselage planking is made from 1mm balsa, reduced to 0.75mm after sanding, finished with three coats of dope. Weight including ply and balsa reinforcements is 44 grams.

Total weight of the model was 240 grams, including 120 grams of rubber, pre-tensioned and direct driving (i.e. no gears).

So, a few words about the flight. It’s consistently streamline shape, combined with the aerofoil chosen, made it sweep along like a fighter plane displaying a very low sinking speed. With thicker and more curved profiles I could have reduced the speed. Otherwise, it had very good ability to be able to turn in any direction with the same rudder setting. It alternated between right and left turns.

But it did not get old. At first, I had the impression that it was very stable. Looks like I was wrong as it's well messed up now. A total write off!

Anders Deurell.

Horry's Wakefield – K. Horry 1949

Back in 1985, the late Mike Kemp, in his *SAM 35 Speaks* Rubber Column, featured an article on the reincarnation of a Wakefield design which had first flown in 1949. The model had been designed and flown by Keith Horry in the 1949 and 1950 seasons, placing 12th out of 212 at the 1949 Nationals. With the changes to the Wakefield specification about that time, Keith did not develop the design further, and it was not until the mid-1980's that he built another model, from photographs and memory, which performed satisfactorily, and he offered plans for sale. The design approach of the model appeared sound to me, so I wrote away for a set of plans, and found that I was Keith's first customer!

In concept the design was straightforward streamlined-slabsider, but it had a number of interesting individual features which distinguished it from the traditional Warring school of this period. The fuselage was 35 3/8" long, with a maximum cross-section of 4" x 3 1/4". Longerons and spacers forward of the wing trailing edge were 1/8" x 1/8", while the spacers rear of the wing trailing edge were 1/8" x 1/16". Additionally, the longerons from the nose to the rear of the wing tongue box, were reinforced by a strip of 1/8" x 1/16". Forward of the wing tongue box spacers were pitched at 2", but this expanded to 2 1/2" aft of the box. Twenty stringers of 3/32" x 3/32" helped fair the front three bays of the fuselage from a rectangular section to a circle at the nose. The wing was mounted in a shoulder position on the fuselage, with tongue slotting into a box, which was sturdily attached to the fuselage at an incidence of 4 degrees or 1/8". Although Keith had adopted a single leg wire undercarriage in 1950, his plan showed the original version, which had a single tapered 7mm x 5mm bamboo leg 10" long, which plugged into a paper tube located on the right-hand side of the fuselage. The leg featured an 18g. wire mounting for a 1 1/4" diameter ply wheel. A circular 1/16" ply former completed the nose, and this was mounted with 1/16" built in side and down thrust for initial trimming.

As the wing was shoulder mounted, it was built in two panels, each of which measured 19 1/2" in semi-span, with a 5 1/2" chord. In planform it was of constant chord, with laminated semi-circular tips, and thus completely different from the Warring school of double tapered outline. The section employed was of own design, which bore a superficial resemblance to an NACA 6409. Three 3/32" x 3/32" spars were employed, with the first two being one above the other at about 25% chord, while the third was an upper surface spar at 75% chord. The leading edge was a solid 3/16" x 3/16". Ribs were of 1/32" sheet and were pitched at 1 1/4". Straight dihedral of 4" was employed, which meant that the wing tongue had to be set at an angle of 11 degrees to harmonise with the flat tongue box.

The tailplane could not have been more straightforward, being rectangular in planform with a span of 17" and a chord of 4". A flat-bottomed section was employed, akin to a Clark Y, with ribs of 1//32" sheet pitched at 1 3/8". There was only one spar, on the upper surface, of 3/32" x 3/32". The leading edge was also solid, being of 3/16" x 3/16". Large tip fins of soft 1/16" sheet were fitted, giving the three-point attitude for take-off. A single fin of sparless construction was used, and sat on top of the tailplane on a built-up structure which faired into the fuselage contours. The tailplane tipped for D/T purposes.

A double-bladed freewheeling propeller was fitted, carved from a medium block 18" x 2 x 1 1/2", to give a nominal pitch of 27". Soft blocks were added to the hub, and carved to form a spinner which blended with the circular front fuselage former. Keith was very particular to emphasise that the weight of the propeller assembly should not be less than 1.2oz to avoid getting the C.G. Too far back. For the same reason he stressed the need to keep the rear light, hence the lighter spacers used in the fuselage aft of the wing.

Keith tried a variety of different motors, varying his approach dependent on the rubber available at the time. The original 1949/50 models had used 16 strands 1/4" Dunlop 48" long, while the 1985 version used 3.7 - 4.0 oz of either 16 strands 1/4" Pirelli or 14 strands of 1/4" FAI or 18 strands of 3/16" FAI between 42 - 48" long depending on the structural weight and the C.G. position.

Weights when new were as follows:

Fuselage	1.8
Undercarriage	0.3
Propeller.	1.2

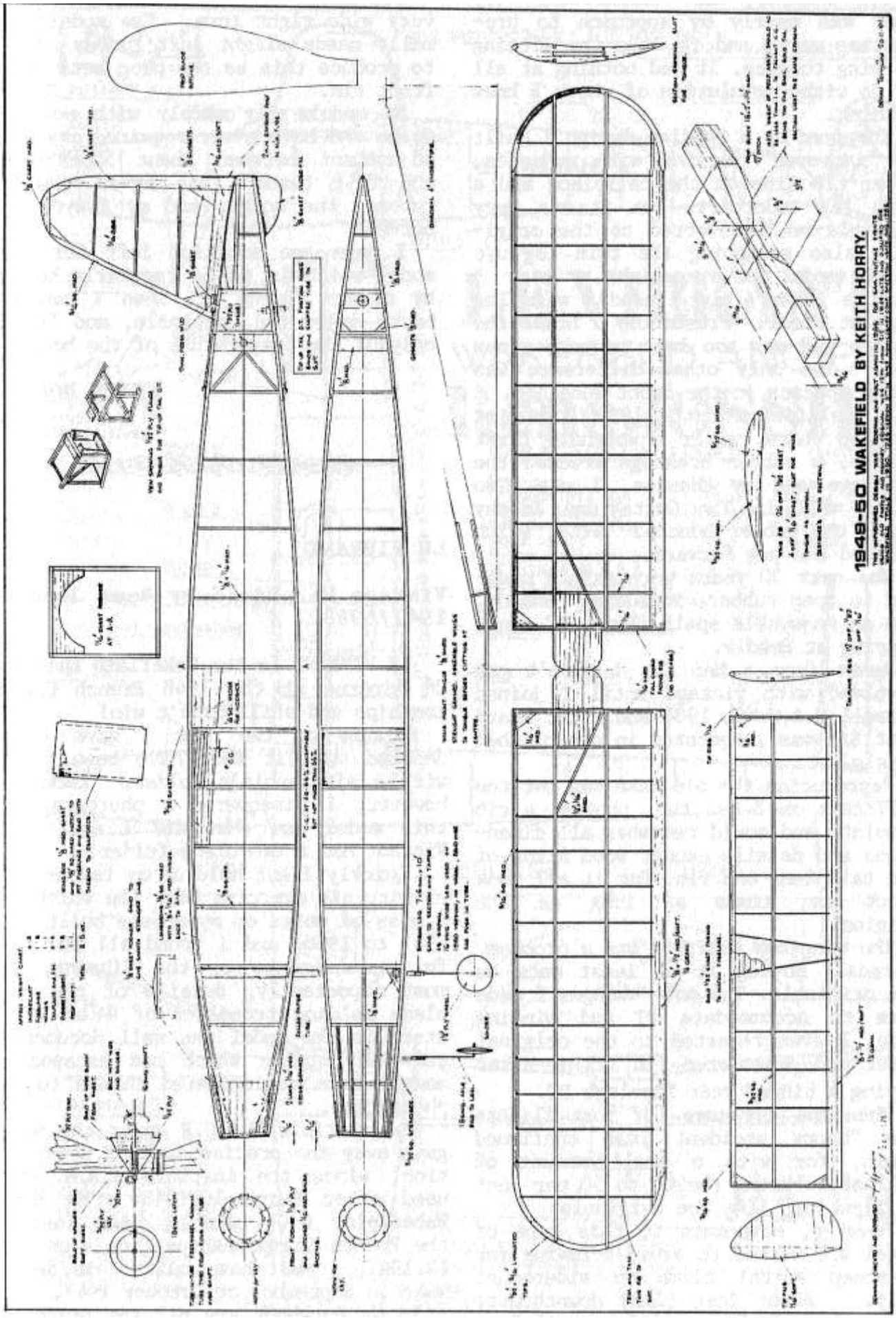
Wings.	1.1
Tailplane and Fin	0.4
	4.8
Motor.	3.8
	8.6 oz

In trimming, Keith aimed for a wide right circle glide, with a smaller power turn. The model was fast under power, and he wanted to ensure that it was not hanging on the propeller. He never used more than 75% turns which produced times in the 2 1/2 - 3 1/2-minute region. These times were conservative and performance on full turns was obviously in excess of 4 minutes.

Although the initial uptake for the plans was slow, demand mushroomed as more modellers tried the design and found it to be an excellent performer. It has continued to place high in Old Timer events, and the design is the first choice of many in 8 oz Wakefield. Demand was such that Keith's original plan was re-drawn by Terry Rose and is still available from stockists of his range.

As the first purchaser of Keith's original plan, it was incumbent on me to build an example. In fact, over time I have built three. The first two were lost, while the third has just been finished. All have proven easy to trim with an excellent performance.

The design is deceptive, as it performs so much better than an initial glance would indicate, and deserves to be regarded as a classic.


1949-50 WAKEFIELD BY KEITH HORRY.

El Dobo – Dick Everett (U.S.A.) 1950

Many designs published in the regular modelling press become well known, and continue to be built for years after their initial publication, but others fade from view notwithstanding an inherent capability which provoked their publication in the first place. Timing can also be an issue, with rule changes rendering a design less suitable for a particular event.

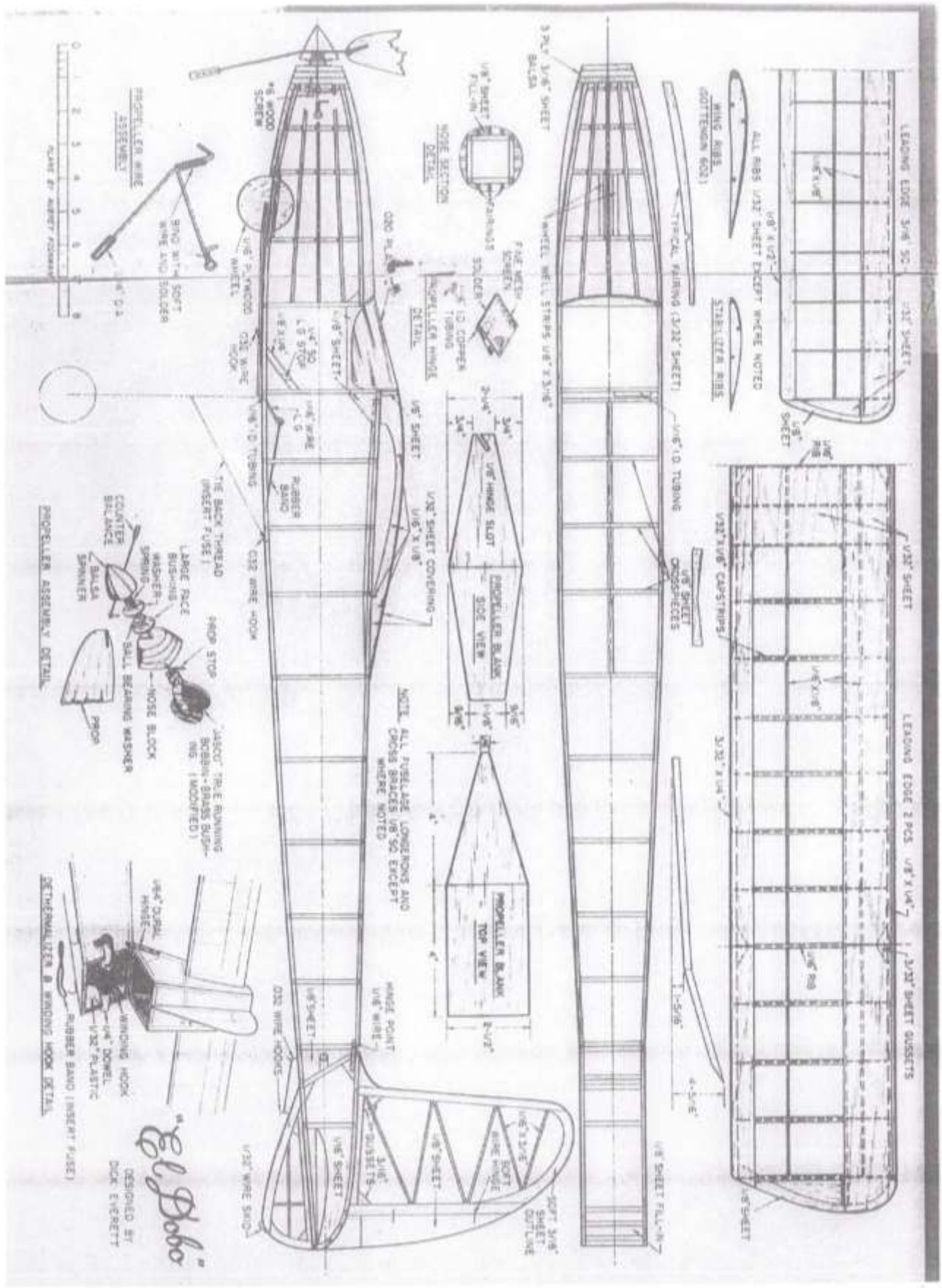
One such design was the 'El Dobo', by Dick Everett, which was published in the December 1950 *Air Trails*. This issue also featured a report on the 1950 Wakefield Finals, which were the last held prior to the introduction of the FAI inspired rule changes in 1951. These changes allowed greater flexibility of approach by comparison to the rules which had existed previously. Dick Everett was a very well-known Californian modeller, who was successful in a number of categories, and during the early 1950's wrote a column on Western Modelling for the *American Modeler.* He had worked for NACA at Langley Field, VA, but shifted to California, and at the time of the 'El Dobo' article worked for Convair in their guided missile programme. Everett had won the Rubber Stick event at the 1950 American Nationals, flying his tandem wing 'El Gismoe' which was published in the December 1950 *Model Airplane News.* By an interesting coincidence, the cover paintings for both *Air Trails* and *Model Airplane News* December 1950 editions featured a Douglas A2D Skyshark. At the time this aircraft showed great promise, but problems with the powerplant and gearbox caused the programme to be cancelled.

The 'El Dobo' design featured a conventional approach, but incorporated some clever design features, as well as several characteristics which were common at the time of publication. The fuselage was of slabsided construction, but utilised a circular, spinnered nose faired in by stringers external to the basic fuselage structure. Unusually, a clear plastic cabin was used, in deference to times past. A retractable, single leg wire undercarriage was employed, complete with a 1/16" ply wheel. The wheel was held down for take-off, but retracted forward when a fuse burned through a thread hold-down. This was a simple approach to improve the reliability of the take-off process, and was achieved with little weight penalty. A single-bladed folding propeller of 18" diameter was employed, described as being of the 'flip-flop' type. Presumably, this related to the ample blade area of the propeller, which was carved from a 2 1/2" x 2 1/4" block. Another innovative feature was the hinged rear fuselage. This served a dual purpose, as it hinged up to allow rear winding without being impeded by the propeller, as well as providing a dethermaliser function. The fixed single fin utilised diagonal construction, no doubt intended for anti-warp purposes, and this was the only component which employed such an approach.

The wing and tailplane were of constant chord, and both used 1/32" sheet on the top surface, extending back from the leading edge to about one-third chord. Capstrips of 1/32" x 1/8" were also used on the upper surface of the wing only, mainly to offer a greater surface for covering purposes to the 1/32" ribs. The wing section was an uncommon choice, being a Gottingen 602, whereas the tailplane employed a thinned Clark Y. Everett described the wing section as being ten per cent thick, with good characteristics of low drag and high lift.

A full-size plan for the 'El Dobo' was available from the *Air Trails* Plans Service, which contained additional particulars from those published in the magazine. Trimming information was supplied, together with details of the rubber motor. The motor was 16 strands 1/4" x 1/24", 48" long, and corded. This could take 850 turns, which gave about a minute prop run. The flight trim was right/right. No balance point was specified. Performance was high, and Everett quoted a January flying session with three consecutive flights recording 5:00, 5:00 and 4:43.

Full size plans for 'El Dobo' are available from the National Free Flight Society.


LEADING EDGE 2 PCS 1/8"X1/4"
1/32" SHEET GUSSETS
LEADING EDGE 3/8 SQ.
1/32" SHEET
ALL RIBS 1/32 SHEET EXCEPT WHERE NOTED
WING RIBS (GOTTINGEN 600)
STABILIZER RIBS
1/32"X1/8" CAPSTRIPS
1/8" SHEET CROSSPIECES
TYPICAL FAIRING (1/32" SHEET)
1/16" I.D. TUBING
WHEEL WELL STRIPS 1/8"X3/8"
3/8"X 3/8" SHEET BALSA
FINE MESH SCREEN
1/8" SHEET PLYWOOD
FAIRINGS SOLDER
1/8" I.D. COPPER TUBING
NOSE SECTION DETAIL
PROPELLER HINGE DETAIL
1/8" SHEET
1/32" SHEET COVERING 1/8"X 1/8"
PROPELLER BLANK SIDE VIEW
1/8" HINGE SLOT
PROPELLER BLANK TOP VIEW
NOTE: ALL FUSELAGE LONGERONS AND CROSS BRACES 1/8"SQ. EXCEPT WHERE NOTED
HINGE POINT 1/16" WIRE
1/8" SHEET
DIS WIRE HOOKS
1/32" WIRE SKID
SOFT 3/16" SHEET OUTLINE
SOFT WIRE HINGE
1/8" SHEET
1/8" SHEET FILLER
4-5/8"
1-5/8"
1/8" SHEET
1/8" SHEET
1/8" I.D. TUBING
RUBBER BAND
DIS WIRE HOOK
THE BACK THREAD (INSERT FUSE)
PROP STOP
LARGE FACE BUSHING
WASHER
SPRING
SMALL BEARING WASHER
NOSE BLOCK
COUNTER BALANCE
BALSA SPINNER
PROP
ASCO TRUE RUNNING BOBBIN-BRASS BUSHING (MODIFIED)
PROPELLER ASSEMBLY DETAIL
1/4" DIAM HINGE
WINDING HOOK
1/4" DOWEL
1/32" PLASTIC
RUBBER BAND (INSERT FUSE)
RETRACTABLE WINDING HOOK DETAIL
"El Bobo"
DESIGNED BY DICK EVERETT
PROPELLER WIRE ASSEMBLY
RING WITH SOFT WIRE AND SOLDER
PLANE OF WINGS FORWARD

Al Richardson (United States of America) – 1950

Some designs languish for years virtually unknown, but when revealed to the wider modelling community, are recognised for their inherent worth. One such design was Al Richardson's 1950 King Orange Champ, which was drawn up by Fred Dunn in 1993, and subsequently SAM approved. Because it is such an attractive design, and Fred Dunn's plan is so complete, the model has been built in large numbers since its SAM approval, and has performed well in SAM events.

Basically, the design featured a diamond fuselage, with the polyhedral wing being mounted on a low pylon, while the parallel chord tailplane utilised twin fins. The single bladed folding propeller was mounted in a spinner, with the undercarriage being of wire with twin legs.

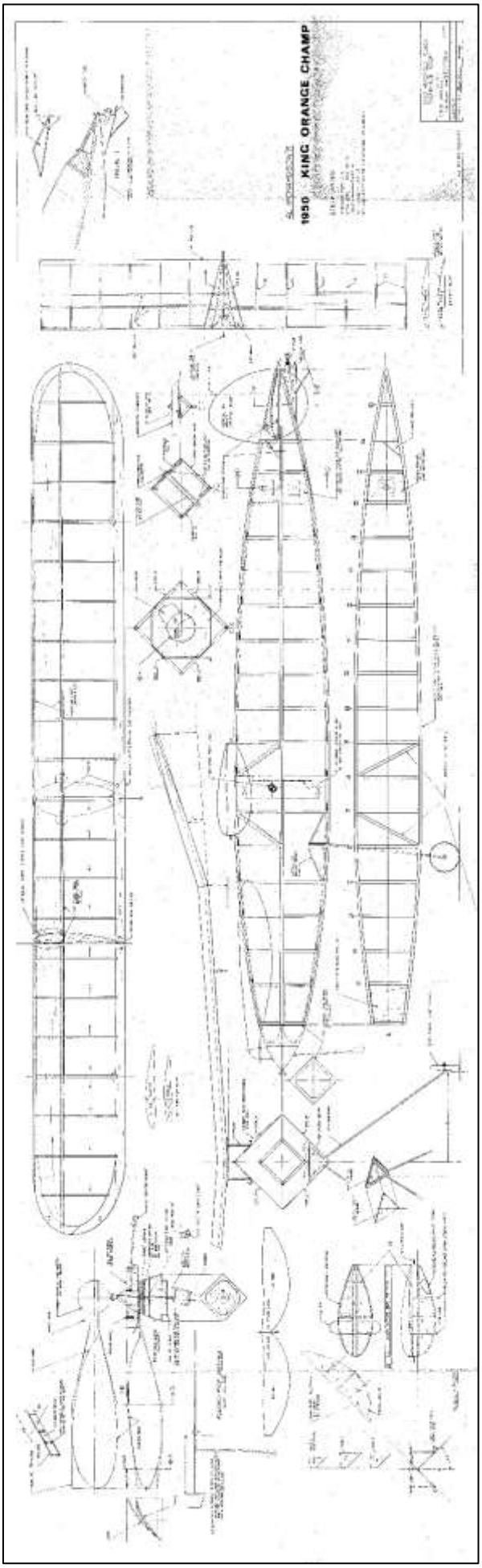
The fuselage was constructed of 1/8" x 1/8" for the longerons and spacers, with the latter being set at approximately 1.75" spacing. An internal sheet former of two sheets of 1/16" balsa, cross laminated, with a 1 3/8" diameter circular hole, was sited in the fuselage at approximately the mid-point of the motor. Obviously, this former was an anti-vibration device, and was a not uncommon practice in designs of this era. With the diamond layout employed, a low built-up pylon was adopted for the wing mounting. This used 3/32" sheet formers, combined with an external skin of 1/32" sheet. Unusually, the pylon was not fixed, but was held in position by rubber bands around the fuselage, and could be moved to obtain the correct balance point. This was stipulated as being 50% of the centre chord. A one-piece twin–legged wire undercarriage was permanently fixed in position, being sandwiched between two triangular pieces of 1/32" ply, and then cemented in place.

The wing was a conventional polyhedral design, with a constant chord centre section and rounded tips. Although not specified, the aerofoil section resembled an NACA 6409. Top and bottom spars were used, with a 1/32" sheet web for the centre section. While the leading edge of 3/32" square was relatively small, 1/32" sheet on the top and bottom surfaces, extending back to the spar, completed a D-box which would have been very strong.

The constant chord tailplane used a typical thinned Clark Y flat-bottomed section, and was complemented with twin fins of oval section and 1/16" sheet. Three spars of 3/32" square were employed, and the tailplane tipped for D.T. purposes.

An 18" diameter single bladed folding propeller was used, carved from a 2 3/4" x 1 3/4" block. A spinner faired the noseblock into the basic fuselage structure to give a neat entry. Power was 12 strands of 1/4" rubber 48" long. This weighed 3.3 oz., and when combined with a structural weight of 4.7 oz., meant that the model was at the specification weight minimum.

This model has been the proverbial 'sleeper', being of conventional proportions, but well-engineered, so that it is capable of a very satisfactory performance. Full size plans are available from Allen Heinrich at Aerodyne.


1950 KING ORANGE CHAMP

Rune Andersson (Sweden) – Sleipner 1950

One of the most active Swedish modellers in the 1940's and 1950's was Rune Andersson, who flew in both the A2 and Wakefield classes.

In 1950 his latest Wakefield design 'Sleipner' was published in the Swedish magazine *Teknik for Alla,* and proved to be a classic example of then current Scandinavian practice. The design was strictly conventional, with hardly any aspects which differed from the accepted norm for the region.

The fuselage was a rectangular slabsider, 822mm long with a maximum cross section of 100 x 70mm. Longerons were 4 x 4mm while the spacers were 4 x 2mm. A twin leg undercarriage of 2mm wire was employed, and plugged into aluminium tubes set in the fuselage. Wheels were 40mm in diameter. The wing sat directly on top of the fuselage, and was held in place by rubber bands attached to dowels which passed through the fuselage and were anchored just below the top longeron. A detachable tail plug was employed.

In planform the wing featured a constant chord, with rounded tips. The chord was 130mm, and the total span 1028mm. The centre 480mm was flat, with a tip dihedral on the outer panels of 80mm. Perhaps the most unorthodox feature of the design was the fact that the wing was of sparless construction using a very thin section with a slight undercamber. The wing ribs were of 1.0mm balsa, and 1.0mm sheet balsa extended back 34mm from the leading edge on the top surface of the rib. This was repeated on the trailing edge, although the sheet here was only 25mm wide.

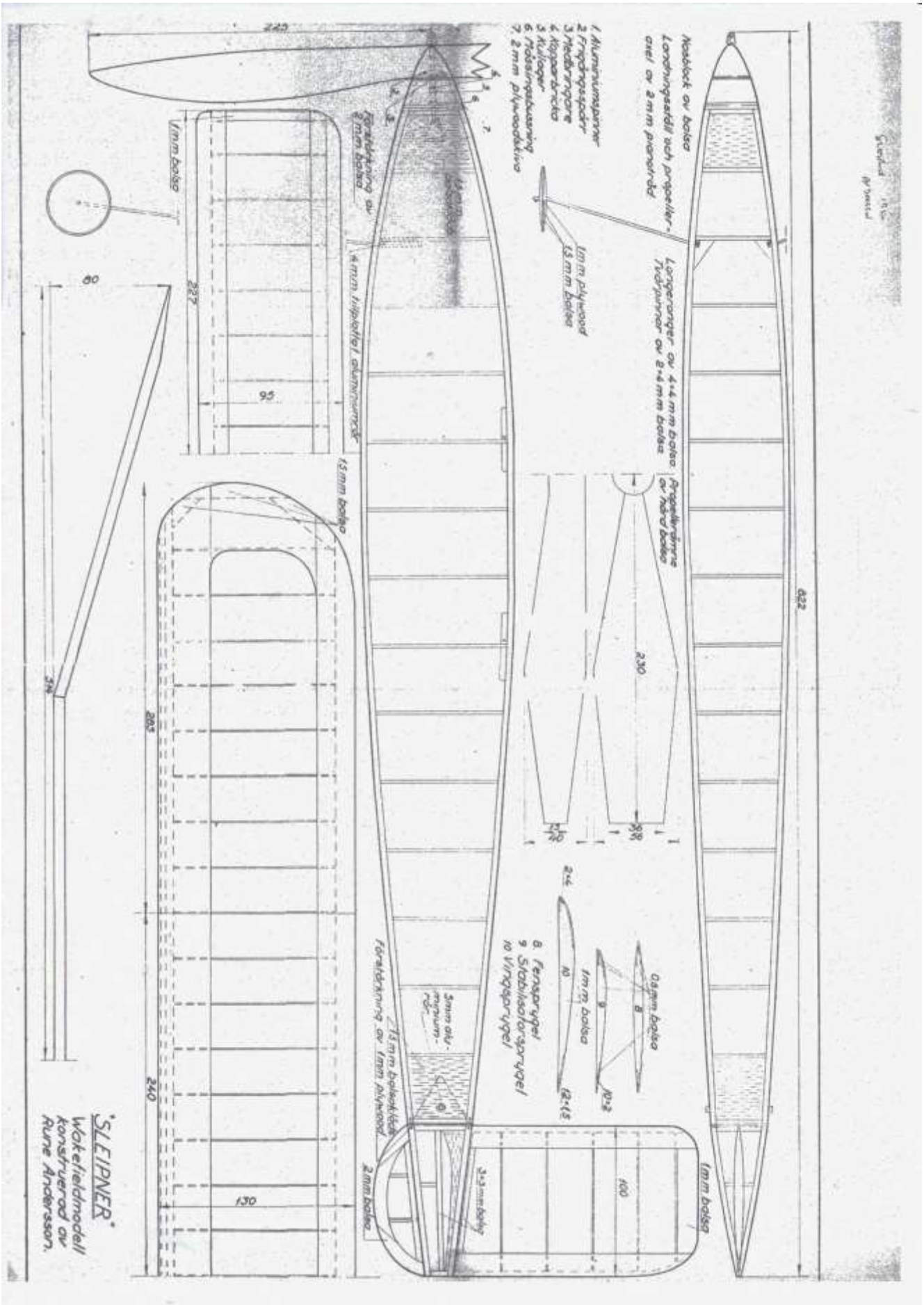
Both the fin and tailplane were of rectangular outline, with radiused tips. A similar constructional approach to the wing was followed, with both the leading and trailing edges being enhanced by 0.8mm sheet. The tail section was flat bottomed and very thin. Tailplane span was 454mm with a 95mm chord. The single fin was attached to the centre of the tailplane, and sat atop a built-up fairing. A small rounded underfin, only 29mm deep, provided the third point for take-off.

A double-bladed freewheeling propeller of 460mm diameter was used. It was carved from a 56 x 40mm blank, and faired into a small spinner. These dimensions were similar to contemporary English propeller dimensions for freewheeling propellers.

No mention was made of the rubber motor employed, save that it weighed 110 grams. The distance between hooks was only 640mm, but probably a considerably longer, corded motor was employed.

In general, the model is neat and compact, with the ability to perform in a satisfactory manner. It also meets any pre1951 cut off criteria for eligibility in old-time events.

In accord with Scandinavian practice, Sleipner was named after an eight-legged horse in Norse mythology.


1. Aluminiumspiner
2. Fripropsspdr
3. Hedbrunpore
4. Kopparbricka
5. Kullager
6. Rödringbussning
7. 2 mm plywoodskiva
Nosblock av balsa
Landningsställ och propeller-axel av 2 mm pianotråd
Longeranger av 4×4 mm balsa
Tvärjunner av 2×4 mm balsa
1 mm plywood
13 mm balsa
Propellerdrivne av hård balsa
Förstärkning av 2 mm balsa
1 mm balsa
14 mm hiplattet aluminium
13 mm balsa
8. Fensprygel
9. Stabilisatorsprygel
10. Vingsprygel
0,5 mm balsa
1 mm balsa
3 mm aluminium-rör
13 mm balsaklädd
Förstärkning av 1 mm plywood
2 mm balsa
3×3 mm balsa
1 mm balsa
'SLEIPNER'
Vakelfieldmodell
Konstruerad av
Rune Andersson.

Rune Andersson and Arne Blomgren (Sweden) Tempo – 1950

Because the Wakefield class has always been designed and built to a specification, there has been a tendency for modellers to specialize, and a reluctance by those of limited experience to compete in the class. Over the years simplified designs have appeared, produced with the object of attracting less experienced modellers, and very often these designs have been a collaborative project.

Examples of this approach have been the 'O-High-O', designed by George Reich and Joe Elgin, which was published in the Aeromodeller, and the 'Tyke', designed by H. Tubbs, G. Cameron, V. Dubery and K. Rutter, which appeared in Model Aircraft'. Both these designs are available from Outerzone.

Slightly earlier than these two designs, was another example of the collaborative approach, a Swedish model called the 'Tempo', which was published in 1950. It was designed by Rune Andersson and Arne Blomgren, both of whom had been successful in Scandinavian competitions. With the designers' pedigree, it is not surprising that the design featured some of the characteristics exhibited in their own models, but the published design looks good enough to compete successfully in its own right. Little attempt was made to simplify the construction from the traditional Scandinavian approach, while the proportions reflect the then current practices being followed.

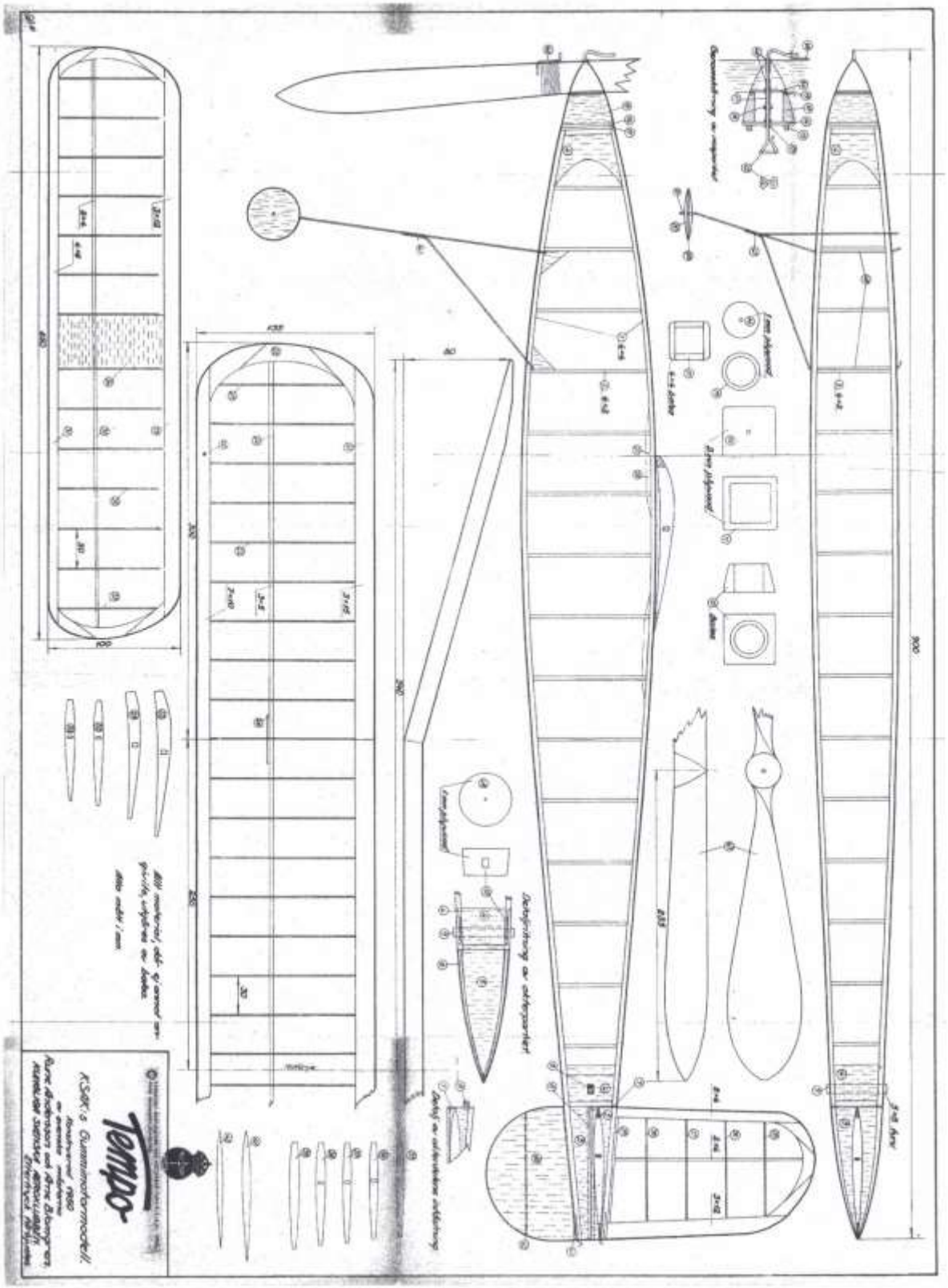
Layout of the 'Tempo' was similar to what both Andersson and Blomgren had published previously. The fuselage was of simple rectangular design, and was 900mm in length. Longerons were 4 x 4mm, while the spacers, pitched at 45mm, were 4 x 2mm. The wing sat on top of the fuselage, and was held on by rubber bands. Unusually, the rear rubber anchorage was not a circular metal or wooden dowel, but instead a rectangle of 5 x 8mm spruce was fitted. A twin legged wire undercarriage, complete with 40mm wheels, was fitted with a bracing stay for stiffness.

The wing was basically of constant chord layout, and completed with rounded tips. Total span was 1100mm, while the chord was 135mm. The centre 250mm was flat, with the tip being elevated for a relatively low 80mm dihedral. No name was supplied for the wing section, which was undercambered and relatively thin. Ribs were of 1.0mm sheet, and the leading edge was a solid 7 x 10mm. A central wing spar of 3 x 5mm was employed.

The tailplane mirrored the wing in shape, and was 450mm in span with a chord of 100mm. Ribs were again of 1.0mm sheet, while an inset spar of 2 x 4mm was fitted. A symmetrical section was employed, which was a departure from the almost universal use of a thin Clark Y. A single fin, together with an underfin, were used. The upper fin mirrored the tailplane in construction by employing a single inset spar in a symmetrical section. By contrast with the tailplane, the upper fin was tapered on both the leading and trailing edges. The lower fin used no internal structure apart from two symmetrical ribs, and featured external 1.0mm sheet covering.

A freewheeling propeller of 470mm diameter was fitted, carved from a 55 x 30mm block. The propeller was fitted with a 25mm diameter spinner. No details of the motor size were specified on the plan, but contemporary Swedish Wakefields used 14 strands of 6 x 1mm rubber, and an 800mm length would have been appropriate for a corded motor.

'Tempo' was an unsung design, but it had sensible proportions, and if built light had the potential to be a very successful model. Today it is still a popular design in Swedish Old Timer competitions.


Tempo
KSMK's Gummimotormodell
Konstruktion 1980
av Kenneth Nilsson
Rune Andersson och Arne Ekberg
Kanalen Sundsvall Länsmuseum

H. Orvin (Norway) – 1950

At the 1950 Wakefield Finals held at Jamijarvi, Finland, the sole Norwegian entrant was Harold Orvin, who placed 51st in a field of 63, with flights of 10, 42 and 111.2 for an aggregate of 163.2 seconds. A photograph of the model, together with its builder appears on p. 645 of the October 1950, *Aeromodeller.*

Orvin's model was a conventional slabsider, with twin fins, but it included a number of interesting features and options. The fuselage was about 880mm long, and instead of being built over a plan, it was constructed using cardboard formers mounted on an internal dowel. Fuselages constructed in this manner generally utilized diagonal longerons, but Orvin used conventional 4 x 4mm longerons in conjunction with 4 x2 mm spacers. Apart from the area adjacent to the wingmount, where the spacers were 4 x 4mm, and set vertically, the remainder of the spacers were employed in a warren girder layout. External stringers at the nose faired the rectangular structure into a spinner. The wing was shoulder mounted, and used a system of mounting devised by Ted Evans, and employed on his 'Jaguar' and 'Clipper' designs. Four layers of .8mm ply, incorporating the correct dihedral, were cemented at the centre and inserted through a fuselage slot. This ply tongue plugged into the wing, and the correct incidence was provided by a flat 1mm ply locating piece cemented to the front of the leading edge. Two undercarriage systems were offered as choice: either a retractable single leg located near the nose, or a fixed double leg located under the wing leading edge, both utilizing 1.5mm wire, with the single wheel being 30mm diameter, and the twin wheels of 40mm diameter.

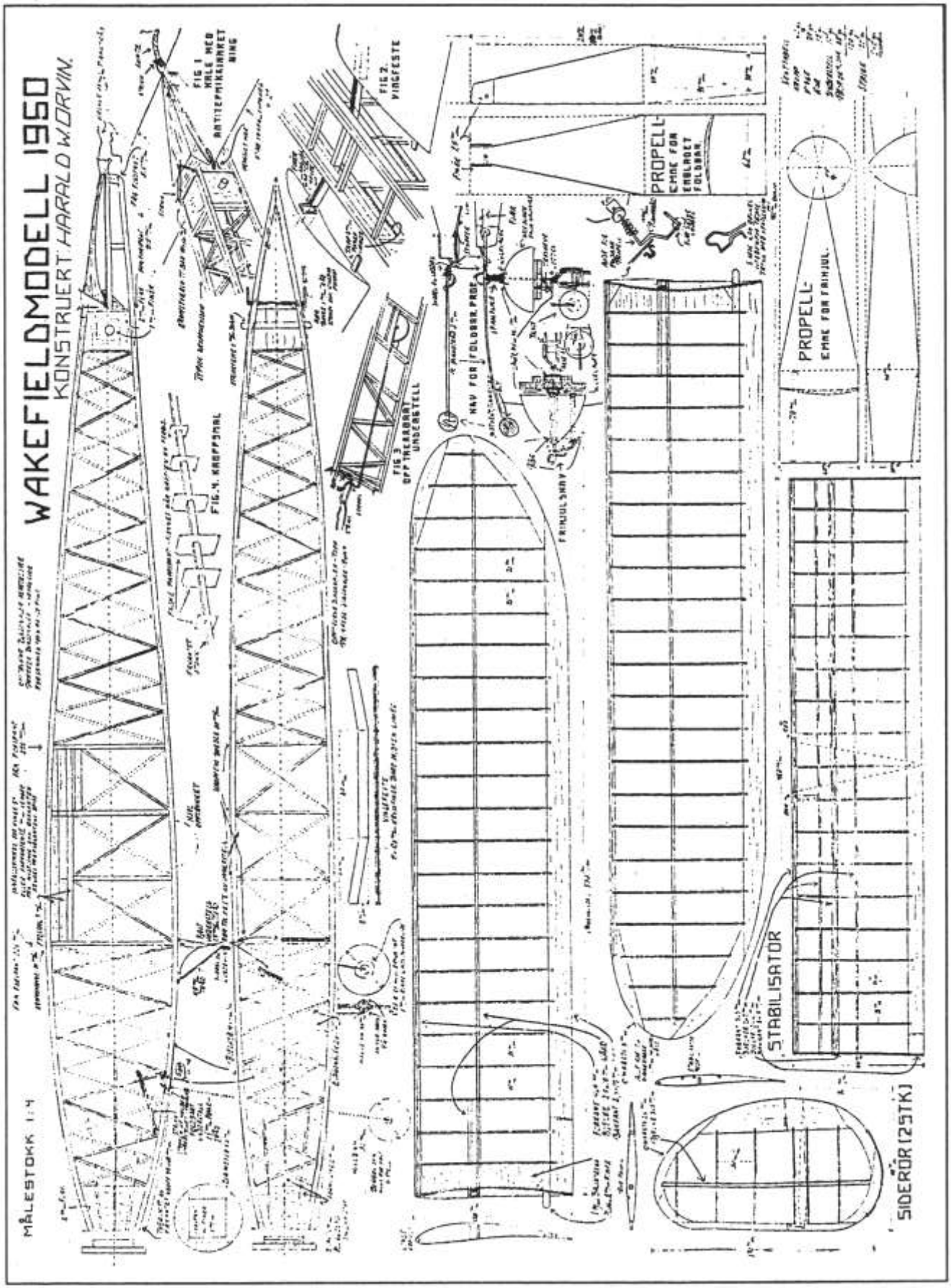
The wing had an overall span of 1260mm, with a chord of 120mm. Straight dihedral was employed, but the value was not stated on the plan, and it was built into the wing tongue to generate a figure of 115mm. An RAF 32 type section was used in a constant chord wing terminated in rounded tips. Ribs of 1.5mm sheet were pitched at 25mm. A single spar of hard 10 x2mm was used on the undersurface of the wing, and incorporated a box on the first four ribs to accommodate the wing tongue.

By contrast with the wing, the tailplane used three 2 x 2mm spars on the upper surface, combined with a 2 x 12 mm spar on the lower surface. A thinned Clark Y section was employed, together with ribs of 1.0mm sheet. Twin large fins were affixed to the tips of the tailplane.

As with the undercarriage, a choice was offered with the propeller. If the retracting undercarriage option was selected, then probably a single bladed folder would have been utilized. This was 530mm in diameter, and carved from a 230 x 62 x 47mm block. A wire nose assembly was used, with a rounded noseblock substituting for a spinner. The alternative propeller was a double-bladed freewheeler of 460mm diameter, carved from a 60 x 42mm block, and incorporating a spinner.

No motor size was specified on the plans, nor was there a suggested balance point. The illustrated wing mounting offered the ability to shift the wing location in order to achieve a suitable balance point, and it may be conjectured that different rubber motors could have been used for each propeller.

Although its performance at the 1950 Wakefield Finals was not spectacular, the design gives the impression that it should have been quite capable.


WAKEFIELDMODELL 1950
KONSTRUERT HARALD WORVIN
FIG 1 VALE MED ROTTEPINNEKRANKET RING
FIG 2 VINGFESTE
FIG. 3 OPPTREKKBART UNDERSTELL
FIG. 4. KRAFTSMAL
HAV FOR FOLDBAR PROPELL
PROPELL-
EMNE FOR FRIHJUL
STABILISATOR
SIDEROR (2 STK)
MÅLESTOKK 1:4

Fred Boxall 1921-71

During the 1940's and 1950's, the twins Reg and Fred Boxall, of the Brighton competed very successfully in Wakefield, as well as in glider and open rubber events. Of the two, Fred was the better known, and was a member of the 1951 Wakefield Team, as well as the 1956 A2 Team.

His first published Wakefield was the 'Bryton Roc', which appeared in *Model Aircraft,* and was published as a full-size plan, MA67. At the time it was the British Record Holder. The model featured a streamlined fuselage, with fixed twin bamboo undercarriage legs, fitted with 1.8" diameter wheels. The 51" shoulder wing was fully tapered, with the ribs alternating between 1/16" and 1/32" sheet. Although the wing section was quoted as RAF32, no full-size section was shown on the plan, nor is the dihedral quoted, and reliance had to be placed on the accuracy of the drawn wing tongue.

One of Fred Boxall's interests was the Centre of Lateral Area (CLA) Theory propounded by Charles Hampson Grant in *Model Airplane News,* and when designing his models Boxall used to make small (6") cardboard models of the fuselage profile. His objective was to obtain a CLA slightly above and behind the Centre of Gravity. While the *Model Aircraft* plan is deficient in some areas of detail, it does indicate the Centre of Pressure Line, the Centre of Gravity Line, and the CLA. A consequence of the CLA theory was that it very often indicated a requirement for a deep underbelly, or a central fuselage underfin, and 'Bryton Roc' features the former.

The fuselage cross-section shape was also complicated, featuring a semi-circular section above the thrust line, and elliptical below. Formers were wound from four layers of 1/8" x 1/32", which were assembled on card templates that were then mounted on a jig. Overall, the fuselage was nearly 35" long, and was assembled around four 1/8" x 1/16" longerons, supplemented by a further fourteen stringers of 1/16" x 1/16". From the nose to the trailing edge of the wing, the longerons and stringers were supplemented on their interior face by 1/8" x 1/16" strips cemented vertically to create a tee section.

The tailplane was fully tapered, with alternating ribs of 1/16" and 1/32" sheet. Again, no full-size ribs were shown, but the section was quoted as being Gottingen 602. Small underfins of 1/16" sheet were fitted to the undersurface near the tips.

A single fin was fitted just forward of the tailplane, and was combined with a small underfin. These fins were of symmetrical section, and for a change all ribs were shown full size.

A 19" diameter freewheeling propeller was employed, carved from a 2" x 1 1/2" block, but again no block drawing was supplied, although this could be inferred from a pitch diagram which was drawn. The propeller faired into a small spinner, and a spring-loaded free wheeler was suggested. Such an arrangement required no cording turns for the [1]shown, but again it was recommended that a parachute type of dethermaliser should be used.

All up weight was quoted as 8.14oz.
Plans for the 'Bryton Roc' were published in the January 1950 issue of *Model Aircraft,* and are available through Outerzone. A photograph of the model features on the cover of the February 1950 *Model Aircraft.*

A fellow member of the Brighton club during the 1950's was Peter Giggle. In later life Peter endeavoured to preserve and record as much information on the Boxall's as he could obtain, and from his efforts we have plans for four further Wakefields designed by Fred.

The first was the ‘Fittleworth Flyer’ from 1950 which represented Fred’s last design to the L2/100 fuselage formula. The maximum cross-section was 4” deep and 3.2” wide, which together with the wing mount, gave a cross-section of 14.8 square inches. In this model the streamlined approach was abandoned in favour of a rectangular slabsider which was 36” long. This was constructed of 1/8” x 1/8” strip for the longerons and spacers, with the latter set at 2 1/2” pitch. The ‘Bryton Roc’ twin legged bamboo undercarriage arrangement was retained, utilising 1 3/4” diameter wheels. Forsaking the shoulder wing layout, Fred moved the wing to a platform positioned on top of the fuselage, which was constructed from 1/16” sheet, cemented on after the fuselage was covered. To comply with Grant’s CLA theories, there were two fins: an upper of 1/16” sheet, complete with tab, and a built-up under fin of symmetrical section, positioned ahead of the tailplane. The latter was set underneath the fuselage, located on a 1/16” sheet platform, which was set to give 2 degrees of tail tilt. Covering of the fuselage was heavyweight Modelspan to the rear peg, and lightweight Modelspan thereafter.

Polyhedral wings were adopted for the 1950 design, with a constant chord inner section which merged into curved tips. Dihedral was 1.5” at the inner break, and 5.5” at the tips. In place of the RAF 32, an NACA 6412 was substituted, employing 1/16” sheet with circular lightening holes. These ribs were supplemented by riblets, which also had a lightening hole. There were two spars: a lower one of 3/32” X 3/16”, and an upper one of 3/32” x 3/32”, situated one above the other, which were also webbed with 1/32” sheet out to the dihedral break.

The fully tapered tailplane had circular tips, and used a Gottingen 602 section with 1/16” ribs and riblets. Two spars of 3/32” x 3/32” were employed.

The propeller had been reduced in diameter to 17 1/2”, carved from a 1.8” x 1.8” blank to give 27” pitch. A Garami type freewheel was substituted for a spring-loaded system. This would have required a tensioned motor, which was 18 strands of 3/16” x 1/24”, 42” long and weighing 3.3oz. At 22 turns per inch, a safe maximum was 924 turns. The front former of the fuselage was sanded to give 1.5 degrees of side and downthrust. On the plan the wing was set at 6 degrees of incidence, and the tailplane at minus 2 degrees, but a decalage of 8 degrees appears excessive. The balance point was 40%, with the CLA about 3 1/2” further aft. A dethermaliser was fitted to the model, but in view of the tailplane position, required the fitting of an upward tilting wing. The D/T angle was set at 35 degrees.

Plans for the ‘Fittleworth Flier’ were drawn up by Bob Jones, and are currently available through Mike Woodhouse at Free Flight Supplies.

With the announcement of a minimum fuselage cross-section requirement for 1951, a new design was needed. This design was subsequently known as ‘Digby’, because Fred placed first in the British Wakefield Team Trials held at Digby Aerodrome. In general, ‘Digby’ was an upgraded version of the ‘Fittleworth Flier’, having the same basic approach, but with refinements wherever possible. Taking advantage of the new rules, the fuselage was lengthened to 38”, while the cross-section was reduced to 3” x 3”. With the wing platform 3” x 7/8”, a cross-section of 11.625 square inches was achieved. The fuselage structure of 1/8” x 1/8” remained the same, with hard longerons; front and middle spacers medium hard, and rear spacers medium soft. Twin bamboo undercarriage legs were retained, 9 1/2” long, with a 3/32” diameter spreader, and 1.8” diameter wheels. To compensate for the shallower fuselage profile, a fuselage keel was added under the wing location. The underfin was of altered profile, with parallel sides and a circular tip. It was of symmetrical section, with an inset centre spar and ribs of 1/16” sheet. The top fin continued of 1/16” sheet, but with addition of a sizeable movable tab. No change was made to the tailplane platform structure.

Very little change was made to the ‘Digby’ wing planform and structure, although each tip section was reduced by 1/2” in span, and 1/8” was removed from the inner section. The NACA. 6412 wing section was retained, but with the adoption of alternate 1/16” and 1/32” ribs.

The loss of wing area was transferred to an increased tailplane, which featured a constant chord planform with circular tips. Ribs were of 1/16” sheet, and the single top spar was 3/16” x 1/16”, with the Gottingen 602 section being retained.

The freewheeling propeller was increased in diameter to 18”, with a pitch of 27”, carved from a 2.1” X 2.0” block. Power was increased to 4.1oz of 1/4” x 1/24” rubber, 49” long, made up in 14 strands, which gave 1070 maximum turns. The pop-up wing D/T was retained, with the D/T angle being set at 35 degrees.

Weights of the actual model were

Wing	1.20
Tail	0.23
Fuselage	1.30
Propeller	1.07
Undercarriage	0.23
D/T bands etc.	0.10
	4.13
Motor	4.10
	8.23 oz

The model had a balance point of 40%, and 1.5 degrees right and down thrust was built into the nose former. The wing was set at an incidence of 6 degrees, while the tailplane was set at minus 3 degrees. A tail-tilt of 2 degrees was also built in by making the port profile 1/16” deeper than the right profile.

At the Digby Trials, Fred had flights of 3:00, 4:38 and 4:16 for an aggregate of 11:54, and top place in the British Team. Details of his model are given on pp. 476-8 of the August 1951 *Aeromodeller.* The three-view on p.478 is incorrect insofar as no riblets for the wing and tailplane, while an exaggerated tailplane tilt for a left turn is illustrated, whereas the tilt should be in the opposite plane, and of less angle.

In the Finland Finals, which experienced difficult weather conditions, flights were 149.2, 143.4 and 16.0 for an aggregate of 308.6 seconds and 36th place.

After his experience at the Finals, Fred felt that he should produce a new design in an effort to improve performance. In fact he produced two designs, one of which was named ‘Jamijarvi’ after the site location where the 1950 and 1951 Finals were held, while the second, designed for calm air conditions, was named ‘Jamijarvi’ Still Air Version.’ He used identical wing and tailplane outlines, but different fuselages, propellers and wing sections.

‘Jamijarvi’ was the less extreme of the two, but followed the general approach of the ‘Fittleworth Flier’ and ‘Digby’. It was a slabsider,, with a wing positioned on top of the fuselage, incorporating a freewheeler and twin-legged undercarriage. The fuselage was considerably extended, having an overall length of 46 1/2”, and was 2.8” square. In an effort to reduce weight, diagonal longerons of 3/16” x 1/16” were adopted, and used in conjunction with 1/8” x 1/16” spacers. Diagonal thread bracing from the nose to the rear peg was also used. Pitch of the spacers was 2 3/4”, while the fuselage, because of its length, had a parallel section of some 22”. The wing platform on top of the fuselage continued in the same pattern of the previous models. Twin bamboo undercarriage legs continued to be used, but they were now located on the top longeron as opposed to the bottom longeron location used previously. An 8” long 1/16” diameter spreader bar was used, together with 1.6” diameter wheels. Because of the increased fuselage length, the 1/16” sheet keel on the underside of the fuselage was increased in size. The fin arrangement reflected the ‘Digby’ approach, with a built up underfin and a sheet upper fin complete with moveable tab. This upper fin was now made of very soft 1/20” balsa sheet. The tailplane continued to be mounted under the fuselage, aft of the fin, with tail tilt of 1 degree being built into the assembly. For D/T purposes, the tipping wing method continued to be employed, with the tip angle being set at 35 degrees.

The wing continued with the polyhedral approach, combined with a constant chord inner section, while the tips were rounded. Chord of the inner section was 5 3/16”, while the overall span was 43”. On ‘Jamijarvi’, an NACA 6412 wing section was employed, with ribs of 1/20” sheet on which 3/16” lightening holes were drilled at selectively located positions. Ribs were pitched at pitched at 2”, with riblets located midway between each rib, and extending back to the spar. Two 3/32” x 3/32” spars were augmented

by 3/32” sheet infill between the spars, while the central four rib bays were webbed with 1/32” sheet. Both tips were washed out 1 degree. The starboard inner section was washed-in 1 1/2 degrees. Centre section dihedral was 1.3”, while the tip dihedral was 5.5”.

The tailplane featured a constant chord planform with rounded tips. Ribs were also of 1/20” sheet, with alternate riblets as well, and were to Gottingen section. Two spars of 1/16” x 1/16” were placed vertically above each other, with the upper spar being the attachment point for the riblets.

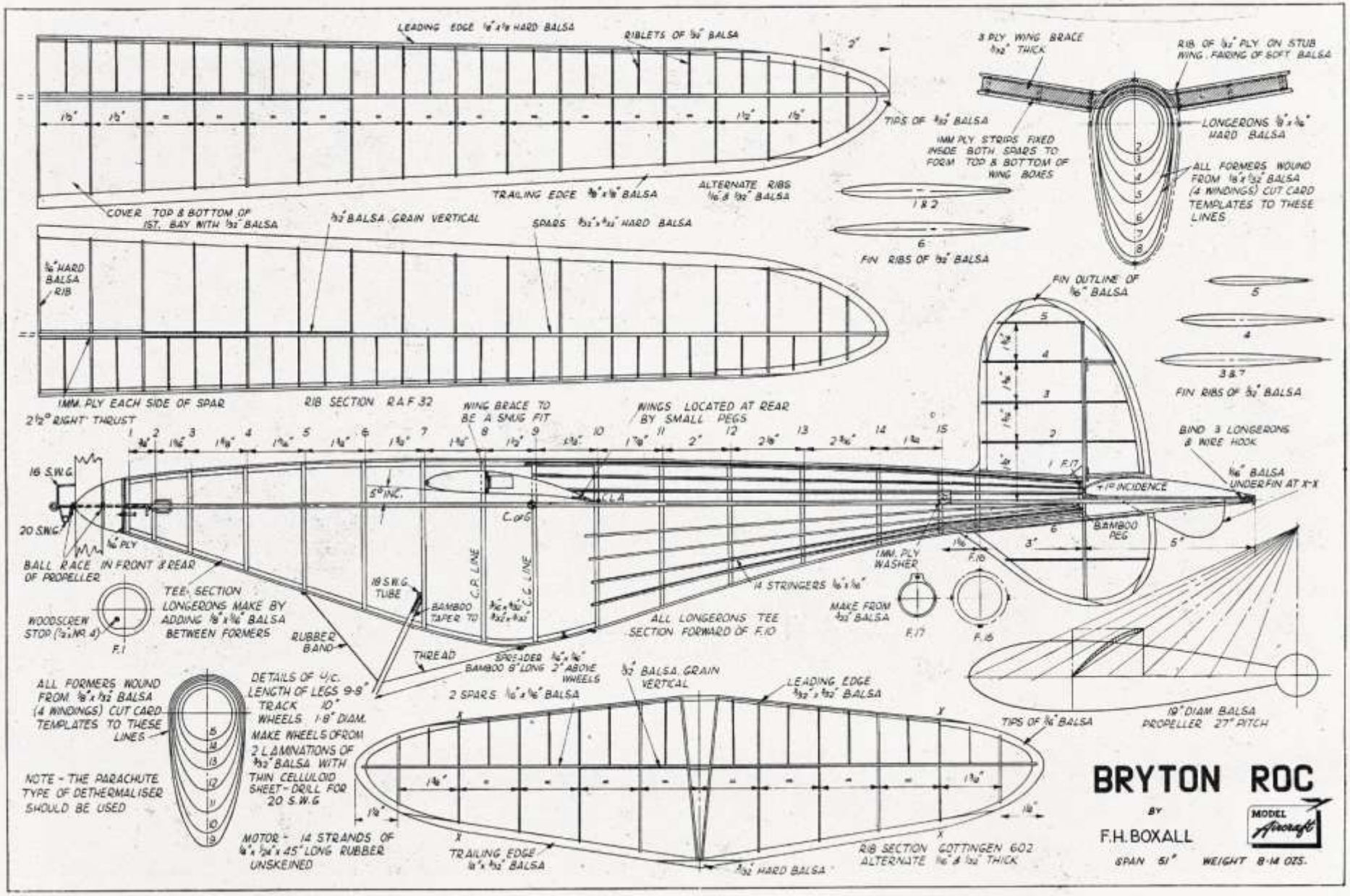
A freewheeling propeller was fitted, carved from a 2.125” x 1.875” block. The original used uncorded motors, as the propeller assembly was fitted with a safety pin type spring with a rear stop screw. Sidethrust of 1.5 degrees was built into the front former, while the balance point was at 55%. The wing was set at 6 degrees, and the tailplane at 0 degrees.

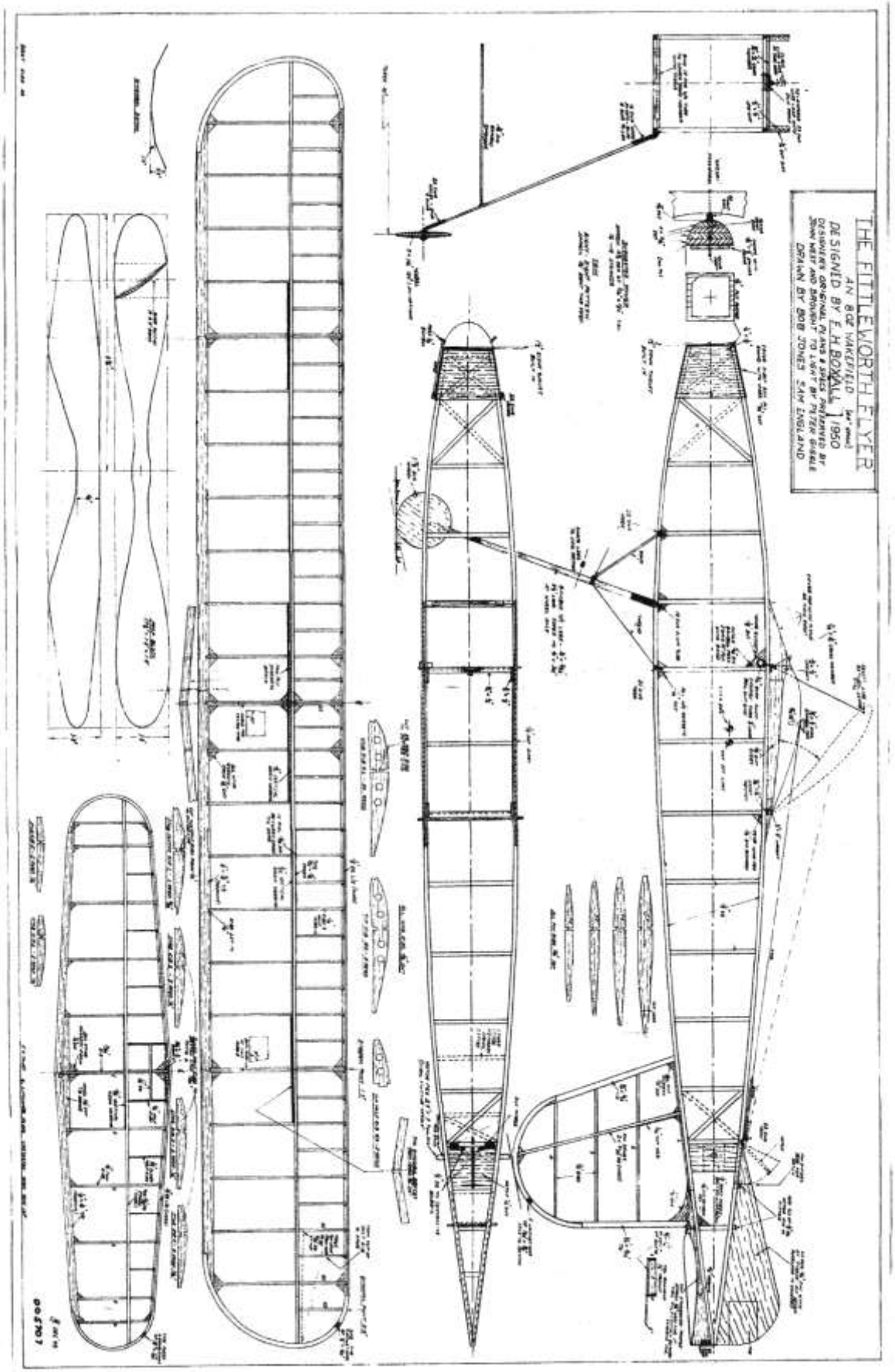
‘Jamijarvi Still Air Version’ differed from ‘Jamijarvi’ in having a fuselage which was 50” in overall length, with a 25.625” parallel section of the same2.8” cross-section. A slightly smaller fuselage keel of 1/20” sheet was used, placed immediately below the wing location. Fuselage construction of ‘Jamijarvi Still Air Version’ were identical with that for ‘Jamijarvi’.

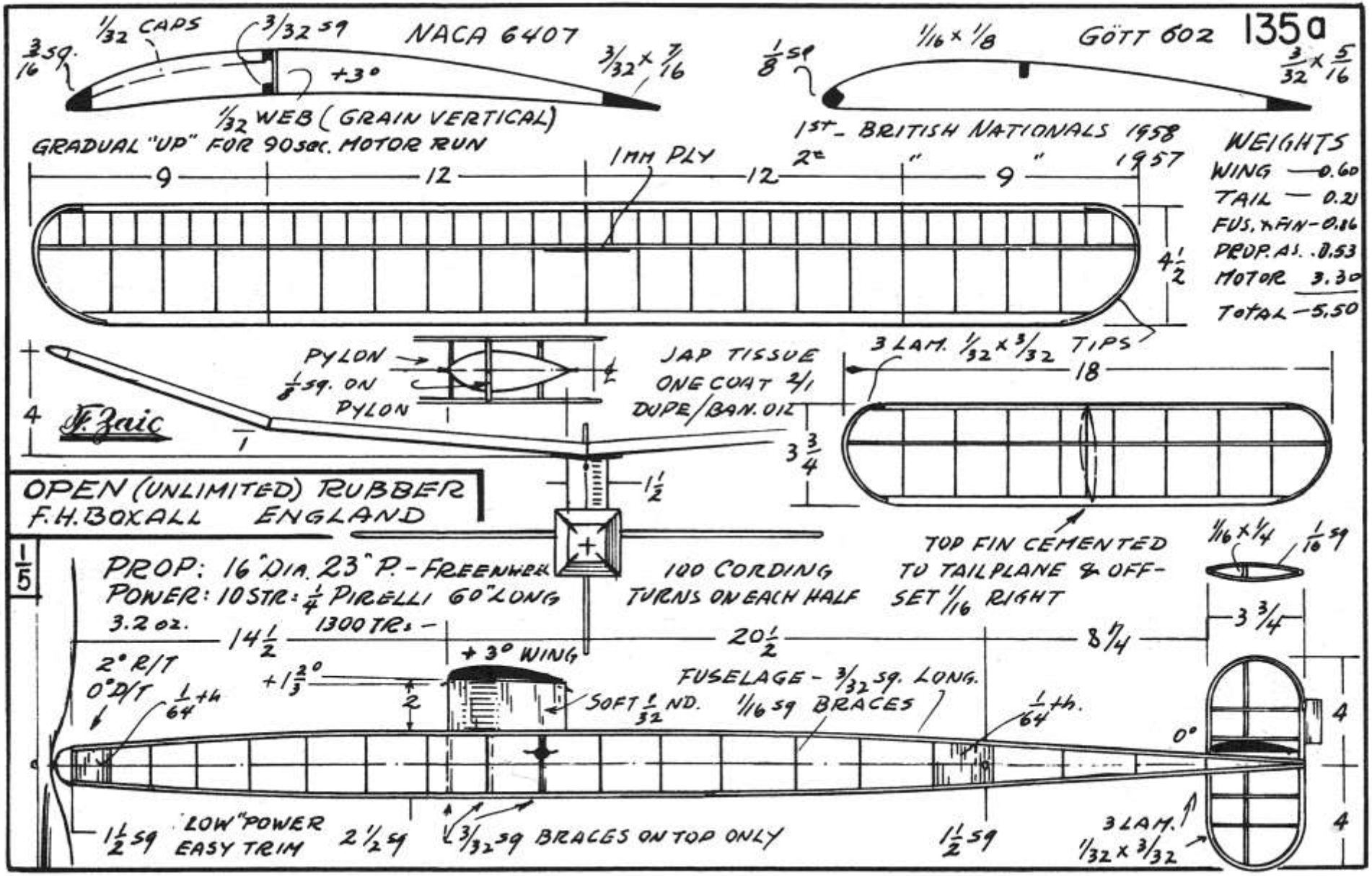
While the wing layout of ‘Jamijarvi Still Air Version’ was identical with ‘Jamijarvi’, an NACA 6409 wing section was used. The 18” freewheeling was also changed, with the block dimensions being altered to 2 3/16” x 2”. Right sidethrust of 1 1/2 degrees was sanded into the front former, while the wing was set at 6 degrees and the tailplane at 0 degrees. On ‘Jamijarvi Still Air Version’ the balance point was set at 50% of the chord.

Both ‘Jamijarvi’ and ‘Jamijarvi Still Air Version’ were featured in an article by Peter Giggle written for Ron Firth’s *Flying Model Designer and Constructor No. 3.* Both models were intended to have 4.8 oz of rubber, made up into 14 strands 1/4” x 1/24”, 58” long, which would take 1200 turns. Peter subsequently drew up full-size plans for these two models, but I do not know any current source of supply.

Fred Boxall died in 1971, at the age of 50. He is remembered as a modest and very capable modeller, who competed successfully over an extended period.


LEADING EDGE 1/8" x 1/8" HARD BALSA
RIBLETS OF 3/32" BALSA
TIPS OF 3/32" BALSA
COVER TOP & BOTTOM OF 1ST. BAY WITH 1/32" BALSA
TRAILING EDGE 3/8" x 1/8" BALSA
ALTERNATE RIBS 1/16" & 1/32" BALSA
3/32" BALSA GRAIN VERTICAL
SPARS 3/32" x 3/32" HARD BALSA
1/16" HARD BALSA RIB
1MM. PLY EACH SIDE OF SPAR
RIB SECTION R.A.F. 32
3 PLY WING BRACE 3/32" THICK
RIB OF 1/32" PLY ON STUB WING. FADING OF SOFT BALSA
LONGERONS 1/8" x 1/16" HARD BALSA
1MM PLY STRIPS FIXED INSIDE BOTH SPARS TO FORM TOP & BOTTOM OF WING BOXES
ALL FORMERS WOUND FROM 1/8" x 1/32" BALSA (4 WINDINGS) CUT CARD TEMPLATES TO THESE LINES
1 & 2
6
FIN RIBS OF 3/32" BALSA
FIN OUTLINE OF 1/16" BALSA
5
4
3 & 7
FIN RIBS OF 3/32" BALSA
2½° RIGHT THRUST
WING BRACE TO BE A SNUG FIT
WINGS LOCATED AT REAR BY SMALL PEGS
BIND 3 LONGERONS & WIRE HOOK
1/16" BALSA UNDER FIN AT X-X
+1° INCIDENCE
18 S.W.G.
20 S.W.G.
1/16" PLY
BALL RACE IN FRONT & REAR OF PROPELLER
5° INC.
C.L.A.
C. of G.
BAMBOO PEG
1MM. PLY WASHER
F.10
F.17
F.18
TEE SECTION LONGERONS MAKE BY ADDING 1/8" x 1/16" BALSA BETWEEN FORMERS
WOODSCREW STOP (3/8" NO. 4)
F.1
18 S.W.G. TUBE
BAMBOO TAPER TO
C.P. LINE
C.G. LINE
14 STRINGERS 1/16" x 1/16"
ALL LONGERONS TEE SECTION FORWARD OF F.10
MAKE FROM 3/32" BALSA
RUBBER BAND
THREAD
SPREADER 1/16" x 1/16" BAMBOO 8" LONG 2" ABOVE WHEELS
ALL FORMERS WOUND FROM 1/8" x 1/32" BALSA (4 WINDINGS) CUT CARD TEMPLATES TO THESE LINES
DETAILS OF U/C. LENGTH OF LEGS 9·8" TRACK 10" WHEELS 1·8" DIAM. MAKE WHEELS OFROM 2 LAMINATIONS OF 3/32" BALSA WITH THIN CELLULOID SHEET - DRILL FOR 20 S.W.G
NOTE - THE PARACHUTE TYPE OF DETHERMALISER SHOULD BE USED
MOTOR - 14 STRANDS OF 1/8" x 1/24" x 45" LONG RUBBER UNSKEINED
2 SPARS 1/16" x 1/16" BALSA
3/32" BALSA GRAIN VERTICAL
LEADING EDGE 3/32" x 3/32" BALSA
TIPS OF 1/16" BALSA
19" DIAM BALSA PROPELLER 27" PITCH
TRAILING EDGE 1/8" x 3/32" BALSA
3/32" HARD BALSA
RIB SECTION GOTTINGEN 602 ALTERNATE 1/16" & 1/32" THICK
BRYTON ROC
BY
F.H. BOXALL
MODEL Aircraft
SPAN 51" WEIGHT 8·14 OZS.


THE FITTLEWORTH FLYER
AN 80' WAKEFIELD
DESIGNED BY E.H.BOXALL 1950
DESIGNED ORIGINALLY AS A SPEED PLANNED BY
SEAN NEEY AND BROUGHT UP TO DATE BY PETER BIBBE
DRAWN BY BOB JONES SAM ENGLAND


135a
NACA 6407
GÖTT 602
1/32 CAPS
3/32 sq
3/16 sq.
+3°
3/32 x 7/16
1/32 WEB (GRAIN VERTICAL)
GRADUAL "UP" FOR 90sec. MOTOR RUN
1/8 sq
1/16 x 1/8
3/32 x 5/16
1st - BRITISH NATIONALS 1958
2nd " " 1957
WEIGHTS
WING — 0.60
TAIL — 0.21
FUS. & FIN - 0.86
PROP. AS. .0.53
MOTOR 3.30
TOTAL - 5.50
1MM PLY
9
12
12
9
4 1/2
PYLON
1/8 sq. ON PYLON
JAP TISSUE ONE COAT 2/1 DOPE/BAN. OIL
3 LAM. 1/32 x 3/32 TIPS
18
4
3 3/4
1 1/2
F. Zaic
OPEN (UNLIMITED) RUBBER
F.H. BOXALL ENGLAND
1/5
PROP: 16" DIA. 23" P. - FREENWER
POWER: 10 STR: 1/4 PIRELLI 60" LONG
3.2 oz.
1300 TRs -
100 CORDING TURNS ON EACH HALF
TOP FIN CEMENTED TO TAILPLANE & OFF-SET 1/16 RIGHT
1/16 x 1/4
1/16 sq
3 3/4
14 1/2
20 1/2
8 1/4
+3° WING
2° R/T
0° D/T
1/64 th
+1 2/3°
2
SOFT 1/32 ND.
FUSELAGE - 3/32 sq. LONG.
1/16 sq BRACES
1/64 th.
0°
4
4
1 1/2 sq
LOW POWER EASY TRIM
2 1/2 sq
3/32 sq BRACES ON TOP ONLY
1 1/2 sq
3 LAM. 1/32 x 3/32

Band Box (Bill De Lorme) U.S.A. 1950

The late John Pool was a perceptive judge of Wakefield designs, and one of the designs which attracted him was the 'Band Box', by Bill Den Lorme, which was published in the July 1950 issue of *Model Airplane News.*

In the article accompanying the plan, De Lorme outlined the development of the design, which started as a super-streamlined model that evolved to a simple and reliable approach which had proven successful in American mid-west contests.

The fuselage was a standard slabsider, constructed from 1/8" x 1/8" for the longerons and spacers, with the latter being pitched at 1 3/4". Total fuselage length was just on 36". A twin legged non-retracting undercarriage of probably 1/16" diameter wire was fitted, complete with 1 3/4" diameter wheels. The wing sat on top of the fuselage, attached to a saddle which provided the correct incidence. A cabin structure was also fitted above the wing to supply the necessary cross-section requirement. A single fin was faired into the fuselage with a short dorsal extension, which was in two parts to allow for a tipping tail D/T. The fin itself was of sparless construction, with symmetrical ribs, and fitted with a sheet rudder on the trailing edge. A small sheet underfin completed the three-point ROG requirement.

The wing was polyhedral, with a constant chord inner section, and fully tapered tips. Overall span was 46", while the inner section had a chord of 5 1/2", which reduced to 2 3/8" at the outboard rib. Dihedral at the inner break was 1 3/4", and 5" at the tip. No name was given to the wing section, but it resembled an NACA 6409. Ribs were of 1/16" sheet, pitched at 1 3/4" on average, and there were three spars in the wing; two on the upper surface of 1/8" x 1/8", and a lower forward one of 3/32" x 3/32". The top surface was sheeted with 1/32" sheet from the leading edge to the forward top spar, which was matched with corresponding sheeting on the lower surface. Tips were of soft block.

The tailplane was of constant chord, with a span of 19" and a chord of 3 1/2". A thinned Clark Y type section was used, with 1/16" ribs pitched at 1 13/16" intervals. Three 1/16" x 1/16" spars were fitted, with the top spar being reinforced by 1/32" sheet to the leading edge. Tips were also of soft block, and it was recommended that they be hollowed out for lightness.

De Lorne offered a choice of propellers on the model: a double-bladed folder, a single bladed folder or a freewheeler. The double-bladed folder was used in normal flying conditions up to 15 m.p.h. wind speed, and gave a 90 second motor run with a high rate of climb. The second propeller was a one blader, with a blade identical with the first propeller, and employed in very windy and gusty weather. It produced a straight up climb at take-off, and quickly took the model away from any ground effect or turbulence. No comment was made on the use of the freewheeling propeller option.

The whole model, with the exception of the fuselage, was covered in Jap tissue. Silk covering was used on the fuselage, although this imposed a weight penalty. It was also recommended that the propeller blades be covered in silk, with motors of 3/16" Dunlop, or 1/4" T56, 48" long and weighing 3.6 oz being used. These were corded for reliability.

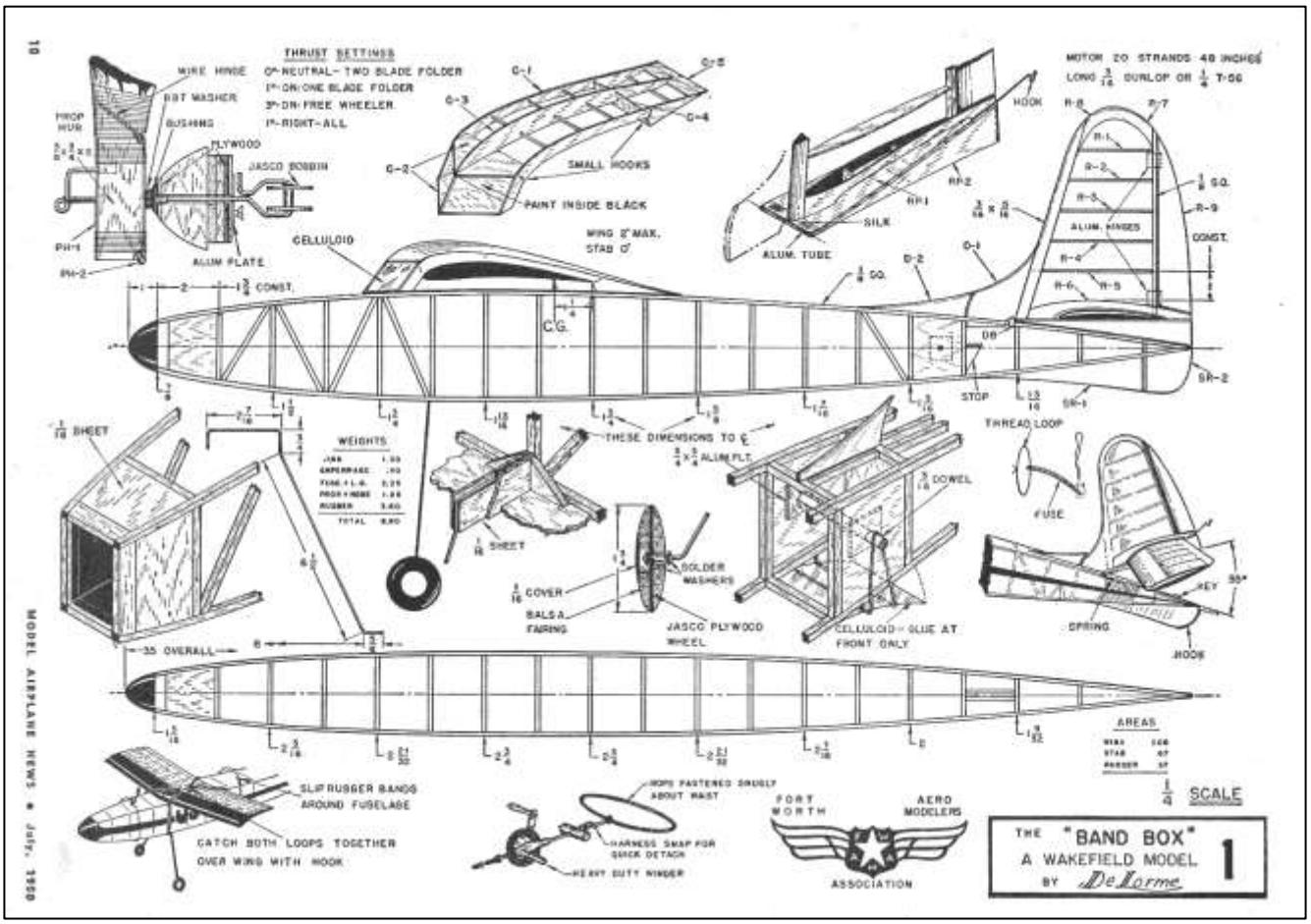
The balance point was 1 1/4" forward of the trailing edge, and it was recommended that the wing be moved to attain this position. On the original model, 1 degree right thrust, a neutral up and down setting, and 1/8" right rudder tab produced a 100' diameter climb and glide circle. Weights of the original model were as follows:

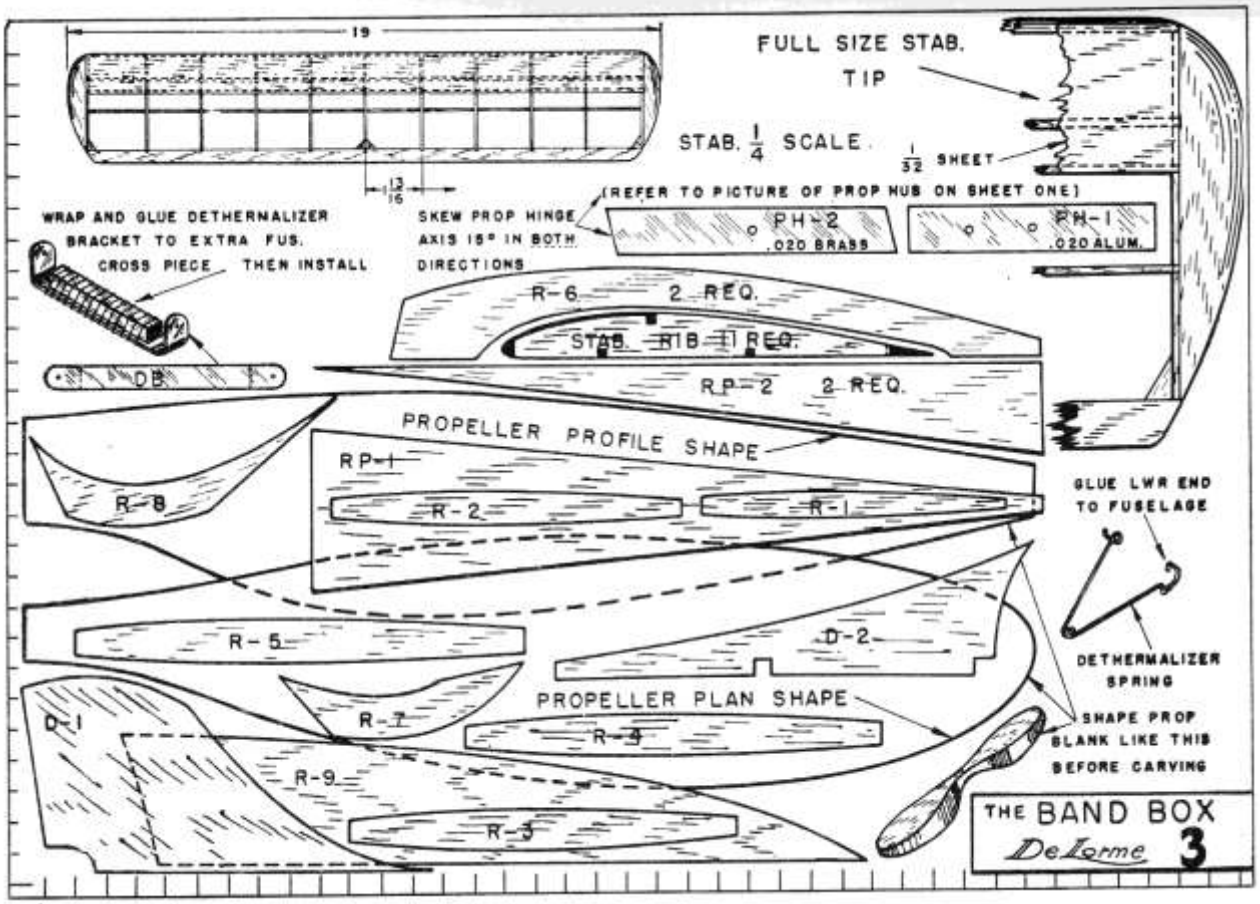
Wing.	1.30
Tailplane.	0.40
Fuselage	2.25
Propeller.	1.25
Rubber.	3.60
	8.80oz

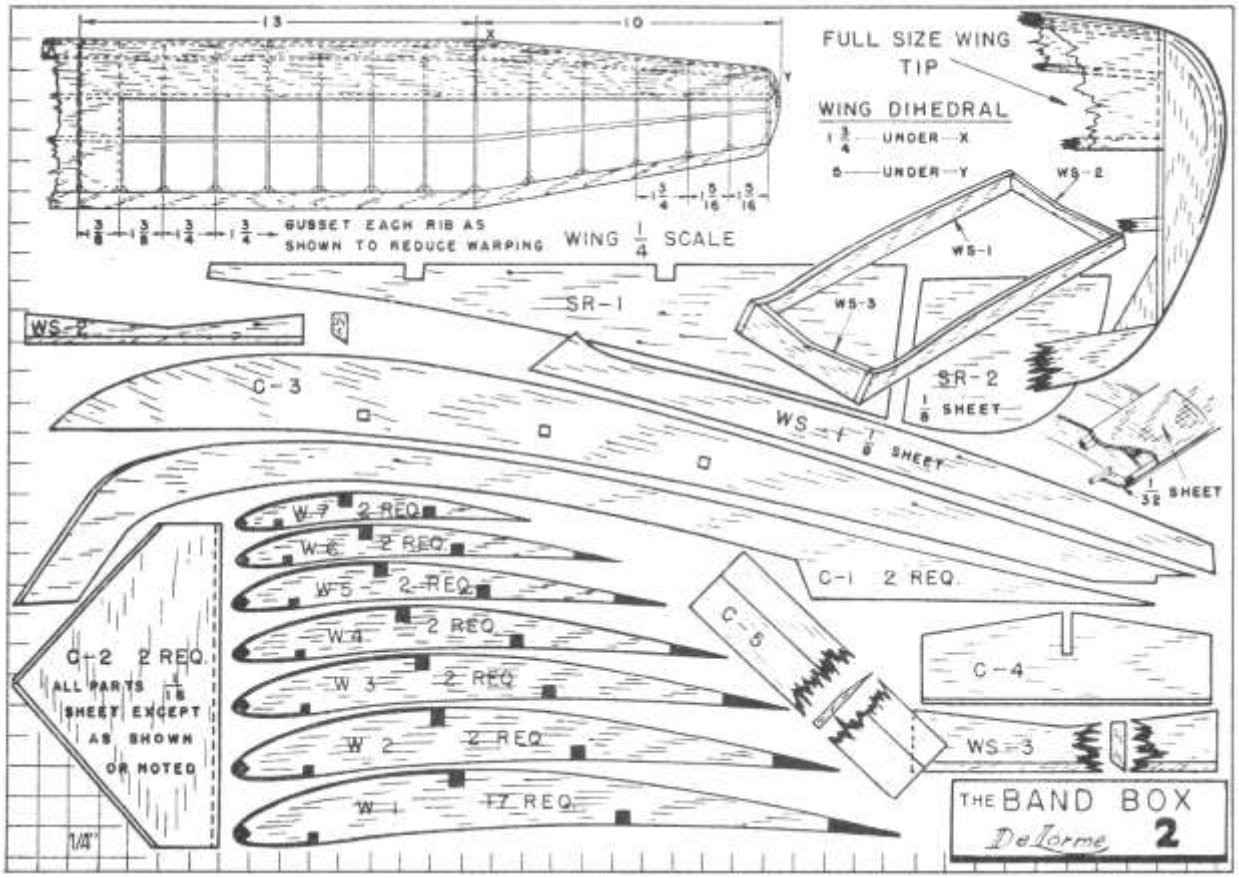
In 1987John Pool drew up plans for, and built, a Band Box. Because some of the full-size parts did not fit, John found it necessary to massage a few components, but otherwise his plan is a faithful rendering of the original. However, he did make a couple of minor modifications, installing a two-piece wing, and using a freewheel fold system on the propeller. This necessitated using cording turns to retain the noseblock.

John calculated the propeller to have an approximate pitch of 28” and he initially used 12 strands of 1/4” FAI rubber 49” long, which weighed 3.6oz. On this motor he could obtain 860 turns. He then added an additional four strands of 1/8” rubber, which increased the motor weight to 4.1oz, but reduced the useable turns to 810. In this configuration John won the 8oz class at the 1988 SAM Champs, recording 3 x 3.00 with a fly-off of 4.06. In testing for this event, John found that the balance point for the model needed to be 2 1/4” in front of the trailing edge, because the model stalled easily. He was also using 1/16” side and downthrust, in conjunction with 3/32” rudder offset. The weight of John’s model at 1998 SAM Champs was 8.68oz (including rubber).

This design illustrates perfectly how John Pool could identify a ‘sleeper’, and by meticulous attention to detail, reduce the weight by over 1oz from that achieved by the designer. John was then able to achieve a standard of performance that few could match.




19
FULL SIZE STAB. TIP
STAB. 1/4 SCALE
1/32 SHEET
(REFER TO PICTURE OF PROP HUB ON SHEET ONE)
WRAP AND GLUE DETHERMALIZER BRACKET TO EXTRA FUS. CROSS PIECE THEN INSTALL
SKEW PROP HINGE AXIS 15° IN BOTH DIRECTIONS
PH-2 .020 BRASS
PH-1 .020 ALUM.
R-6 2 REQ.
STAB. RIB 1 REQ.
DB
RP-2 2 REQ.
PROPELLER PROFILE SHAPE
RP-1
R-8
R-2
R-1
GLUE LWR END TO FUSELAGE
R-5
D-2
DETHERMALIZER SPRING
PROPELLER PLAN SHAPE
D-1
R-7
R-4
SHAPE PROP BLANK LIKE THIS BEFORE CARVING
R-9
R-3
THE BAND BOX
DeLorme 3


13
10
FULL SIZE WING TIP
WING DIHEDRAL
1 3/4 UNDER X
5 UNDER Y
WS-2
GUSSET EACH RIB AS SHOWN TO REDUCE WARPING
WING 1/4 SCALE
WS-1
SR-1
WS-3
WS-2
SR-2
1/8 SHEET
C-3
WS-1 1/8 SHEET
1/32 SHEET
W-7 2 REQ.
W-6 2 REQ.
W-5 2 REQ.
W-4 2 REQ.
W-3 2 REQ.
W-2 2 REQ.
W-1 12 REQ.
C-1 2 REQ.
C-5
C-4
C-2 2 REQ.
ALL PARTS 1/16 SHEET EXCEPT AS SHOWN OR NOTED
WS-3
THE BAND BOX
DeLorme 2

Clipper – E.W. Evans (U. K.) 1950

The March 1950 issue of *Aeromodeller* at p.185 carried a small advertisement, complete with photograph, from Super Model Aircraft Supplies of Northampton for E.W. (Ted) Evans' 'Clipper' Wakefield. It was featured as 'Another contest winner', with a 'Rocket' climb that even made the power fans look. Additional features were a fully flexible self-locking wing fixing, skid undercarriage, side thrust adjuster and eccentric pin rudder adjustment. A new force set-up was claimed to ensure an unusual degree of spiral stability. Plans and instruction sheet were 5/6 post free, while Printed Parts 3/-, and Propeller Blank 3/-, were also available.

This advertisement was the sole occasion on which the model was advertised, but examples shortly started appearing in contest results and Eric Smith (Icarians) won the Gamage Cup with one in an event held on 9 April. Smith must have obtained an early copy of the plan, as he started construction on 1 January, and finished the model within five weeks. Smith had been a member of the 1949 U.K. Wakefield Team, and in electing to build the 'Clipper', he was joined by three other 1949 Team members – Chesterton, Clements and Hinks, all of them choosing this model in preference to their own designs.

In the September 1950 *Model Aircraft,* the cover of which featured Eric Smith launching his 'Clipper', Ron Warring at pp. 302-4 analysed the design in the column 'Model Report'. Initially he concentrated on the 'Jaguar', 1948 Wakefield Trophy Winner, which was the immediate predecessor of the 'Clipper'. Warring had been initially critical of the 'Jaguar', commenting on its introduction, that the layout with the under slung belly fin was not stable in a side slip inwards, in a manoeuvre which could be induced by gusty air. His warnings were borne out in practice, as under certain conditions' Jaguars' had a definite tendency to go inverted, with a roll onto their backs. Over banking produced the tendency, with the nose being held down. This had been illustrated by Evans himself at the 1948 Trials, when his model had rolled on its back and dived in.

Although the 'Jaguar' had been very successful, the reduced stability margin had been a heavy price to pay, and Evans had made radical changes to produce a virtually new design in the 'Clipper'. Almost the only major point in similarity was the retention of the diamond shaped basic fuselage. In general terms, the 'Clipper' was a high wing, diamond fuselage slabsider of conventional proportions. However, the method of mounting the wing was unorthodox, in that a cabin-type centre section fairing was built-up on the basic diamond fuselage, with the wing being assembled on this in a somewhat similar manner to the 'Jaguar'. In the 'Clipper' internal rubber bands were used for anchorage, which allowed the wing position to be adjustable fore and aft, as well as incidence adjustments. The actual centre section fairing, which was celluloid covered, gave an increase in effective area within the scope of the then current rules.

Warring was highly critical of the wing attachment and cabin structure, believing it to be unnecessarily complicated, and an average modeller would experience difficulty in duplicating it accurately, in addition to obtaining a good appearance. Sheet celluloid was hard to apply successfully to a light framework, and a major field repair to this area would have been hard to tackle.

The basic fuselage was 34" in length, with a maximum cross-section 2 7/8" square. Longerons were 1/8" x 1/8", while the majority of the spacers were 1/8" x 1/16", with some highly stressed members being 1/8" x 1/8". The pitch of the spacers also varied, becoming progressively greater towards the rear.

For Warring, the disposition of fin area was of particular interest. The 'Clipper' fin area was disposed almost equally above and below the centre line of the fuselage, resulting in satisfactory spiral stability characteristics, and eliminating the 'Jaguar' weak point. The fact that this point was highlighted in the *Aeromodeller* advertisement acknowledged Evans' concern. Warring also commented that the design could use considerable side thrust for trimming, thus reducing or eliminating the need for downthrust, which he felt was a desirable feature.

The wing and tailplane were roughly of blunt elliptical shape, and were a new development for Evans, which he perpetuated in later Wakefields. Flat span worked out at 44", with an inner constant chord of 5 1/4". Chord of the final tip rib was 4 1/2". The wing section was described as a modified RAF 32, and

all ribs were 1/32” sheet, with the ribs being pitched at 1 1/4” intervals. The wing construction retained the same anti-warp features as the ‘Jaguar’, using two flat 1/8” x 1/16” main spars, top and bottom, with 1/32” sheet covered leading and trailing edges. Straight wing dihedral of 4” was employed.

Warring felt that the tailplane structure was on the flimsy side, being liable to warp, and some form of anti-warp structure could have been tried, in keeping with the wing construction. The tailplane was 18 1/2” in span, with a centre chord of 4 1/2”. Ribs were of 1/32” sheet, and of thinned Clark Y section. They were pitched at 1 3/8” intervals. The leading edge was 1/8” x 1/8”, with the sole spar of 1/4” x 1/16” being inset in the ribs, and the trailing edge was 1/4” x 1/16”. An eccentric pin for rudder adjustment was set in the tailplane, and consisted of a 3/16” diameter dowel with a 1/16” diameter bamboo dowel fixed on its perimeter. A tipping tail D/T was employed.

Another feature which attracted Warring’s displeasure was the wire skid undercarriage, in place of conventional bamboo or wire legs and wheels. He admitted grudgingly that none of the ‘Clippers’ at the Wakefield Trials had experienced take-off difficulties, ‘but it does not look *right* - and something that does not look right often is *not* right’. Lack of good quality bamboo could have prompted Evans’ decision to adopt the wire skid approach, and he continued with it’s use the following year in his ‘Vansteed’, adopting a single strut with outrigger skids on the tailplane tips. Eric Smith followed this approach, and used a single leg on his ‘Clipper’. The ‘Clipper’ plan had struts which were of 16 g. Wire, and had a 11 1/2” tread.

A double-bladed freewheeling propeller was used, with a diameter of 18”, and carved from a 2 1/4”x 1 3/4'' block. Power was 16 strands of 1/4” x 1/24” rubber, which gave maximum turns of 850. The balance point was 3” back from the wing leading edge, and the model was adjusted with sidethrust and the fin to give a 100’ circle to the right on the glide. Sidethrust was adjusted by means of an adjusting plate on the rear of the noseblock, made of 22 swg dural, and held in place by two 1/2” x 5g wood screws which slotted through the plate. Performance was estimated by Evans to be 4 to 4 1/2 minutes on maximum turns in still air at 8 1/2 oz weight.

Fuselage and Undercarriage.	1.7
Wings and Connecting Brace	1.1
Tailplane and Fin.	0.5
Propeller and Noseblock.	1.2
	4.5
Motor.	4.0
	8.5 oz.

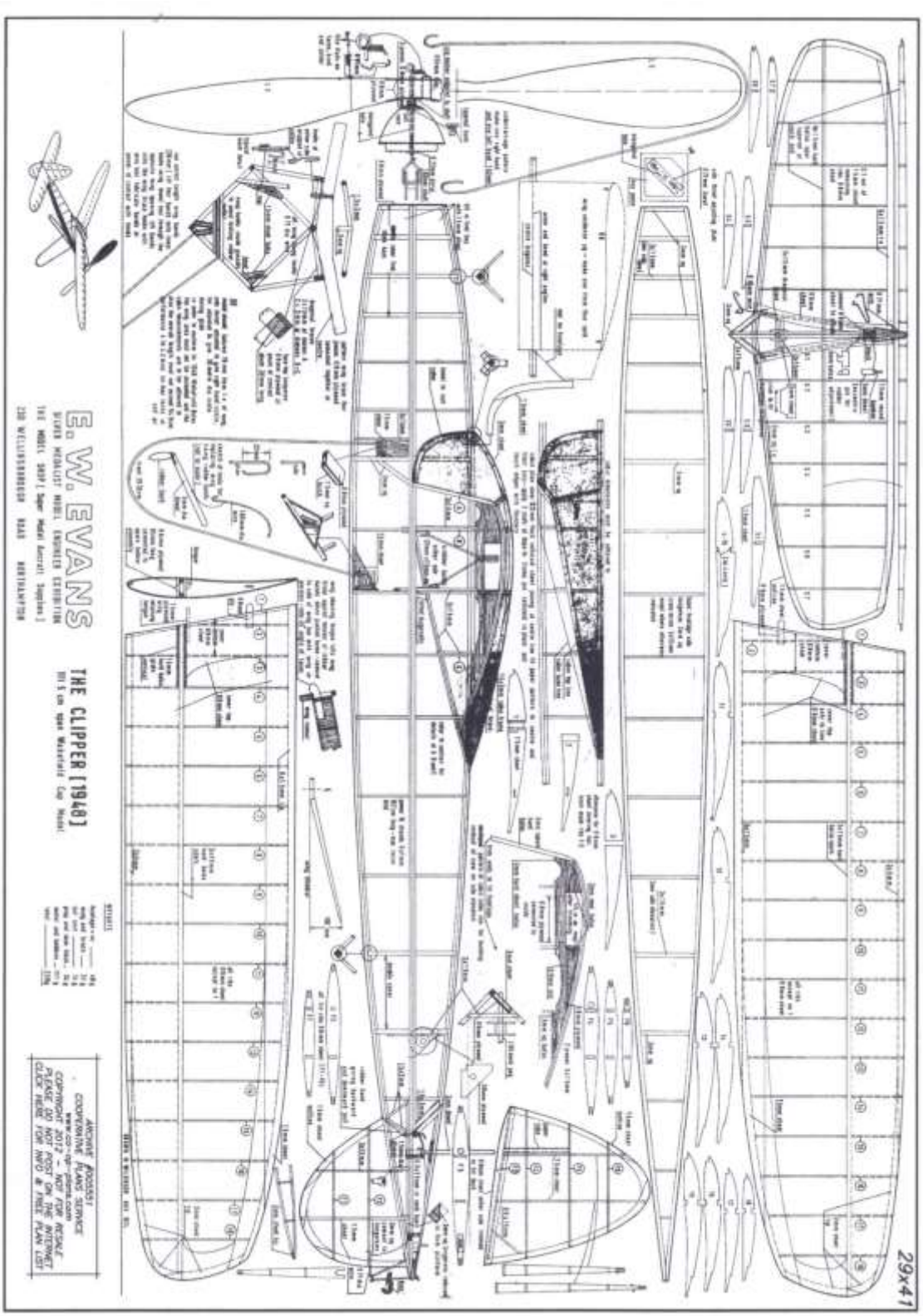
In his article Warring also enumerated the component weights of various contemporary Wakefields as an interesting comparison:

	Jaguar	Zombie.	49 Copland
Fuselage and Undercarriage.	1.9	1.625.	2.0
Wings.	1.0.	1.25.	1.375
Tailplane and Fin.	0.6.	0.375.	0.375
Propeller Assembly.	1.0.	1.25.	1.375
	4.5.	4.5.	5.125
Motor.	3.8.	3.625.	3.875
	8.3 oz.	8.125 oz.	9.0 oz.

Accompanying Warring’s article was a cutaway drawing of the ‘Clipper’, illustrating details of the structure. This cutaway was based on the perspective of the photograph in the *Aeromodeller* advertisement.

Full size plans of the ‘Clipper’ are available from Super Model Aircraft, having been re-drawn in metric in the 1980’s. The accompanying three-view has been drawn up in CAD by Michael Glaister, and is the first time this design has been published in the U. K. modelling press.

Despite his qualified review, Warring thought that any Wakefield enthusiast who was keen on getting top performance, and was prepared to put effort into constructing the model, the ‘Clipper’ was a very attractive proposition. Potential performance was as good as any contemporary design, the layout was sufficiently original to be interesting, and the model did not appear to have any definite vices. After 65 years his verdict stands sound.



Sune Stark (Sweden) – 1950-51

Sune Stark was a Swedish modeller who flew in six Wakefield Finals, commencing in 1937, and concluding in 1952. His post-war models followed a straightforward design progression with a common theme of rectangular fuselages, constant chord wings and tailplane, and all were powered by freewheeling propellers.

His 1949 design flown at Cranfield conformed to this general theme, but featured twin fins. Conditions at Cranfield, where it was cloudy with strong winds, were obviously not suited to the design, and Stark achieved only two flights, for an aggregate of 162.5 seconds and 53rd place.

By virtue of Ellila's victory in 1949, the 1950 Wakefield Finals were held at Jamijarvi in Finland on 22/23 July 1950. Stark had developed a new design, which he flew with impeccable consistency with flights of 180.4, 181.2, and 169.6, for an aggregate of 531.2 seconds and 12th place.

The design featured a rectangular fuselage with a cross-section approximately 100 x 75mm. Longerons were approximately 4.5mm square, with spacers 2 mm square. The fuselage length was only 800mm, in keeping with the current Wakefield rules, with the objective of ensuring that the minimum cross-section did not become excessive. The wing was set in a shoulder position. A twin leg, plug-in wire undercarriage, complete with wheels, was used to meet the R.O.G. rule.

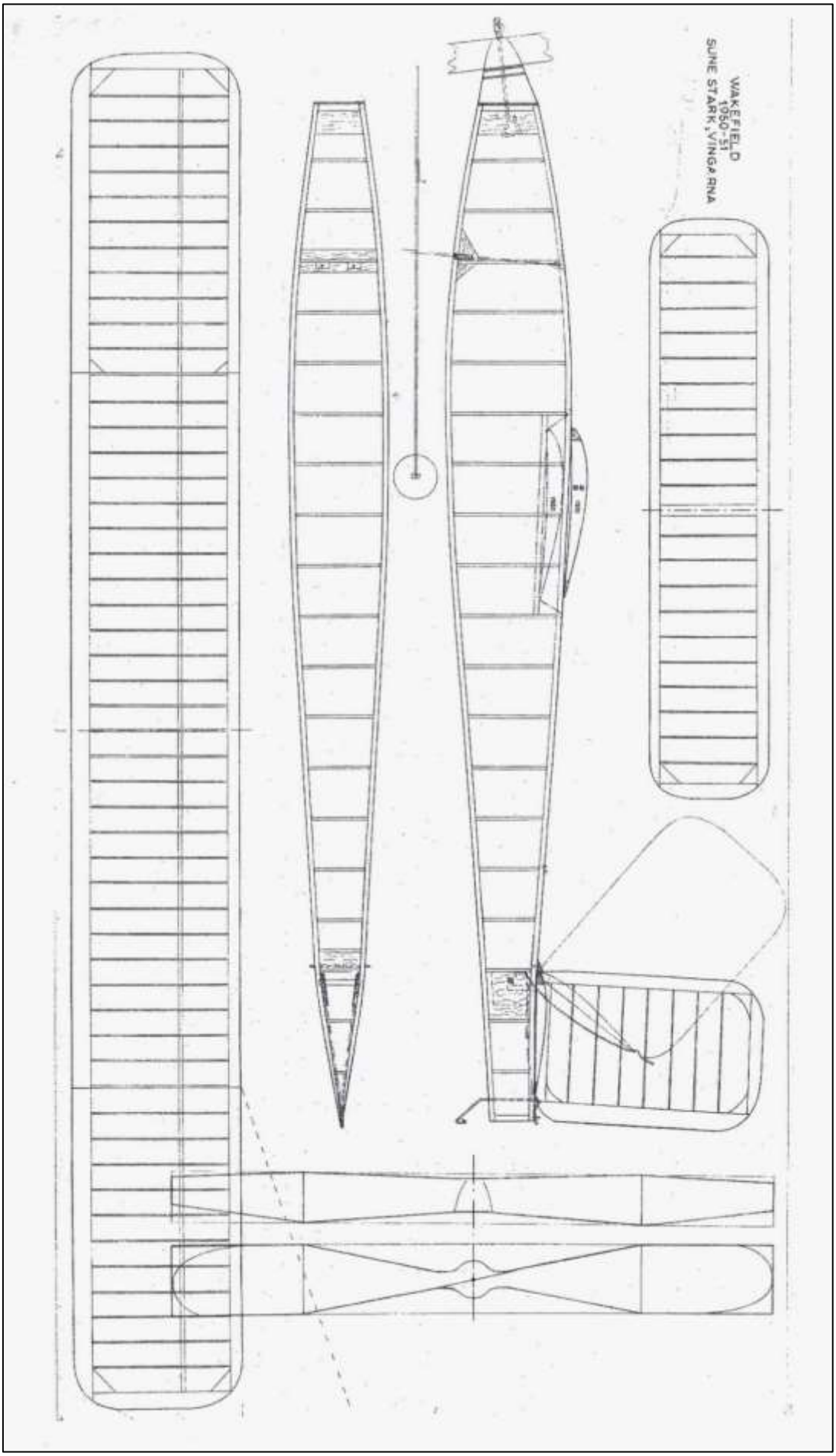
Both the flying surfaces were untapered, with the wing having a span of 1065mm, and a chord of 134mm. Twin 2mm square inset spars were employed at one third chord, with the ribs being set at 20mm spacing. Tip dihedral of 85mm was employed. The tailplane, of 450mm span and 92mm chord, was sparless, as was the fin, which retained the 20mm rib spacing.

A double-bladed freewheeling propeller of 480mm diameter was faired into the noseblock with a small spinner. While a single straight motor was used, no record exists of the size which was employed.

Stark must have been impressed with the performance of Ellila's model at Jamijarvi, and with the knowledge that the 1951 contest was again to be held at that location, he was forced to consider design changes, as the 1950 model seemed to be at its limit. Stark did not construct many Wakefields in his career, and his initial approach was to convert the 1950 model to a high wing configuration, abandoning the shoulder wing position he had embraced initially. However, it would appear that initial tests revealed a quantum leap in performance was necessary to better Ellila, and return gears were the approach. Stark was a fellow club member of Arne Blomgren, and the two worked closely in their design approach. Blomgren's model, which he flew in the 1949 and 1950 Wakefield Finals was a slabsider with a shoulder wing fitting and twin fins. Both the wing and tailplane were of constant chord, while the model was fitted with a 470mm freewheeler.

In 1951 Stark produced a new design, as did Blomgren, and there was marked similarity between the designs. Both had constant chord wings and tailplanes, with Blomgren employing V-dihedral, while Stark continued with tip dihedral from mid-span. Both used the same wing spar arrangement of two small section spars inset in the ribs at one-third chord Fittingly, both Stark and Blomgren adopted twin return gears rather than the straight motors they had used previously.

Photographs of their new designs appeared in the Swedish modelling press during mid-1951, and Stark went on to win the Wakefield Finals that year. In 1952 he placed 16th in his last international contest. Blomgren placed 33rd in 1951, won in 1952 and was 7th in 1953, all with the same model. They illustrated that deceptively simple designs, filled with rubber, were difficult to beat in the early 1950's.


WAKEFIELD
1950-51
SUNE STARK, VINGA RNA

Silvano Lustrati – Italy 1950 SL111 and 1952 SL 114.

One of the best performing Wakefield fliers in the period leading up to the imposition of rubber weight restrictions in 1954 was Silvano Lustrati of Rome, Italy, who placed 63rd in 1949, 7th in 1950, 3rd in 1951 and 4th in 1952. Nineteen forty-nine was the one aberration, as his model was badly affected by the adverse weather conditions at Cranfield. Lustrati flew a geared model (*Aeromodeller*, September 1949, p.568), which was regarded as underpowered (ibid, p.559), and after an average first flight of 99.9 seconds, recorded only 5 seconds for the second round, and a nil score in the third round, for an aggregate of 104.9 seconds.

Lustrati obviously learned from his Cranfield experience, and produced an all-weather model known as the SL111. Gears were abandoned in favour of a straight, corded motor, in a layout that was almost identical with E.W. Evans 1948 winning Jaguar. A diamond fuselage was adopted, but fattened slightly to meet the required cross-section rules, as no fuselage underfin was employed. A spinnered nose was also used, differing from the plain noseblock of the Jaguar. But the wing, tailplane and rudder outlines were almost identical with the Jaguar, while the wing fixing was also the same, employing a wing tongue with a heavily concave under surface designed to allow clearance for the rubber motor. The structure was again also almost identical, with the only difference being an additional two wing ribs in the Italian model, while the fin also had one less rib. The fuselage longerons were 4 x 4 mm, while the spacers were 4 x 1.5 mm. A 520 mm diameter freewheeling propeller was used, driven by 14 strands of 6 x 1 mm Pirelli, 1400 mm long.

The model proved immediately successful, placing second in the Coppa Tevere and first in the Coppa Arno. It qualified for the 1950 Italian Wakefield Team, and flew at the Jamijarvi finals in Finland. Lustrati placed seventh with steadily improving flights of 193, 196.5 and 208.2 for an aggregate of 597.7 seconds, in conditions which could best be described as ‘dead air’. Photographs of the model are on p.637 and p.643 of the October 1950 *Aeromodeller*. A write-up of the model and a plan were published at pp.868-9 of the magazine *Modellismo* of January 1951.

At the 1951 Wakefield Finals, again at Jamijarvi, Finland, under trying conditions, Lustrati placed a creditable third, with flights of 226.0, 229.1 and 209.1 for an aggregate of 664.2 seconds.

In 1952 Lustrati produced a new design, the SL-114. This design continued the use of a diamond fuselage with 3.5 x 3.5mm longerons, and 3.5 x 1.5mm spacers. Gears were employed to utilise the power of 16 strands of 6 x 1 Pirelli, 680mm long, although the distance between hooks was 790mm. A freewheeling propeller of 520 x 800mm was used, echoing the Scandinavian approach.

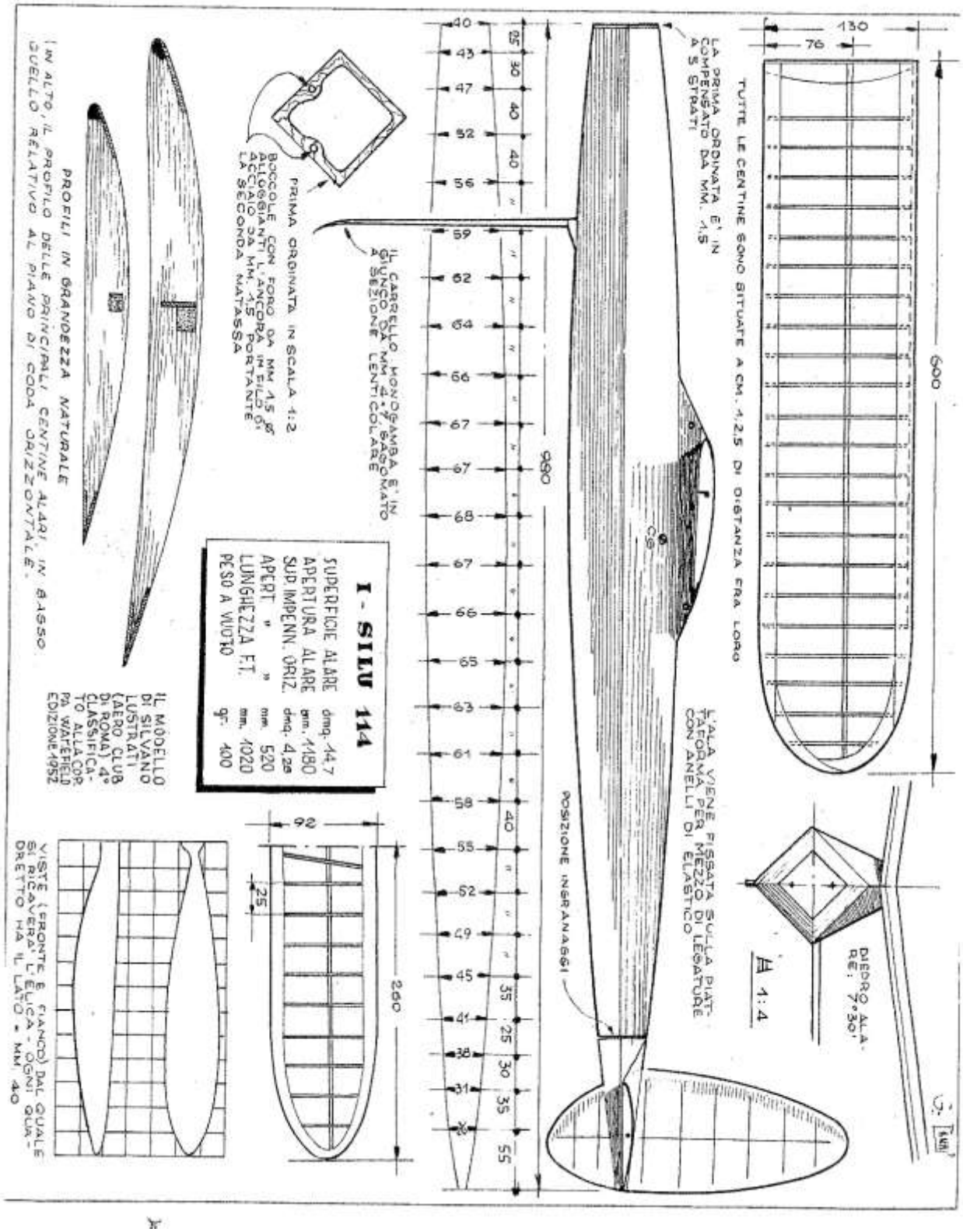
The wing was set on a shallow pylon, and together with the tailplane, featured sophisticated construction involving an inset single spar. The trailing edges of both surfaces were also built up from 0.8 mm sheet. These efforts at weight reduction produced an airframe weight of 100 grams. Covering was Jap tissue. The conservative layout was consistent with a balance point of 64% and the straight dihedral angle of 7 º 30’.

In Italian competition flights the model regularly exceeded 4 minutes and at a Pisa contest recorded 4.25, 5.14 and 3.14. Lustrati qualified for the 1952 Wakefield Finals scheduled to be held at Norkopping in Sweden, on July 13. Conditions were not good with a strong drift, and reduced visibility after heavy rain showers. Lustrati turned in three good flights of 208, 196 and 300 seconds to place fourth. Writing in the October 1952 issue of Model Aircraft, Ron Warring in his article ‘Technical Report on the Wakefield’ had this to say: Fourth place man, Lustrati of Italy, also flew a geared model with a very high rate of climb. During the test flying periods before the contest he got as high as anyone, probably by using a finer pitch propeller than most of the geared jobs.

Warring also analysed the flight times of the top 16 place getters, and assessed Lustrati’s model as having a nominal ‘still-air’ performance of 3 3/4-4 minutes. In retrospect, after studying details of the model, Warring’s assessment is probably about 30 seconds too conservative.

Details of the model and a three-view were published in *Modellismo* No. 46 July/August 1952 at pp.1300/1301.

Lustrati did not form part of the 1953 Italian Wakefield team and his 1952 model represents the pinnacle of his Wakefield achievements. However, he moved on to other areas, and in 1983 became the F1C World Champion at the World Champs in Australia. He was still competing in F1C at the 1993 World Champs at Lost Hills.



Giulio Gastaldo – Italy 1950-51 I-Gast 0116 and 1953 I-Gast 0124

During the period 1949-53, in the years leading up to the imposition of rubber weight restrictions in 1954, members of Italian teams placed consistently high in the Wakefield Finals. Starting with Sadorin's second place in 1949, Leardi was third in 1950, followed by Lustrati who placed third and fourth in 1951 and 1952 respectively, while Kannenworf placed ninth in 1953. These places reflected the very high standard of Italian Wakefield flying during this period, coupled with a widespread adoption of geared models.

Among the leading Wakefield exponents was Giulio Gastaldo of Turin, who was 18 in 1950. He lived in the same area as other keen Wakefield fliers including Guido Fea, Cargnelutti and Varetto. Inspired by Ellila's victory in 1949, Giulio designed the *I-Gast 0116* in the spring of 1950, with assistance from Cargnelutti who designed the propeller and built the gear set. The propeller was a freewheeler of 500mm diameter (nearly 19 3/4"), and about 2" larger in diameter than the standard 18" freewheeler of contemporary English Wakefields. This propeller was carved in 'cirmolo', a fine grained, yellow alpine pine.

The fuselage was initially built with a cross section of 120 x 84mm, but the 1951 formula change allowed a slimmer fuselage of 80 x 75mm cross section, and four models were built of this later variant. Apart from the propeller, the construction was entirely of balsa. The fuselage longerons were 5 x 5mm and the spacers 2 x 4 mm. The wing was in two parts, with a dural joiner 1.5 x 5mm. Wing ribs were 1.5mm, except for the first two in 1mm ply. The wing section was NACA 6409, thinned by 10%. Stab ribs were 1mm, apart from the two central ribs in 1mm ply, which located a peg of 2mm aluminium tubing for D/T purposes.

The two motors weighed a total of 110 grams, with a cross section of 84 square mm. This implies that 14 strands of 6 x 1mm rubber were used, 680mm long. This was wound to 1100-1200 turns, which gave a motor run of 105-110 seconds.

The fuselage was covered with lightweight modelspan, while jap tissue was used for the wing and stab covering.

Completed weights were as follows:

Wing	44
Fuselage	42
Propeller	18
Stab and fin	14
Gears	8
	126 grams

Giulio used the 1951 model to qualify for the Italian Team at the 1952 Wakefield Finals, but did not fly in the event.

With this success, Giulio designed his 1953 *I-Gast 0124*. While the same general layout was employed, the fuselage was considerably longer (1030mm to 945mm) and the wing utilised polyhedral instead of straight dihedral. The new wing was smaller at 15.30 sq. dm against 15.40 sq. dm, but the tailplane was larger at 3.70 sq. dm against 3.60 sq. dm.

A freewheeling propeller of 500 mm diameter continued to be used, allied with only minor alterations to the block layout. The motor weight was increased to 133 grams, using motors 700 mm long with a cross section of 90 sq. mm or 15 strands. On 1200 turns this gave a 2'15" prop run.

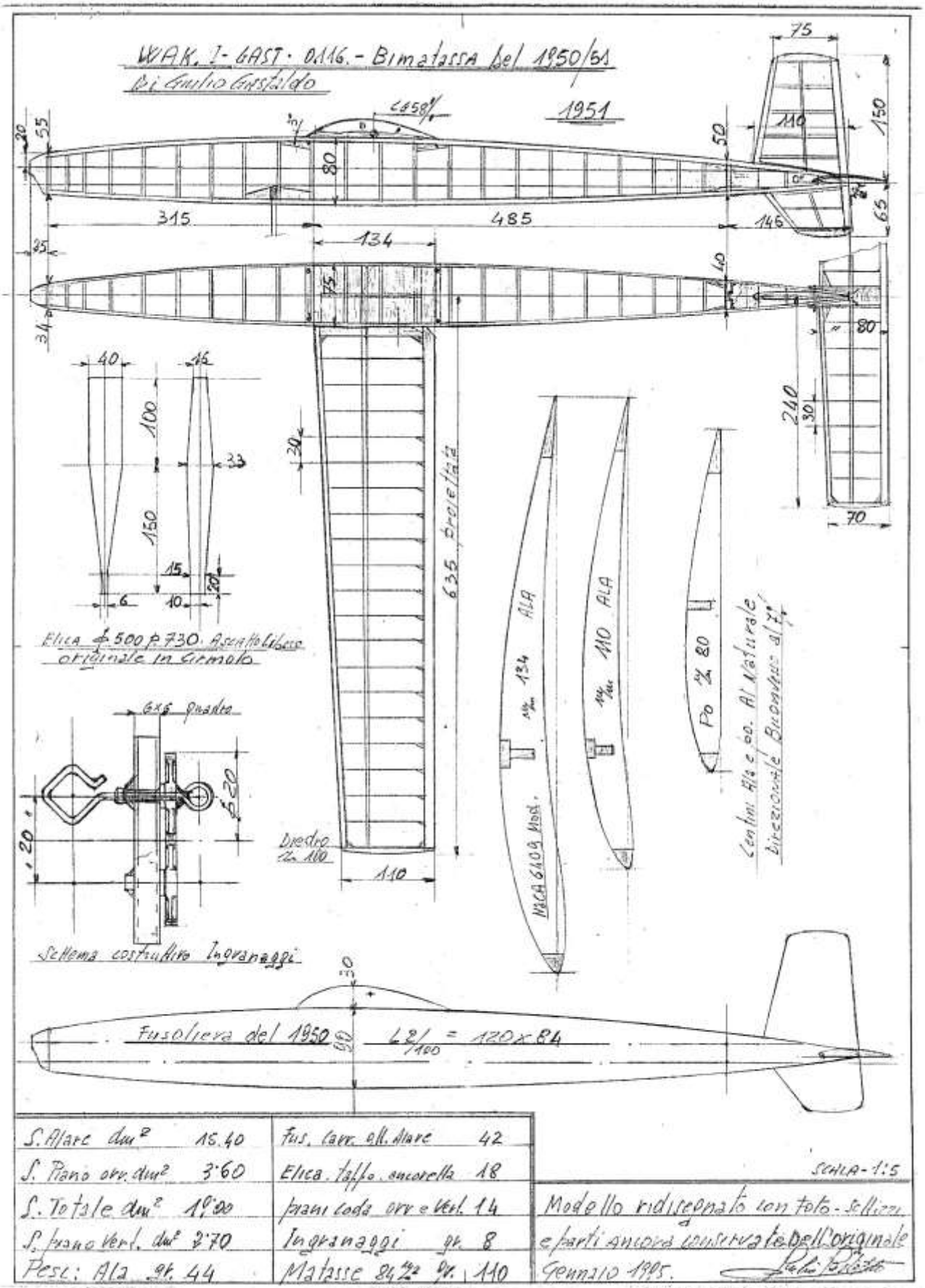
The structure was essentially the same in the new model, although wing and tail rib spacing was reduced from 30mm to 25 mm. The tailplane mounting was simplified by being located above the fuselage, which allowed a conventional D/T setup. Another change was the substitution of a Davis section for the thinned NACA 6409.

Weights were as follows:

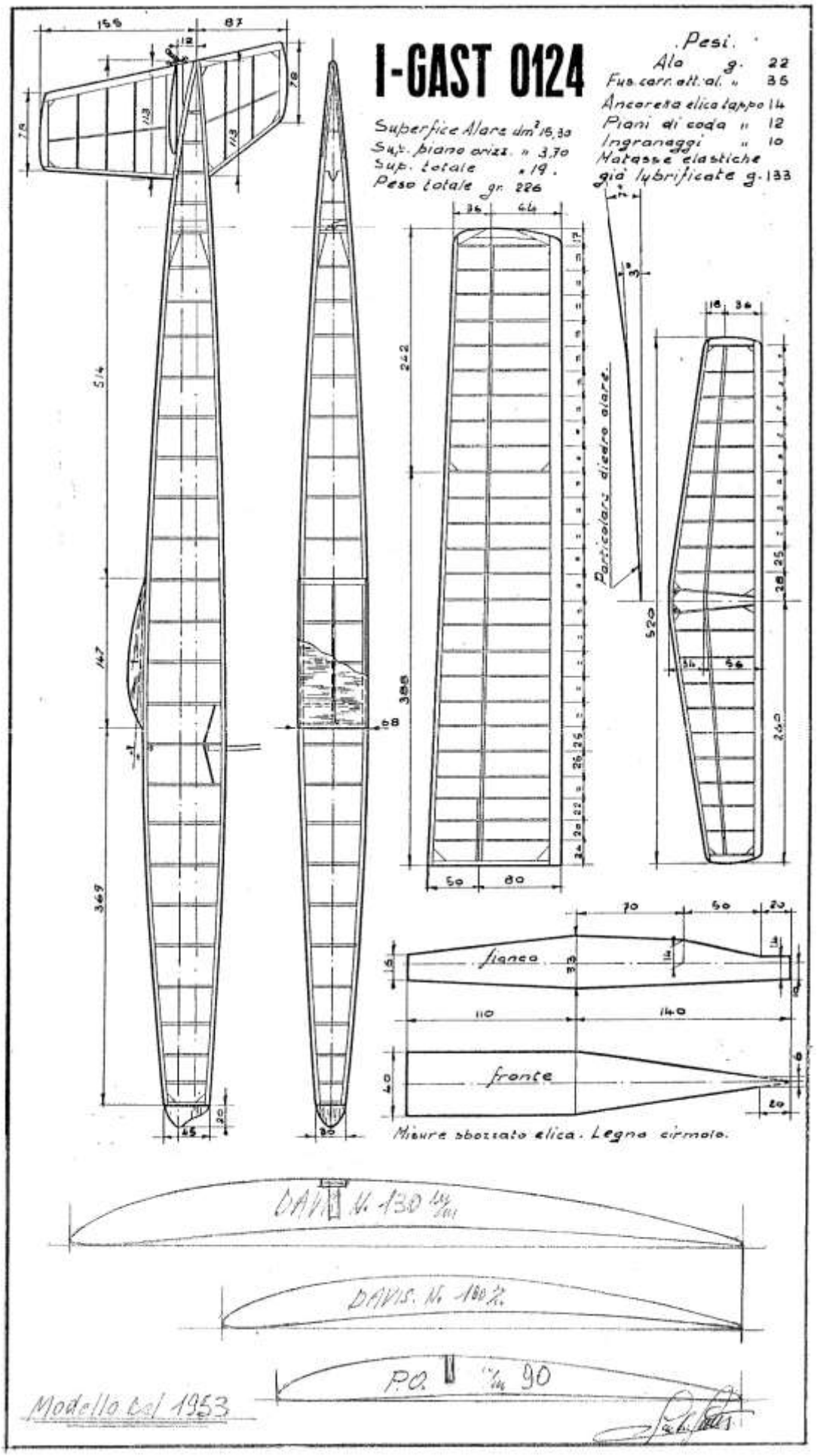
Wing	22
Fuselage	35
Propeller	14
Tailplane	12
Gears	10
	93 grams

With the reduction in structural weight, combined with an increased rubber component, performance would likely have improved. The trim utilised a wash-out of 1.5 mm on each wing tip, as opposed to only the left tip on *0-116*, and employed a right-hand glide in large circles. Power required 1.5 mm right thrust. With the introduction of the limited rubber rules, the model did not enjoy the opportunity to participate in many contests, but placed 4th in the Nationals at Reggio Emilia in 1953.

Giulio Gastaldo gave up Wakefield flying after a road accident led to a two-year convalescence and a permanently damaged leg. However, he took up the F1G Coupe d'Hiver class, and had considerable success including winning the 1973 XXIX International Challenge from 189 entries, and was still winning in 2007.



S. Alare dm²	15.40	Fus. Carr. all. Alare	42
S. Piano orr. dm²	3.60	Elica. Taffo. ancorella	18
S. Totale dm²	19.00	piani coda orr e Vert.	14
S. piano Vert. dm²	2.70	Ingranaggi gr.	8
Pesi: Ala gr.	44	Matasse 84/22 gr.	110


I-GAST 0124
Pesi.
Ala g. 22
Fus. carr. att. al. " 35
Ancoretta elica lappo 14
Piani di coda " 12
Ingranaggi " 10
Matasse elastiche già lubrificate g. 133
Superficie Alare dm² 15,33
Sup. piano orizz. " 3,70
Sup. totale " 19.
Peso totale gr. 226
Particolare diedro alare.
fianco
fronte
Misure sbozzato elica. Legno cirmolo.
DAVIS N. 130 %
DAVIS. N. 180 %
P.O. % 90
Modello del 1953

Assunta – Igino Di Pietro 1951

In its issue XIV Nr 8 of 24 February 1952, the Italian magazine *L'Aquilone,* featured a construction article and plan of a leading Italian Wakefield designed by Igino Di Pietro of Rome. The design had been particularly successful during 1951, placing high in a number of contests, including the Coppa F.N.A. and the Coppa Breda where it had recorded flights of 4'32", 4'06" and 4'38". The plan of the model was available full-size, and it was drawn by G.Janni, himself a prominent Wakefield flier and a member of the 1949 Italy team. He also drew up a number of contemporary Italian Wakefield designs which were published in other Italian modelling magazines.

The model itself had a conventional diamond fuselage, with a shallow pylon for the wing mounting, and straight dihedral. Fuselage longerons were 3 x 3mm, while the spacers were 3 x 2mm. A single bamboo leg was employed, mirroring the method used by most Italian designs of this period. Gears were located towards the rear of the fuselage, and were mounted on an aluminium channel. The complete rear section of the fuselage, which included the fin, was detachable, no doubt to assist the winding of the rubber motors, and popped up for dethermalising.

In its structure, the wing had closely spaced 1mm ribs, and utilised a tapering monospar, which was braced by a forward web. No dihedral dimension was quoted on the plan, but the accompanying photographs indicate that it was relatively shallow, and extrapolation from the wing mount cross-section sketch infers 75mm or approximately 3''. The wing section was NACA 6409. In a foretaste of future trends, the wing tip was curved back from the leading edge in a manner subsequently utilised by Bob White in his Vol Libre series of Wakefields.

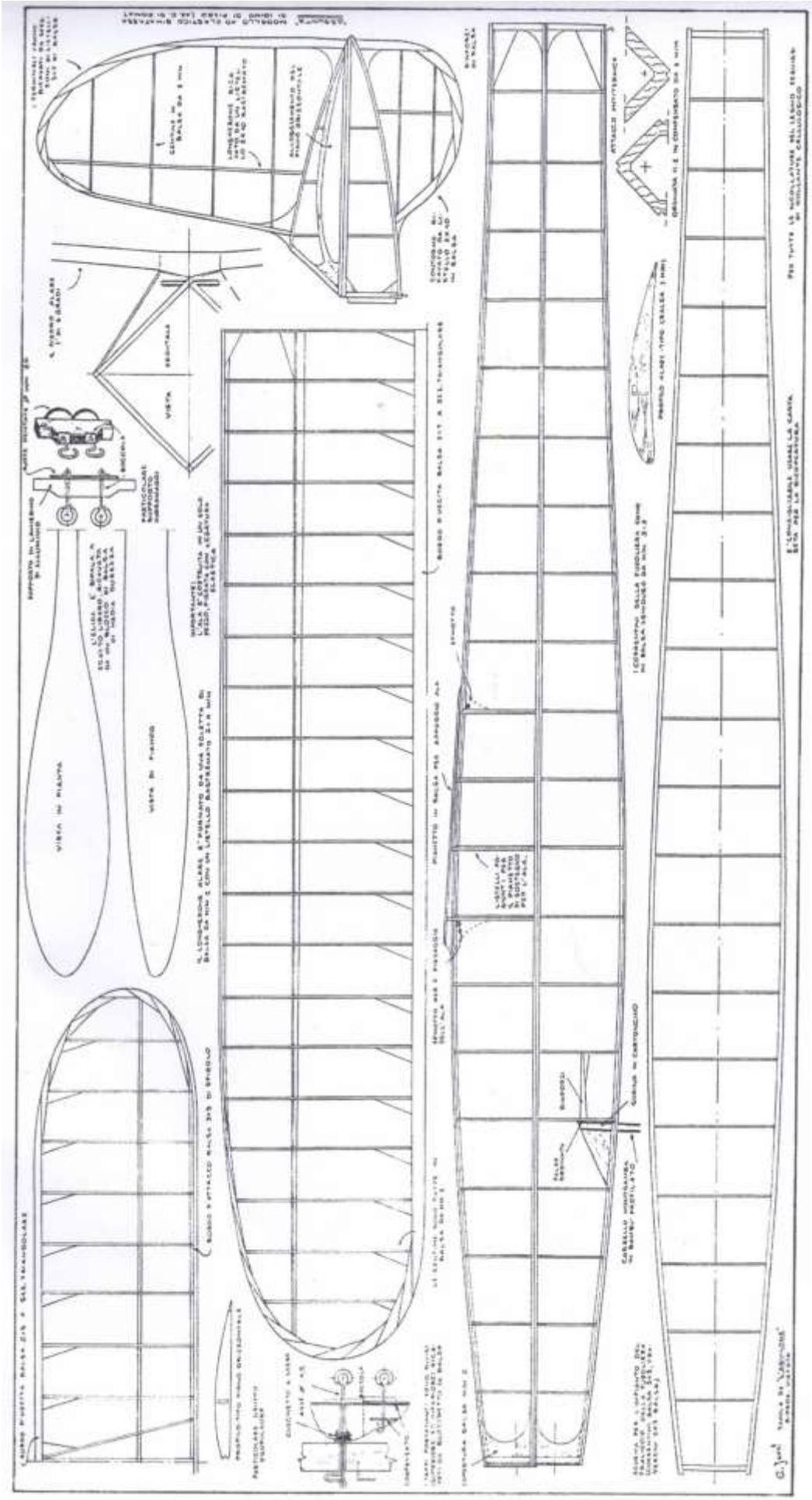
The tailplane tip shape conformed to that of the wing, again with 1mm ribs and an inset monospar. A Clark Y type section was employed, of 8 1/2% thickness.

All covering was of Jap tissue.

The propeller was a freewheeler of 520mm or approximately 20.5" diameter, which was consistent with the Italian use of larger diameter freewheelers than contemporary English practice.

No mentions were made of the size of the rubber motor employed, nor were any weights quoted for the structural components. Both omissions seem inconsistent with the general amount of detail supplied.

Di Pietro never represented Italy at a Wakefield Finals in the period 1948-53, but he was undoubtedly a fine flier and representative of other equally talented Italian Wakefield fliers from this period.



Thermal Chaser IV – Earl L. Cayton (U.S.A.) 1951

Back in 1951, the world was different, and in their April 1951 issue *Flying Models* published full size plans for a contemporary Wakefield design. The model was the Thermal Chaser IV, designed by Earl Cayton, who was a prolific designer and had numerous plans published in the 1940's and 1950's.

Cayton claimed a lengthy pedigree for the design, stating that the first model of the series had been built in 1940. It was a typical American slab-sided box, following the traditions of such modellers as Korda, Lanzo, Reich and Nelder. In a standard exhortation of the period, Cayton reminded readers that the 1951 Wakefield eliminations were not far off 'so grab that beat up razor blade and battered tube of cement, and let's start construction.' The full-size plan extended over three and a half pages of the magazine. Today they can be photocopied with ease, but in 1951 the pages would have required removal from the magazine and joined. The plan was very cleverly drafted to save space, with surfaces superimposed to supply the necessary detail.

In its shape, the fuselage was pure Korda or Lanzo. It was just on 36" in overall length, and the basic framework of longerons and spacers was constructed from 1/8" x 1/8". A cabin was fitted, complete with celluloid windows. The length between motor hooks was approximately 22 1/2". A single wire leg retracting undercarriage, complete with a 2" wheel, was fitted.

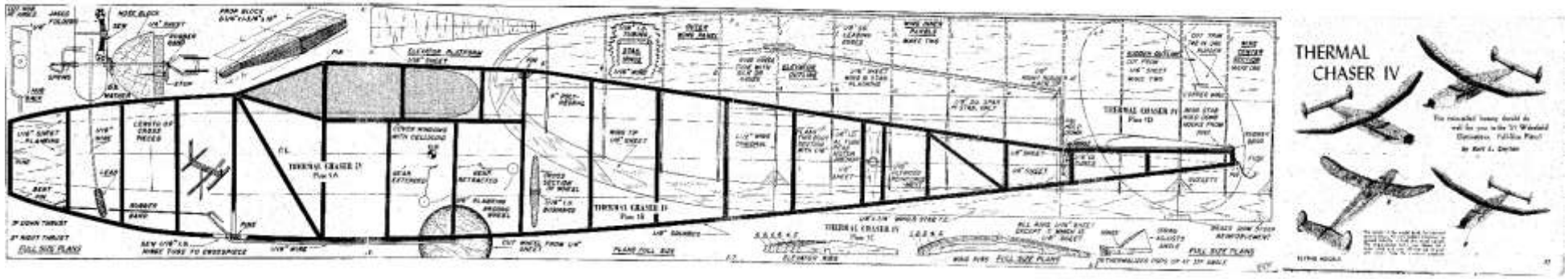
The wings were generally Korda-ish in shape, featuring polyhedral with a constant chord inner section, and curved tips. With a chord on the inner section of 5 1/2", the total span was only 40 1/2". Construction was unusual in that no spars were employed, but 1/16" was used on the top surface which extended to 40% of the chord from the leading edge. No name was supplied for the wing section, but it resembled an NACA 6409. All wing and tailplane ribs were 1/16" sheet.

The tailplane incorporated a swept back leading edge, combined with a straight trailing edge. A flat-bottomed Clark Y type section was employed, together with a lower surface spar and 1/16" sheet planking on the upper surface. Twin 1/16" sheet fins were fixed to the tailplane tips, and incorporated a moveable tab on one fin for trimming purposes. Unusually for the period, but in a foretaste of the future, a fuse D/T was fitted to the tailplane.

A single bladed folding propeller of 18' diameter, carved from a 2 1/4" x 1 3/4" block, was specified. Silk covering of the propeller was recommended, followed by five coats of sanding sealer, and then finished with a final coat of wax. Two different rubber motors were suggested: either 24 strands of 3/16" Dunlop 46" long, or 32 strands of 1/8" T56, with the motor being corded. These motors could take 800 turns, but for average flying 700 turns were ample.

Cayton recommended that all surfaces be keyed, and suggested flying the model right/right, but right/left would be acceptable. With the specified power, a good portion of the climb was straight up, and a dead air duration of 3 1/2 minutes was attained.

Overall, it is a sensible, straightforward design which gave a good performance for its time. It foreshadowed the extremely popular Yankee IV, to which it bears a passing resemblance, and merits consideration in 8oz Wakefield competition


THERMAL CHASER IV

Sal Fruciano (U.S.A.) Ranger - 1951

The March 1951 issue of *Model Airplane News* reflected the wider interests of the then Editor Bill Winter, including the cover painting by Jo Kotula of a Mig 15. At that time, information on Russian aircraft types was difficult to obtain, and with the Korean War in full swing, the choice of the Mig 15 was appropriate, with the painting being a faithful depiction of the type. A few years later *Model Airplane News* ran a three-view of the Lockheed U2, which was the first publication of this type in the western aviation press. *Model Airplane News* clearly had contacts with a wide variety of sources.

One of the model designs published in the March 1951 issue of *Model Airplane News* was the 'Ranger' by Sal Fruciano. Fruciano had attended the 1948 Wakefield Finals in Akron, Ohio, and had observed carefully the models flying there, as well as the techniques employed by the fliers. To him it boiled down to a fast climb, and a slow floating glide. He incorporated his thoughts into the first 'Ranger' built in early 1949, and flew the model successfully in East Coast contests for the next two years, as well as obtaining a National record. With the 1951 Wakefield rule changes, slight modifications were made to the design to reflect these changes, and were incorporated in the published plan.

This showed a traditional American slabsider, with a fuselage length of 34 3/4". It was constructed from 1/8" x 1/8" longerons and spacers, with the latter being pitched at 2" intervals. A single leg retractable 1/16" diameter wire undercarriage was employed, and fitted with a 1" diameter ply wheel, which semi-retracted into a fuselage well. A single fin was mounted at the rear of the fuselage. This was of sparless construction, and fitted with a trim tab. There was also a very small sheet underfin.

The wing was of a conventional layout for the period, as it was polyhedral, with a constant chord inner section, and tapered tips, with all the taper occurring on the trailing edge. The wing sat on top of the fuselage, and consequently had a short, flat under section. This was enhanced by a sheeted fairing designed to meet the minimum fuselage cross-section requirements. While the wing section was not named, it resembled an NACA 6409, and ribs were from 1/20" sheet, pitched at 1 3/4" intervals. Two sets of double spars from 3/32" x 3/32" comprised the spar structure. Inner chord was 5", tapering to 3 1/2" at the tips., which were of soft 5/16" sheet. Dihedral at the inner break was 1", and increased to 4" at the tips. Overall span was 473/4".

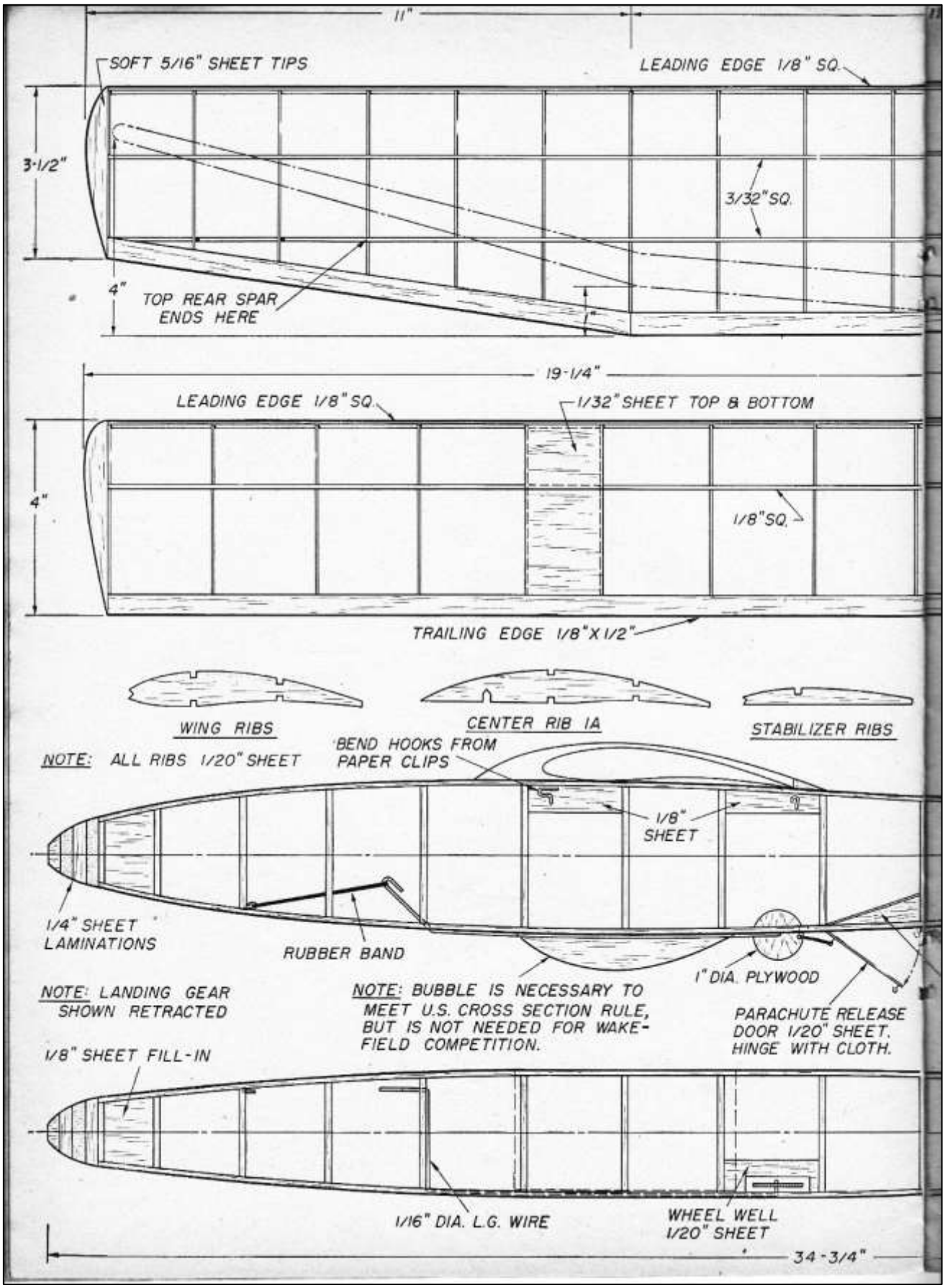
The tailplane was strictly utilitarian, with a span of 19 1/4", and a chord of 4". A flat-bottomed Clark Y type section was employed, with 1/20" sheet ribs, and with a single spar of 1/8" x 1/8" on the upper surface. Ribs were pitched at 2". The tailplane slotted through the fuselage, necessitating the use of a D/T parachute, which was stowed in a box on the underside of the fuselage, with the attachment point being on the underfin. Betraying the design's earlier origin, an optional under fuselage external blister was used to bring the model up to specification, if flown as a fuselage model under United States rules, and if fitted, was suggested as an alternative location for the D/T parachute.

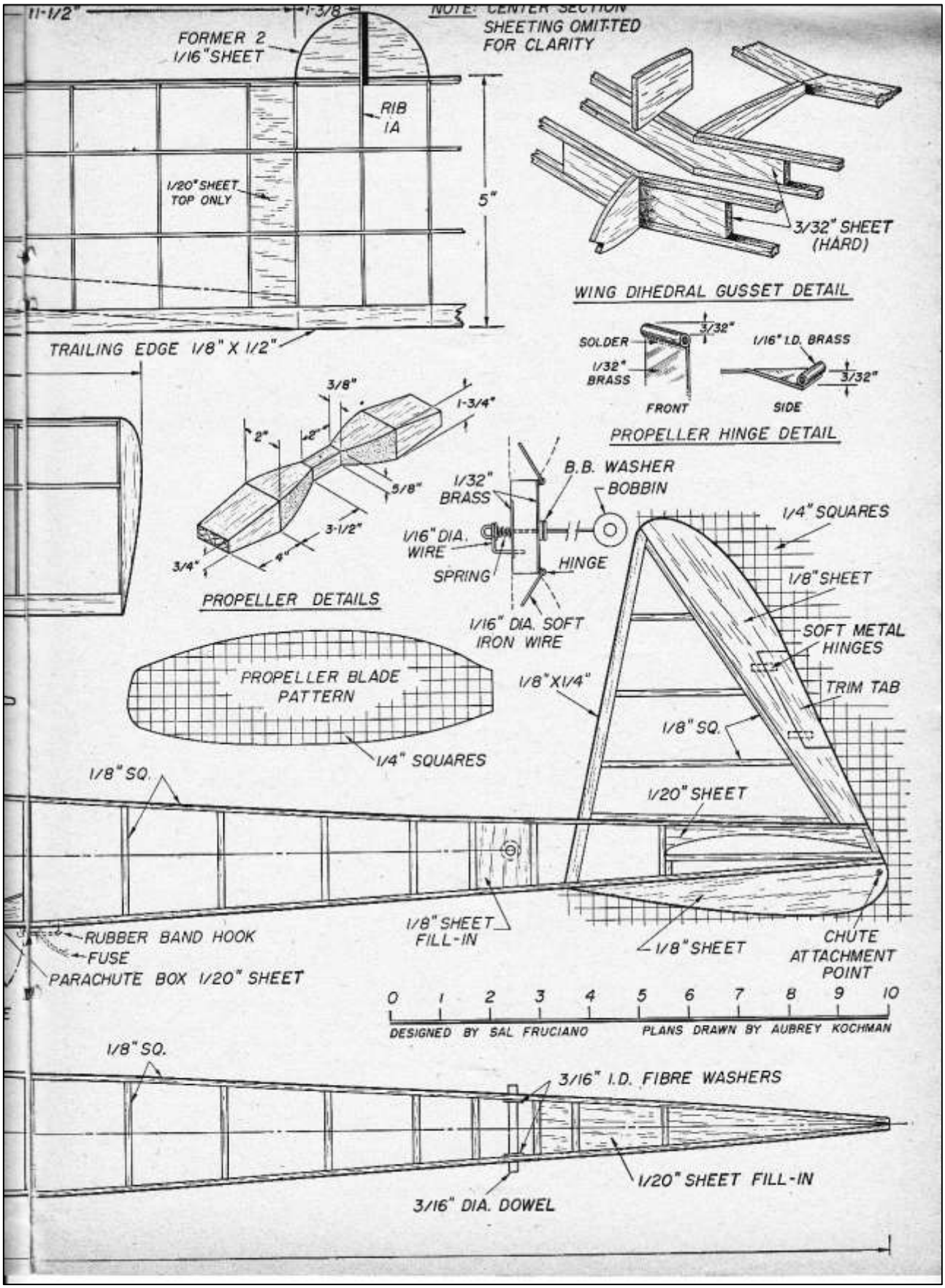
'Ranger' used a double-bladed folding propeller, carved from a 17" x 1 3/4" x 2" block. It was powered by a motor of 14 strands of 1/4" black Dunlop rubber 44" long. For windy days a shorter motor of 40" was recommended. No balance point was mentioned, but it was suggested that the plan position be used for the wing, with incremental adjustments being obtained by modelling clay additions to the nose or tail. About 3/32" rudder tab was required for a left-hand glide, with early test flights commencing with 1/16" down and 1/16" right thrust. The objective was a steep spiralling right climb, followed by a floating left glide. On contest flights 720 turns were used.

Covering was of Jap tissue, with the wing and tailplane being covered in yellow. The fuselage and fin were covered in dark blue tissue, with the fuselage being double-covered with the tissue cross-grained.

The 'Ranger' was a typical American design of the period, and should have been suited to thermal conditions. In this regard, the use of a parachute D/T was surprising, and few designs published after 1951 featured this approach

Sal Fruciano continued to fly Wakefields with success, eventually moving to Scottsdale, AZ, and running FAI Model Supplies in the latter part of the 20th century.




11-1/2"
1-3/8"
NOTE: CENTER SECTION SHEETING OMITTED FOR CLARITY
FORMER 2
1/16" SHEET
RIB 1A
1/20" SHEET TOP ONLY
5"
TRAILING EDGE 1/8" X 1/2"
3/32" SHEET (HARD)
WING DIHEDRAL GUSSET DETAIL
SOLDER
3/32"
1/32" BRASS
FRONT
1/16" I.D. BRASS
3/32"
SIDE
PROPELLER HINGE DETAIL
3/8"
1-3/4"
2"
2"
5/8"
3-1/2"
3/4"
4"
PROPELLER DETAILS
1/32" BRASS
B.B. WASHER
BOBBIN
1/16" DIA. WIRE
SPRING
HINGE
1/16" DIA. SOFT IRON WIRE
1/4" SQUARES
1/8" SHEET
SOFT METAL HINGES
TRIM TAB
1/8" X 1/4"
1/8" SQ.
PROPELLER BLADE PATTERN
1/4" SQUARES
1/8" SQ.
1/20" SHEET
RUBBER BAND HOOK
FUSE
PARACHUTE BOX 1/20" SHEET
1/8" SHEET FILL-IN
1/8" SHEET
CHUTE ATTACHMENT POINT
0 1 2 3 4 5 6 7 8 9 10
DESIGNED BY SAL FRUCIANO
PLANS DRAWN BY AUBREY KOCHMAN
1/8" SQ.
3/16" I.D. FIBRE WASHERS
1/20" SHEET FILL-IN
3/16" DIA. DOWEL

J. Elgin (U.S.A.) 1951

Back in the early 1990's Joe Elgin advertised in the N.F.F.S. Digest that he had full-size plans for his Wakefield design, the Cleveland Gull, available for sale. I sent off for a copy, and was delighted to find when I received the package back that Joe had included a copy of his 1951 Wakefield as well.

Joe was born in 1920, and during the years 1939-40 had worked for the Cleveland Model Company as a principal designer. In this role he was responsible for the design of numerous models including the Playboy, Condor, Eaglet, Itsy Bitsy, Viking, Thermalier and Gull. Ed Packard, owner of Cleveland Models, was a notoriously difficult personality, and refused to allow anyone to put a name on a plan, with the result that it was many years before Joe Elgin's design output was recognised.

Joe had grown up in Cleveland and became a member of the famous Cleveland Balsa Butchers Club. Fellow members included Chester Lanzo, Dick Korda, George Reich and Jerry Kolb. Joe was an avid indoor and outdoor rubber flyer, and this interest was reflected in some of his designs for Cleveland. Two in particular were the Thermalier and the Gull. The former was a Class C outdoor stick at just over 100 square inches of wing area, which flew well with a small amount of rubber, while the Gull was a shoulder-wing diamond fuselage Wakefield which is still flown today with success in SAM events.

In 1940 Joe left Cleveland and started as a lithographic apprentice. He stayed in the industry and eventually retired as Vice-President of Photo Litho Plate Company. During the Second World War he joined the United States Army Air Corps, training in Biloxi, Mississippi as a navigator. He flew 19 missions over Germany, but was then shot down and spent 16 months as a prisoner of war.

After the war he resumed active modelling, and qualified for United States teams in both Wakefield and FAI Gas. He also flew proxy for Ron Moulton in FAI Gas at the 1954 World Champs held at Long Island, New York.

His Wakefield Finals participation in 1951 was at Jamijarvi in Finland. He had flights of 212.1, 192.0 and 156.0 for an aggregate of 560.1 seconds, and 12th place, which was third in the U.S.A. Team. Weather conditions at the contest were difficult, with considerable drift being evident, and 12th place was commendable.

His model was straightforward, but sophisticated, slabsider with a polyhedral wing, twin fins, double bladed folder and a retracting mono-leg undercarriage. It represented a sensible and practical approach to the changed rules and his placing probably under-rated the potential of the design.

The wing had a span of 46", and in planform featured a 5 1/4" constant chord inner section, while the outer 8" merged into a semi-elliptical tip. Ribs were pitched at 1 3/8", with riblets between each rib which extended back only as far as the front spar. While the wing section was not named, it appeared to be an NACA 6409, and the ribs were of 1/32" sheet. There were six spars, three on the upper surface matched by three more on the lower surface, all of 1/16" x 1/16". This was a typical spar layout from the Cleveland area, as used by Chet Lanzo and Dick Korda. The leading edge was 1/8" x 1/4", while the trailing edge was 1/8" x 1/2". Dihedral was 1 1/4" at the inner break, and 4 1/2" at the tip.

The basic fuselage structure was 39" long, with a maximum cross-section of 4" x 2 1/2". All longerons and spacers were 1 /8" x 1/8", pitched at 1 3/4". The wing sat on top of the fuselage, and the spacers a this point were arranged in a 'V' to provide a snug seating for the wing, which was held on by rubber bands. An anti-vibration former was built into the fuselage at the wing mid-point to damp vibration from the long motor which was employed. A 1/16" diameter wire leg was used, which was rubber loaded to retract after take-off. The leg was 7" long, and fitted with a 1 1/2" wheel, which retracted into a slot in the bottom of the fuselage.

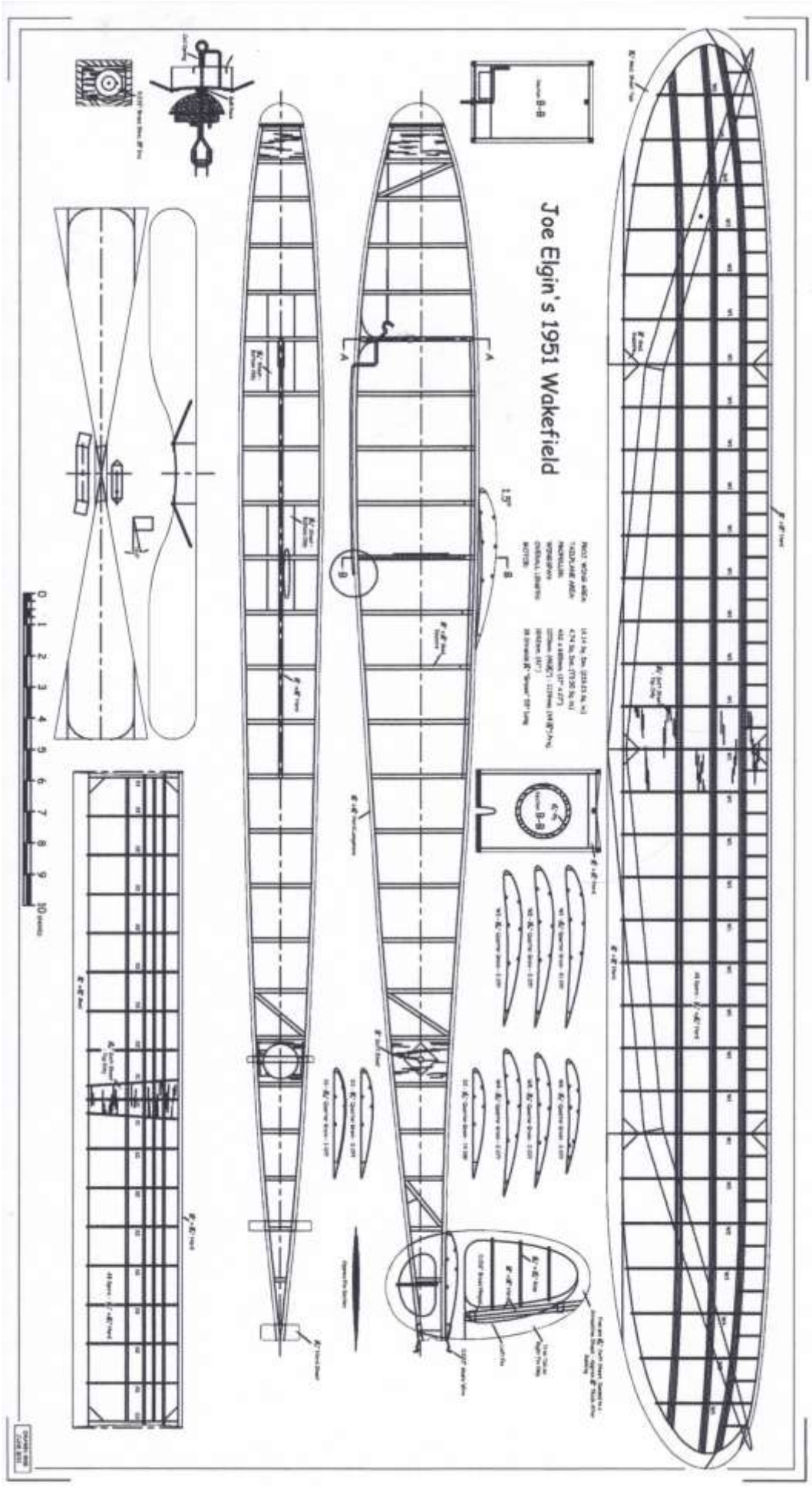
The tailplane was rectangular in planform, and measured 21" in span with a chord of 3 1/2". It utilised a flat-bottomed section of thinned Clark Y profile with four spars of 1/16" x 1/16", located equally on each surface. Ribs were of 1/32" sheet, and were pitched at 1 1/4" without any riblets being employed.

Twin built-up rudders of elliptical shape were positioned on the tailplane tips. An adjustable trim tab was fitted to the right-hand fin only. The tailplane sat on top of the fuselage, and tilted for D.T. purposes.

A double-bladed folding propeller of 17” diameter and 27” pitch was fitted, carved from a 3” X 1 1/2” block. This was driven by a motor of 18 strands 1/4” brown rubber 53” long.

No balance point was shown on the original plan, nor were any details provided of the covering materials used.

The attached three-view has been re-drawn in CAD by Mike Glaister, but Joe’s original plan is presently available from the N.F.F.S. Plans Service. Joe donated it prior to his death in 2002, and a design which was never published is now available to all. Joe was a very capable modeller, and while he may be best remembered for his power designs, his 1951 Wakefield fits neatly into the Nostalgia era, and deserves a wider recognition of its capabilities.


Joe Elgin's 1951 Wakefield

Norman Marcus (U.K.) 1951

Back in the 1990's I used to visit the U.K. on a regular basis, and occasionally these visits coincided with modelling events. For a couple of years running I was able to attend a Crawley Indoor Meeting, at which a Croydon MAC reunion was held. At these meetings I met Norman Marcus, and during the course of our conversation he mentioned his 1951-52 Wakefield, which he claimed as the best he ever built. I was familiar with the design from the *1951-52 Frank Zaic Yearbook,* so I approached Bob Jones to see if he could produce a full-size plan. Bob experienced great difficulty in attempting to scale the Zaic three-view, as it was drawn in varying scales, and Bob was not sure of the accuracy for the final drawing, which he sent me in draft. It was one of his final drawings before his retirement. On another U.K. trip, I was talking to David Beales about the drawing, and he offered to discuss it with Norman. It turned out that Norman still retained a 1/10 scale outline drawing of the model, and he also had a notebook covering various design details. He was only too happy to have a look at Bob's drawing in order to check it for accuracy. So, the drawing went to David, who passed it on to Norman for annotation and eventual return to me. It has now been redrawn in CAD by Michael Glaister, and this is the plan which accompanies this article.

The genesis for the 1951-52 model obviously lay with the 'Hereward', published in *Aeromodeller,* February 1951 at pp.82-3. 'Hereward' had been built in 1949, and performed successfully in the 1949 and 1950 contest seasons. For the 1951 specification change, Norman recommended that the 'Hereward' wing be increased in area by adding an extra 2" to the centre section, and to the tailplane by increasing the centre chord from 4" to 4 1/2", the tip from 3" to 3 1/2" and the span to 20". These suggestions were to accommodate an existing design, but Norman felt that a more radical approach would be better.

This involved matching the modified 'Hereward' wing and tailplane to a new longer and slimmer fuselage. The 'Hereward' was always portly, having been built to the L2/100 fuselage formula, but the new design did not have the same constraints. As a result, the basic fuselage was 48" long, with the main structure being a 2 1/2" square diamond. A single fin was set in front of the tailplane, which allowed the use of a tipping tail D/T. The fin itself was of sparless construction, and featured a small external trim tab. A tipping tail D/T was an innovation for Norman, as his previously published rubber designs – the 'Raff V', 'Supa Dupa', 'Bazooka', 'Dinah Mite' and 'Hereward' had all featured a parachute D/T. Longerons were 1/8" x 1/8", while the spacers were 1/8" x 1/16", pitched at 1 1/2" intervals. In his model Norman had used cotton diagonal bracing on the fuselage as an additional form of strengthening. However, on the model's last flight, a rubber bunch caught in the bracing shortly after Norman launched the model, with the result that the fuselage exploded in a cloud of tissue, balsa scraps and writhing rubber. The flight terminated abruptly, and as a result Norman had the retrospective recommendation that the fuselage be double covered with tissue.

Although the L2/100 fuselage rule had gone, there was still a minimum cross-section requirement, and this was met by a built-up pylon which was 1 5/8" high at the wing leading edge. This pylon had a single 1/16" sheet former at maximum depth, and was covered with 1/32" sheet forward of this former. Aft of the former, the pylon was covered with tissue only. A single leg of 20g. wire, 8" long, was located on the bottom longeron, in line with the leading edge of the pylon. This leg was rubber loaded to retract, and had a cotton limiting line. The model could not stand by itself with this arrangement, although it met the three-point R.O.G. requirement when the wire leg was allied with the tailplane tip fins. Evidence that the system worked is on p.346 of the June 1953 *Aeromodeller*, with the model taking off in exemplary fashion.

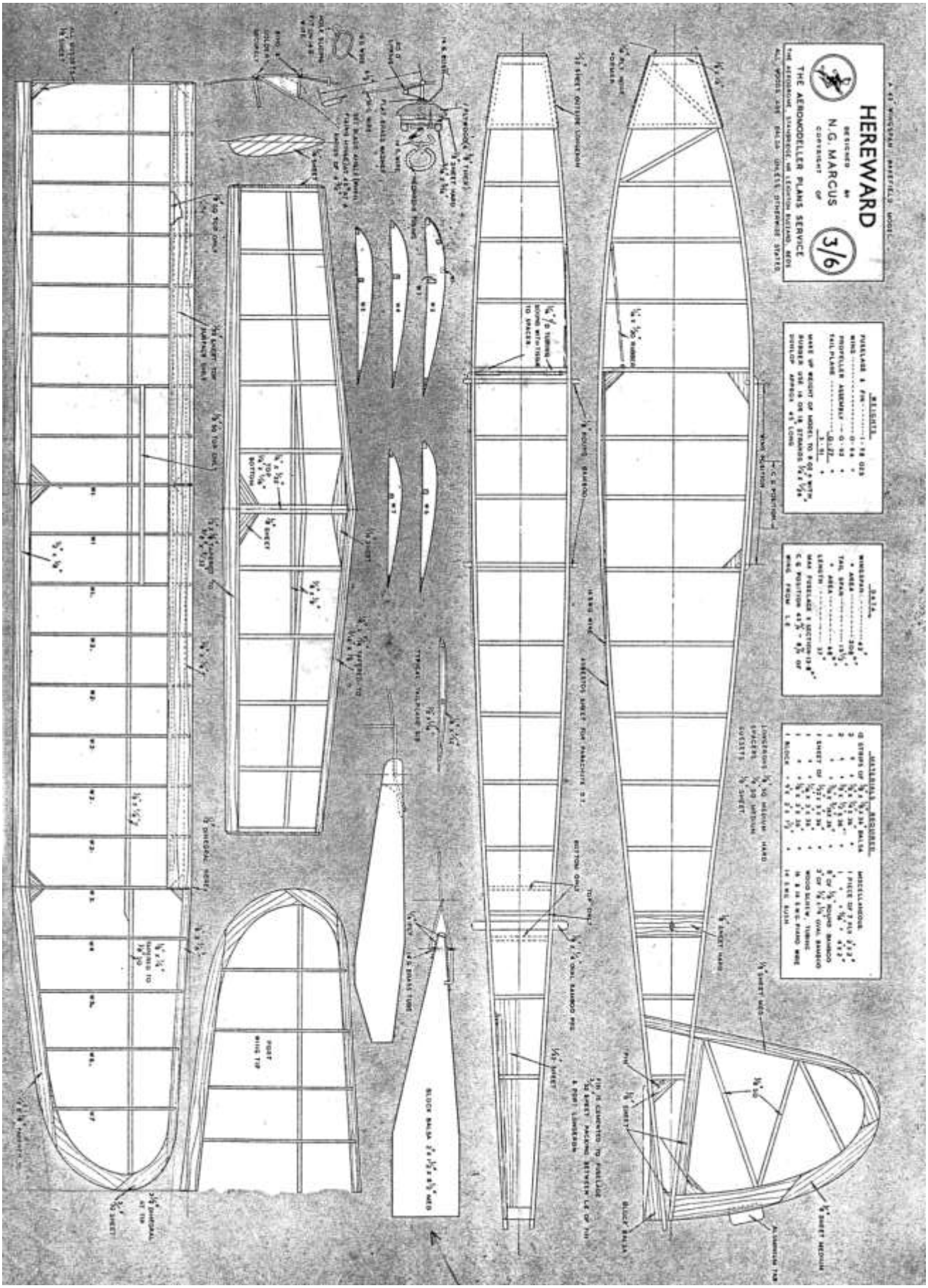
The wing was pure 'Hereward' in planform, with an additional 2" added at the centre, combined with a slight modification to the structure. Chord of the inner section remained at 5 1/2", while the same wing section was also retained. Pitch of the 1/16" sheet ribs was 1 1/2". The only significant alteration was to the wing spars, where the 'Hereward' front upper spar of 1/8" x 1/8", and the rear lower spar of 1/8" x 1/4", were each replaced by 3/16" x 1/16" spars. Although the inner panel 'Hereward' dihedral of 1/2" was retained, the tip dihedral was increased from 3 1/2" to 4".

The tailplane conformed to the ‘Hereward’ planform, but the span was increased to 20”. Chord at the centre was 4”, and tapered to 3” at the tips. Small tip fins of 1/16” sheet were fitted, while the structure was identical to the ‘Hereward’.

A single bladed folding propeller was retained, with a diameter of 18”, and carved from a 2 1/4” x 1 3/4” block. A hub of 16g wire was employed, and the counterbalance weight was attached to the propeller, swinging forward when the propeller blade folded to compensate for the centre of gravity shift. This was a concept borrowed from fellow Croydon MAC member, Jimmy Tangney. The propeller folded on the bottom side of the fuselage.

Norman’s notebook also kept a record of the tissue colours used on the model. The tailplane was white, as were the wing tips. White was also used on the top surface of the wing, with black being used on the lower surface as an aid to visibility. Yellow was employed on the fuselage, in conjunction with a red fin.

Power was 16 strands of 1/4” x 1/24” Pirelli, 45” long. This gave a motor run of approximately 60 seconds. Both climb and glide were to the right, and the model had a conservatively estimated performance of about 3 1/2 minutes in late evening air. However, the model flew well, and caught thermals easily, doing many 5-minute maximum flights. Proof of its class lay in the 1952 Contest Average results. In the Rubber category, Norman placed 4th where from six contests he made 16 flights for an actual flight average of 3:39. It is not hard to understand why Norman held this model in such high regard.


HEREWARD
DESIGNED BY
N.G. MARCUS
COPYRIGHT OF
THE AEROMODELLER PLANS SERVICE
3/6
WEIGHTS
DATA
MATERIALS REQUIRED
MISCELLANEOUS
TYPICAL TAILPLANE RIB
BLOCK BALSA

Roy Nicole's 1952 Wakefield

At the 1952 International Eliminators for the Great Britain Team, Roy Nicole of the West Middlesex club placed second with an aggregate of 14.20 from three flights. In the *Aeromodeller* article of the Trials, at p.469 of the August 1952 issue, a photograph is shown of Roy's model, which is described as 'interesting'.

For the 1952 Wakefield Finals, held at Norrkoping, Sweden on 13 July, initial conditions were not good, with the start of the contest being delayed by rain, so that the first round commenced at 2.30 a.m. A strong drift, coupled with the difficulty of seeing models in the early morning light against a dark background, meant that models passed from the timekeepers' sight when they were still well up. Roy's first flight was 3.02, to place him 19th at the end of the first round, in the one round which seemed free of thermal activity. However, he was unable to locate his model initially, and was not able to make a second-round flight, because he did not have a reserve model.

Both the *Aeromodeller* at p.530 of their September 1952 issue and *Model Aircraft* at p.395 of their September 1952 issue commented on the situation. While they diplomatically refrained from blaming Roy outright, stating that he was attending college, and had no time or facilities to construct a reserve, they felt that the provision of a thoroughly tested reserve must be made a condition of inclusion in the British team.

Roy's model was located finally, and he managed a third-round flight of 4.02, for a total aggregate of 7.04 and 33rd place. Had he been able to achieve a flight of a little over three minutes in the second round, he would have placed in the top ten.

The photograph of Roy's model in the *Aeromodeller* had always intrigued me, so during the 1980's I made an effort to see if I could track Roy down. Believe me, from 12,000 miles away, this is not easy, but I eventually obtained an address, and wrote to Roy. He replied with details of his model, together with copies of photographs.

Roy did not have any drawings left, but the model he took to Sweden was the Mark 4 version of his 'Ahriman' design. Several variants were built by members of the West Middlesex MFC, but Roy continued to develop the design up to the Mark 7, all versions of which featured twin fins. Roy's Wakefields were strongly influenced by Ron Warring, although Roy had his own design input. All his models were fully geodetic and used thin, highly cambered wing sections. Another difference from Warring involved Roy's use of a two-bladed folding propeller. The balsa used was carefully selected, and weighed before use to obtain medium strength balanced material. Target weight for the wing structure, uncovered, was 1 1/4 oz.

The wings, tailplane and fins were fully geodetic, with 1/32" quarter sawn ribs. Wing leading edge sheeting on the top surface was 1/64" sheet back to the main spar of 1/8" x 1/16" hard balsa. The wings had about one degree of wash-out built in, and were covered with white Jap tissue.

The fuselage was of square cross-section, built of 1/8" square longerons, 3/32" square cross members, and 1/32" x 1/16" diagonal braces running continuously around the fuselage so that they would be loaded in compression. The nose section was circular, blending into the square section, a la Warring. A wing box was mounted above the top longeron, between 1/8" sheet root ribs, and faired into the fuselage using 1/16" sheet frames. The wing fairing was covered with an American tissue, 'Skysail', which was applied wet, and shrunk to shape. A small underfin supported the rear fuselage on the ground, level with the twin fins.

The aerofoil section used was a Jockum section, turbulent flow, fairly thin around 7%, and heavily undercambered. It came from one of the issues in the 1950's *Ian Allen Model Aviation* series. The wing was mounted by tongue and box, with the box being built first around the 3/16" sheet tongue. The latter was made in one piece and built into both wings at the correct dihedral angle, then cut in two. Stub spars supported the tongue in the wing, as in Ron Warring's designs.

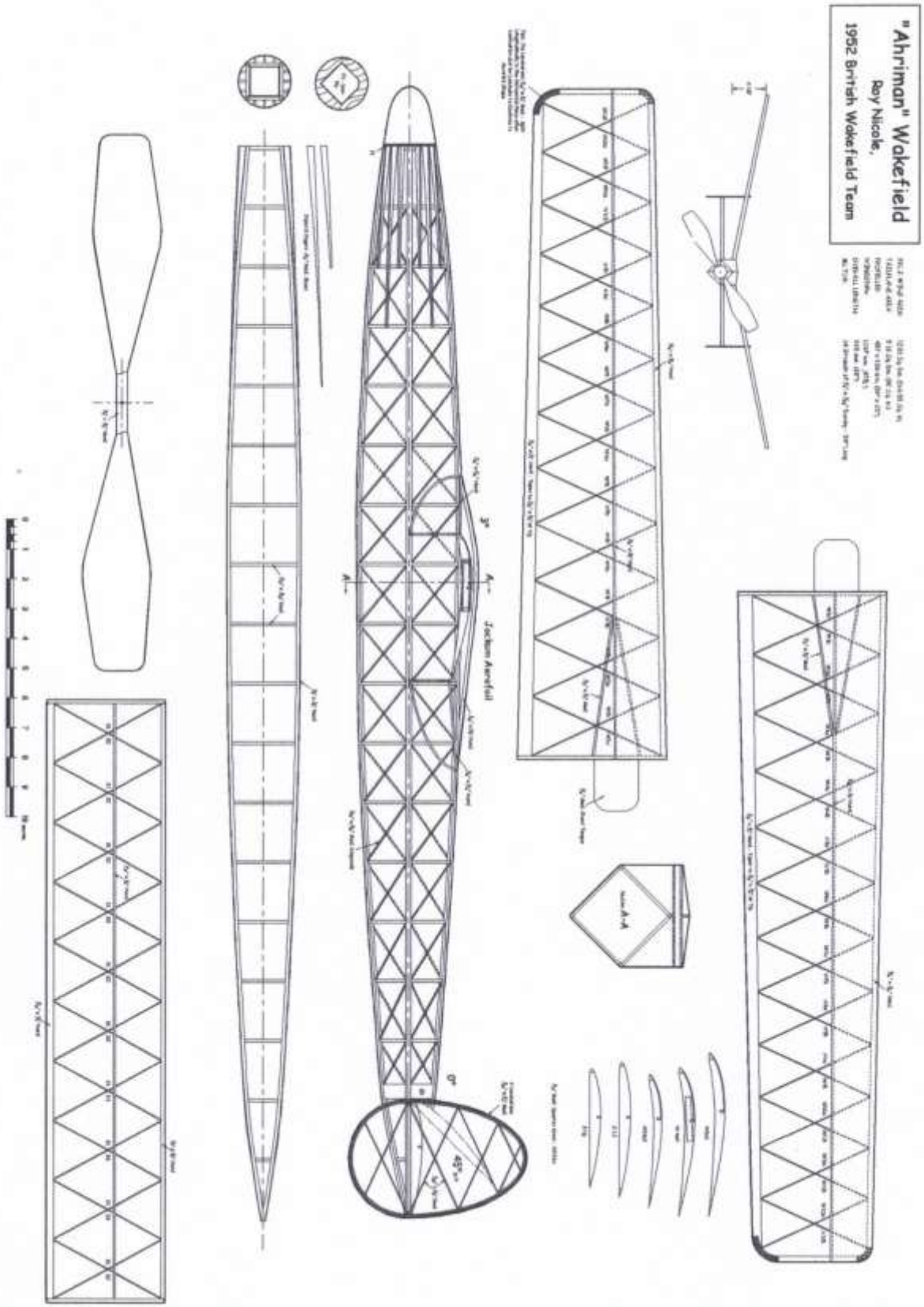
The tailplane section was taken from the wing rib template, without the undercamber. The fins were laminated from 1/32" sheet with geodetic 1/8"x 1/32" ribs. The fins were of flat section, with the LE and TE rounded.

Power was 14 strands of 1/4" Pirelli, 54" long. This gave a climb of around 75 seconds with an 18" two bladed folding prop, which had a very thin, heavily undercambered section. Prop hubs were wire, with all the mechanism kept inside the spinner. The prop blade root was about 3/8" square, faired to the aerofoil shape, and the hinges were small brass plates with bent lugs, skewed so that the blades folded flat to the fuselage. The rubber went through a wire figure of eight loop which was detached from the prop for winding and hooked back on again when fully wound.

The undercarriage was a single retracting balsa leg; about 1/4" x 3/32" shaped to fit the bottom of the fuselage. The hinge was again skewed, with the leg being held down by 1/32" rubber slightly over-centre, so that it held the leg either fully down against a retaining thread strap, or fully up. Natural forces retracted the leg every time.

From Roy's notes, Mike Glaister has superbly re-created the model in CAD, as shown in the accompanying three-view.

I was unfamiliar the derivation of the name of the model, and was interested to learn that Ahriman is the evil spirit in the dualistic doctrine of Zoroastrianism. His essential nature is expressed as greed, wrath and envy. With Roy's acknowledgment of his debt to Ron Warring, a similar parallel exists in Warring's Zombie and Voodoo designs.


"Ahriman" Wakefield
Ray Nicole,
1952 British Wakefield Team

Don Wilson (New Zealand) 1952

Don Wilson was a member of the North Shore MAC, and a fellow club mate of Frank Bethwaite, with whom he had a close relationship. Wilson was a structural engineer in his working life, and incorporated innovative thinking into his designs to ensure that his models retained their integrity under all weather conditions. This meant that he was not troubled by surfaces which warped, and Frank Bethwaite was of the opinion that Wilson's designs were exemplars of structural balance.

Wilson qualified for the 1952 Wakefield Finals with a top placing at the New Zealand 1951-52 Nationals at Masterton. This was the first occasion when a centralised location had been used to conduct the final trials. Weather conditions were difficult, with considerable drift and large areas of sinking air. Wilson's average for three flights was 3:07.0.

At the 1952 Finals, held at Norkopping, Sweden, Wilson's model was proxy flown by Deurell of Sweden. Flying in the first round, under windy conditions which were generally accepted to be free from significant vertical movement, Deurell recorded a flight of 4:10. This placed the model second at the end of the round to Joe Bilgri of the United States of America. In the second round Deurell achieved only 2:47, dropping Wilson's placing to 13th at round end. The model was not recovered in time for the third round, and no flight was recorded. Final placing was 34th with an aggregate of 6:57. A photograph of the model, being held by Deurell, is shown at p.531 of the September 1952 *Aeromodeller.*

The majority of the New Zealand models in the period 1930-75 were flown in international contests by proxy. New Zealand was not alone in adopting this practice, as it was also employed by Australia and South Africa, while even Great Britain (1954) and the United States (1956) were forced to utilise the procedure. Because of the distances involved, models often arrived just before the contest, and the proxy flier had little time to become acquainted with them. Knowing this, Don Wilson supplied very full notes for his proxy.

Wakefield Entry – D.A. Wilson

General Description: parasol monoplane, slab sided fuselage, twin fins, two bladed folding prop, single wheel retracting undercarriage. Single skein 16 strand ¼"x 1/24" Dunlop – NOT corded – motor.

Identification Marks: small black cross on each component.

Colours: red fuselage, wings and stabiliser white top and black underneath, fins natural wood.

Assembly; (use rubber bands provided)

(a) Tailplane – two bands around fuselage on to hooks on L.E. of stab. Cotton loop around wire prong on T.E. and around prong on end of fuselage. (Tie slip knot in cotton, and pass loop over the two prongs, pull up firm and tie thumb knot to secure. Do NOT pull so tight that L.E. is raised off its seating.)

(b) Fins – push loop of rubber band into hole in end ribs of tailplane and catch on hooks inside. Pass other end of looped band thru fin and pull to both L.E. and T.E. of fin and secure over hooks on tailplane.

Note (1) Port fin has small 'P' on outside of fin.

(2) Starboard fin has small 'S' on outside of fin.

(3) Fins may appear to be a very loose fit and they are. In flight they are quite rigid enough, and also are not damaged in a D.T. landing.

(4) Small packing piece glued to inside of port fin for turn adjustment.

(c) Wing – pass bands across centre section and catch on hooks provided.

(d) Undercarriage – check rubber band for retraction.

(e) Rubber motors – no bobbins used. Insert motor into fuselage and pass rear peg through rear hook. Put on a few turns, using a winder, and allow motor to unwind until mechanical stop operates.

(f) Check for warps: all surfaces should be warp free. If not, carefully remove warps, using steam.

Trim and Adjustments.

During its life, this model has been very consistent regarding trimming; in general, no alterations have been necessary to the original trim, for all types of conditions. However, after a crash or hard knock, the trim should be checked.
The trim is for a LEFT GLIDE, and RIGHT POWER CLIMB circle.
The glide circle is obtained by the rudder packing referred to under item 4, b (4).
The climb circle by right and down thrust, which should not be altered.

(a) *Glide test: from a hand glide, no stall should be apparent, and a slight left turn present.*
(b) *Power test: (see winding procedure later): wind on 400 turns, LIGHT DT FUSE, and hand launch. The climb should be to the right, but not too tight; under increased power, the right thrust will tighten the turn a little.*

Adjustments

(a) *If stall present in the glide, following a power flight, increase left glide turn slightly. If stall still present, put 1/64" packing under L.E. of tailplane.*
(b) *If glide too steep, increase wing incidence 1/32" and check again.*

Note: This model's set-up is very stable, for both calm and windy weather. For gusty weather, please ensure that glide is not on stall.
Winding Procedure: two motors provided which have been wound to a max of 750 turns each. Extreme max. should be approximately 850, using care and intelligence.
Winding gear supplied: S hook on one motor, winding rod of 3/32" wire, ply protection plate.
Procedure.
1. Attach D.T. fuse, but do not light yet.
2. Remove rear peg and place in a readily accessible pocket.
3. Pull out nose assembly and rubber motor. Check for lube on motor and oil on shaft.
4. Helper passes hooked end of wire rod through slot in underside of fuselage beneath the tailplane, and attach S hook to winding rod.
5. Place ply protection plate over shaft of S hook.
6. Check that rear peg handy.
7. Put on winds in normal way, finishing winding when the length of the wound motor equals the length between rear peg and nose of fuselage.
8. Remove protective plate.
9. Slip fuselage along winding rod.
10. Sight S Hook through the transparent panel of fuselage, and get helper to adjust the winding rod until the rear peg can be inserted.
11. Disengage winding rod and withdraw.
12. Check seating of tailplane on platform.
13. Light D.T. fuse.
14. Have helper swing down u/c, place model on ground if 600 or more winds, and release.
Important. Hold propeller by the HUB, not by the blades.
15. Fins will probably fold under when model is on the ground, but this is quite in order.

Performance to be expected.
The model has been entered only once in a contest, but tests have shown it to be very consistent in all weathers.
Still air performance with 760 turns ROG, gives a 50 second motor run, with a 3mins 35 sec flight when DTing at about 50 feet. With 825-850 turns, full flight times should be 4 1/2-5 minutes consistently.
Notes
1. The winding device is almost fool proof, as at least one Wakefield motor has broken while using the winding method, and no damage resulted to the model.
2. The propeller blades are a very poor fit at present, on the hub, but they work O.K. The wobble is the result of a full power crash on a windy day ROG.'
The winding system which Wilson described was based on an article 'Wind in Safety' by George Woolls, and published at pp.228-30 in the April 1951 Aeromodeller. Wilson had adopted the variation illustrated in Fig. 7 of the article, which involved the use of an assistant to hold the handle of the winding rod.

Construction of the model commenced in August 1951, and the model was only just finished in time for the New Zealand 1951/52 Nationals held over Christmas/New Year. The wing was 45” in span, with a 4.9” chord, and employed a 4” straight dihedral. While the wing section was unspecified, it bore a resemblance to an NACA 6409. Top and bottom 3/16’ x 1/16” spars were used at 1/3rd chord, together with a thread herringbone laced between the ribs at 2/3rd chord. The trailing edge was built up from two pieces of 1/32” sheet. Two out of each three ribs featured a cut-out to reduce weight, but Wilson discovered that paper tension distorted the top surface of ribs with cut-outs. He thought that circular holes would have been a better weight saving measure.

The tailplane was of 20” span, with a 4” constant chord, using 17 ribs of 1/32” sheet. A thinned Clark Y section was employed, with two spars at one third chord, supplemented by a thread herringbone at 60% chord. The trailing edge was also built up from two pieces of 1/32” sheet, while the twin fins were of 1/16” sheet.

Fuselage construction involved 1/8” x 1/8” hard longerons, combined with warren girder spacers of 1/8” x 1/16” set at approximately 2 1/2” pitch. Overall length of the fuselage was 40”, with the rear motor peg being set back 30 1/2” from the nose. The centre of gravity was set at the centre of the rubber motor, or 65-70% of the wing chord. Power was 16 strands of 1/4” x 1/24” Dunlop, 46” long. This drove a 19” x 28” double bladed folder, which had a maximum blade width of 2 1/2” at 7” radius.

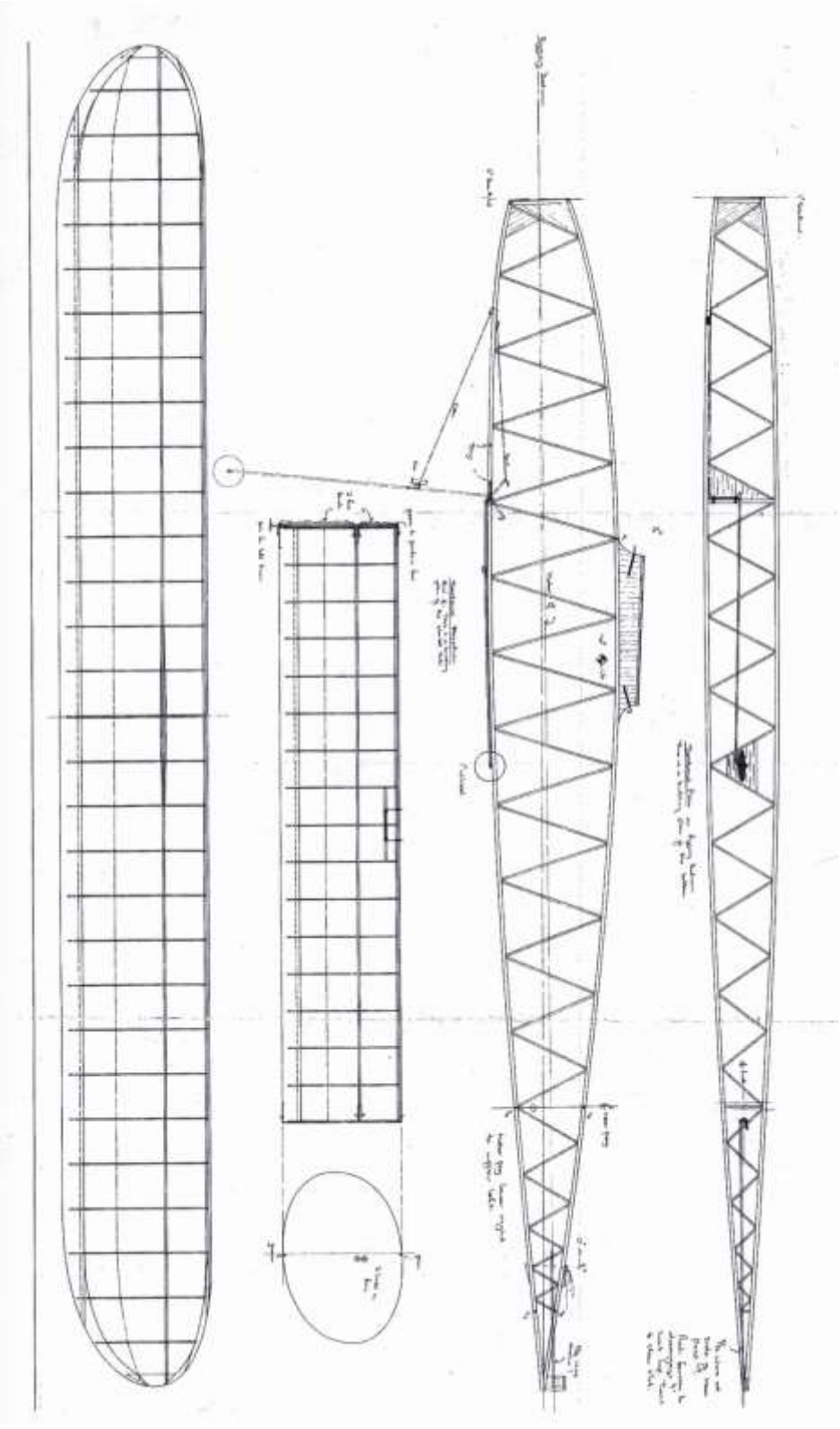
Component weights of the model were:

Wing	1.00
Tailplane	0.37
Fins	0.15
Fuselage	1.60
Propeller	0.92
	4.04
Motor	4.20
	8.24 oz.

As Wilson did not have access to American sources of contest balsa, the weights he achieved were commendable.

No plans for this model existed, but Don Wilson kept sketches of the design. From these sketches, Bill McGarvey has drawn up a full-size plan which has been approved by Don, and copies of this plan are available from Mike Woodhouse at Free Flight Supplies.

Don also represented New Zealand at the 1954 Wakefield Finals, held at Long Island, New York. His model was a development of the 1952 model, and placed 15th in the hands of proxy Ed Naudzius. A three-view of this model is in the 1955/56 *Frank Zaic Year Book.*



Arne Blomgren (Sweden) 1952

One of the glaring omissions from the English aeromodelling press was the publication of a plan for Arne Blomgren's1952 Wakefield Cup winner. Although all Wakefield winners prior to that year were published, Blomgren's winner has never appeared in an English language publication until now. It did in the Scandinavian model press, with the plan being notated in English, but further publication did not eventuate.

Arne Blomgren was a prominent Swedish aeromodeller who lived in Stockholm, and flew with the Vingarna Club. A fellow clubmate was Sune Stark, winner of the Wakefield Cup in 1951, and with whom Blomgren collaborated regarding design suggestions. Blomgren flew in all Wakefield Finals from 1949 to 1954, and posted a very fine record over this period. In 1949 he placed 8th with flights of 39.4, 266.3 and 138.3 for an aggregate of 444 seconds. A three view of the model he flew was featured in the 1950 Frank Zaic Yearbook at p.146. The design was a relatively conventional slab-sider, with constant chord wing and tailplane, but the wing was set in a shoulder position in the fuselage, and twin fins were attached to the tips of the tailplane. The structure was also conventional, with closely spaced wing ribs and 4 x 4mm longerons combined with 4 x 2mm spacers. A freewheeling propeller of 470 mm diameter was employed, and while no motor size was specified in the Zaic three-view, the weight of the rubber was quoted as 120 grams, allied with a structure weight of 110 grams.

Blomgren used the same design for the 1950 Finals held at Jamijarvi in Finland. He was again the highest placed Swedish team member with flights of 197.5, 196 and 155.1 for an aggregate of 548.6 seconds and 11th place. As the flights were made in dead air, Blomgren must have accepted that no further potential existed in the design, and came up with a new model for 1951. A photograph of his new design was shown on the front cover of the Swedish magazine *Teknik for Alla* for the issue 20 July – 3 August 1951. In the cover shot Blomgren has been joined Sune Stark, who was holding his own new 1951 design. The interesting fact about the cover is that the image is reversed: both the models are being held left-handed, although both Blomgren and Stark were right-handed, and †he propellers would rotate clockwise when viewed from the front, rather than the customary anti-clockwise rotation.

The 1951 Finals were again held at Jamijarvi, Finland, but on this occasion the wind blew. Blomgren had an uncharacteristically poor contest with flights of 21, 153 and 164 for an aggregate of 338 seconds and 33rd place. The poor time for the first round was caused by the motors of his twin-geared model tangling, which Blomgren admitted was the first time he had experienced such an event in the fifteen years he had been flying geared models.

Not deterred, Blomgren returned with the same model for the 1952 Finals, held at Norkopping, Sweden. This time he flew impassably and recorded 3.30, 5.00 and 5.00 for an aggregate of 13.30 and first place. The design of his model was deceptively simple at first sight, but closer inspection revealed how sophisticated Blomgren's approach had been. Overall fuselage length was 980mm, with the rectangular section being relatively narrow at 60mm, with a depth of 109mm. Diagonal longerons of 5 x 2mm were employed, and combine with 4 x 2mm spacers at 40mm pitch. Such a fuselage could only have been made on a jig. The saving in weight achieved by the adoption of diagonal longerons would have been significant as the cross-section area of the diagonal longerons would have been only 10 units by comparison with the 16 units of the 4 x 4 mm longerons used in the 1949 design. Twin undercarriage legs of 1.5mm wire plugged into aluminium tubes, giving a clean, neat installation which was light and practical. Twin rails were located on top of †he fuselage for the wing mounting. Length between hooks was 760mm, or approximately 30", with the return gears being mounted in the rear of the model, on a lightened dural tube. About 1.5mm downthrust was built in.

Both the wing and tailplane were of constant chord, with both the wing and tailplane being to the same dimensions and dimensions as the 1949 model. However, the new model used V-dihedral, with a flat section over the fuselage. All flying surface ribs were 1mm thick. The wing structure featured a solid 8 x 10mm leading edge, while the spars were two 2 x 3mm, mounted internally in the rib and located one above the other at approximately 20% chord. The spars were reinforced at the rear by 1mm sheet, which extended 180mm from the centre of the wing. The wing section, from the ordinates quoted on

the plan, was identical with that used by Stark on his 1951 winner. A similar structure was adopted for the tailplane, with a leading edge of 4 x 4mm and twin inset spars of 2 x 2mm.

A single fin was mounted on top of the tailplane, combined with a relatively small underfin. Blomgren differed from Stark in his design approach for this component, incorporating a slight sweep into the leading edge of both fins, while the trailing edge was straight.

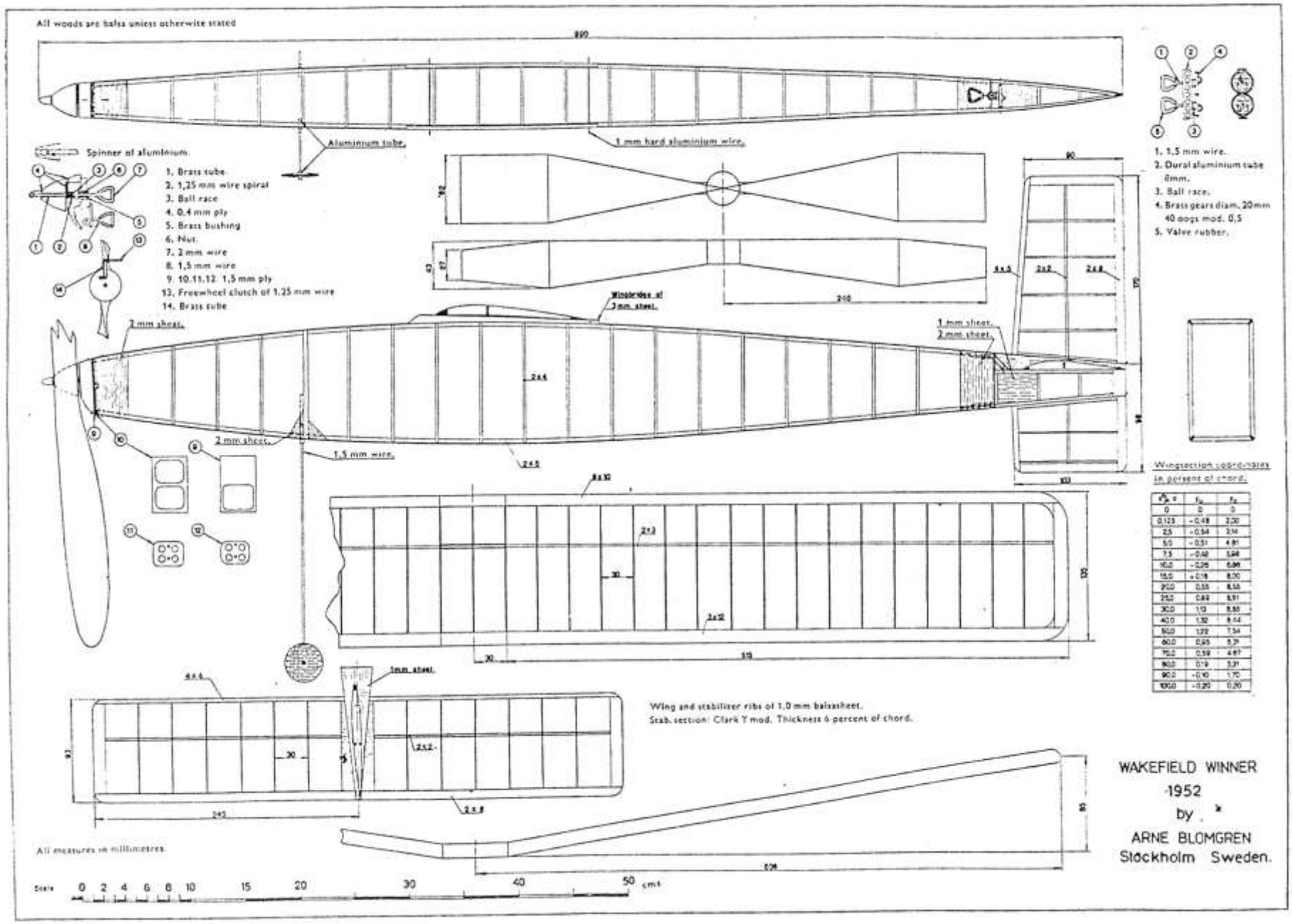
A double-bladed freewheeling propeller, incorporating a small spinner, was used, with a diameter of 480mm. It appeared to be identical in size with that used in the 1949/50 model, and the noseblock was held in place by rubber bands. This would suggest that the motor used would have approximated the distance between the hooks, although no motor size was quoted on the plan. It was probably similar to that of Stark's 1951 model, which used 14 strands of 6 x 1mm.

Blomgren was 27 at the time of his 1952 victory, and lived for many years following his success. Although his 1952 winner suffered from lack of publicity, Jim O'Reilly drew it up in CAD, and produced a short kit. He simplified the wing and tailplane spar layout, but otherwise is a faithful replica of an under-recognised design.

During the 1980's, Mike Kemp, who wrote the first Rubber Column for *SAM 35 Speaks*, constructed a number of 1949 Blomgren Wakefields. At the time Mike had a modelling contact in Sweden, who acted as a liaison for communication with Arne Blomgren. Mike put a series of questions about the 1949 model to Arne, who responded with the following information. The component weights of Arne's model were:

Landing Gear	10
Propeller.	30
Fuselage.	48
Wing.	37
Tailplane & Fin.	15
	140 grams.

Arne used a Dunlop rubber motor consisting of 16 strands of 1/4 x 1/32" with a weight of 95 grams. The balance point of his model was 87 mm aft of the leading edge.'



x/c %	y_u	y_l
0	0	0
0,125	-0,48	2,00
2,5	-0,54	3,14
5,0	-0,51	4,81
7,5	-0,40	5,66
10,0	-0,25	6,06
15,0	+0,19	6,30
20,0	0,55	6,55
25,0	0,88	6,61
30,0	1,13	6,55
40,0	1,32	6,44
50,0	1,22	7,54
60,0	0,95	5,71
70,0	0,59	4,67
80,0	0,19	3,31
90,0	-0,10	1,70
100,0	-0,20	0,20

Red Everitt (U.S.A.) 1952- Red's Remarkable Wakefield

Some designs attract attention because of their contest successes, but others exhibit a degree of technical excellence which makes them memorable. One of the designs in the latter category was 'Red's Remarkable Wakefield', by Red Everitt, which pushed the boundaries of current technology, and had a lasting influence on rubber model design. The model did not win any trophies, or fly in a Wakefield Final, but offered an approach which produced a five-minute design.

Everitt started with the force arrangement of Ron Warring's 'Zombie', but from there everything was changed, with every component being subject to scrutiny. The basic fuselage was a diamond, with a cross-section of 2 1/2" square. Longerons were 1/8" x 1/8", while the spacers were 1/8" x 1/16" pitched at 2" intervals, and reinforced by diagonals also of 1/8" x 1/16". Overall length of the fuselage was 39 1/16", with the basic structure being 36" long. The rubber motor extended the full length of the fuselage, and measured just over 35" between hooks. The rear peg was located in slots cut in ply tongues cemented to the rear fuselage bulkhead, and designed for ready accessibility. A shoulder mounting was adopted for the wing, with the top longeron being removed, and a v-structure substituted to supply a stable wing mount. Located beneath the wing was an external structure designed to meet the fuselage cross-section rule, as well as supplying a housing for the DT parachute. The housing was also the location point for the undercarriage, which consisted of a single, solid balsa leg which plugged into a paper tube installed in the housing. A single upper fin was permanently attached to the upper fuselage longeron, and was fitted with 1/32" sheet ribs which were flat on the right-hand side, but cambered on the left to generate a right-hand turn. The fin had a single, internal tapered spar. There was also a small lower fin, which was similarly cambered, and reinforced on the flat side with 1/32" sheet for strength purposes.

The wing was double tapered, with a span of 44 1/4", and a root chord of 6" which reduced at the tip to 4". In a concession to Warring, the wing section was Joukowski. There were two spars of 1/8" x 3/32" placed vertically one above the other at about one-third chord, with 1/32" sheet extending from the upper spar to the leading edge. Ribs were of 1/32" sheet, with six circular lightening holes cut in them; three in front of the spar, and three to the rear. The tips were built up from 1/32" sheet, and the straight dihedral wing was set at 4" dihedral. A stiff paper fairing fitted over the wing to provide a streamlined cover in keeping with the fuselage profile. The wing was held in position by rubber bands internally located in the fuselage and held by anchor pins. This was similar in principle to the method used by Evans on his 'Clipper'.

Because the rubber motor extended the full length of the fuselage it was necessary to employ a two-piece tailplane. A tailplane saddle of 1/32" ply, together with .032" wire locator pegs, allowed the tailplane to plug into its fuselage locators. A flat-bottomed tailplane section was used, with ribs of 1/32" sheet, combined with a single undersurface spar of 1/16" x 1/4", and 1/32" sheet on the top surface. No lightening holes were cut in the tailplane ribs. The tips were completed with small built-up tip fins.

Because of the contemporary concern about centre of gravity shift when the propeller folded, Everitt chose to incorporate considerable sweepback in the blades of his propeller. This was a double-bladed folder of 20" diameter, and carved from a very light block of 2" X 1 7/8" balsa. Everitt also chose to employ a freewheeling/folder stop mechanism, and to introduce the use of a double bobbin – two innovations which had not been published previously. He also used a system of external winding for the motor, which involved a winding rod extending the full length of the fuselage, combined with a protective plate to shield the fuselage from the effects of a motor burst.

Because of its combination of new and interesting features, the design attracted wide publicity. It was the subject of an article in *Model Aircraft,* and was published as a full-size plan in the February 1952 issue of *Air Trails,* which also included a superb cutaway drawing by Douglas Rolfe. The *1952 Aeromodeller Annual* featured a three-view, and Outerzone offer a copy of the *Air Trails* plan, which has been used as the basis for the accompanying CAD drawing by Mike Glaister.

In the July 1951 *Model Aircraft* there was an article entitled '5 min American Wakefield' which featured Everitt's model. While some of the details quoted differed from the subsequent published full-size plan,

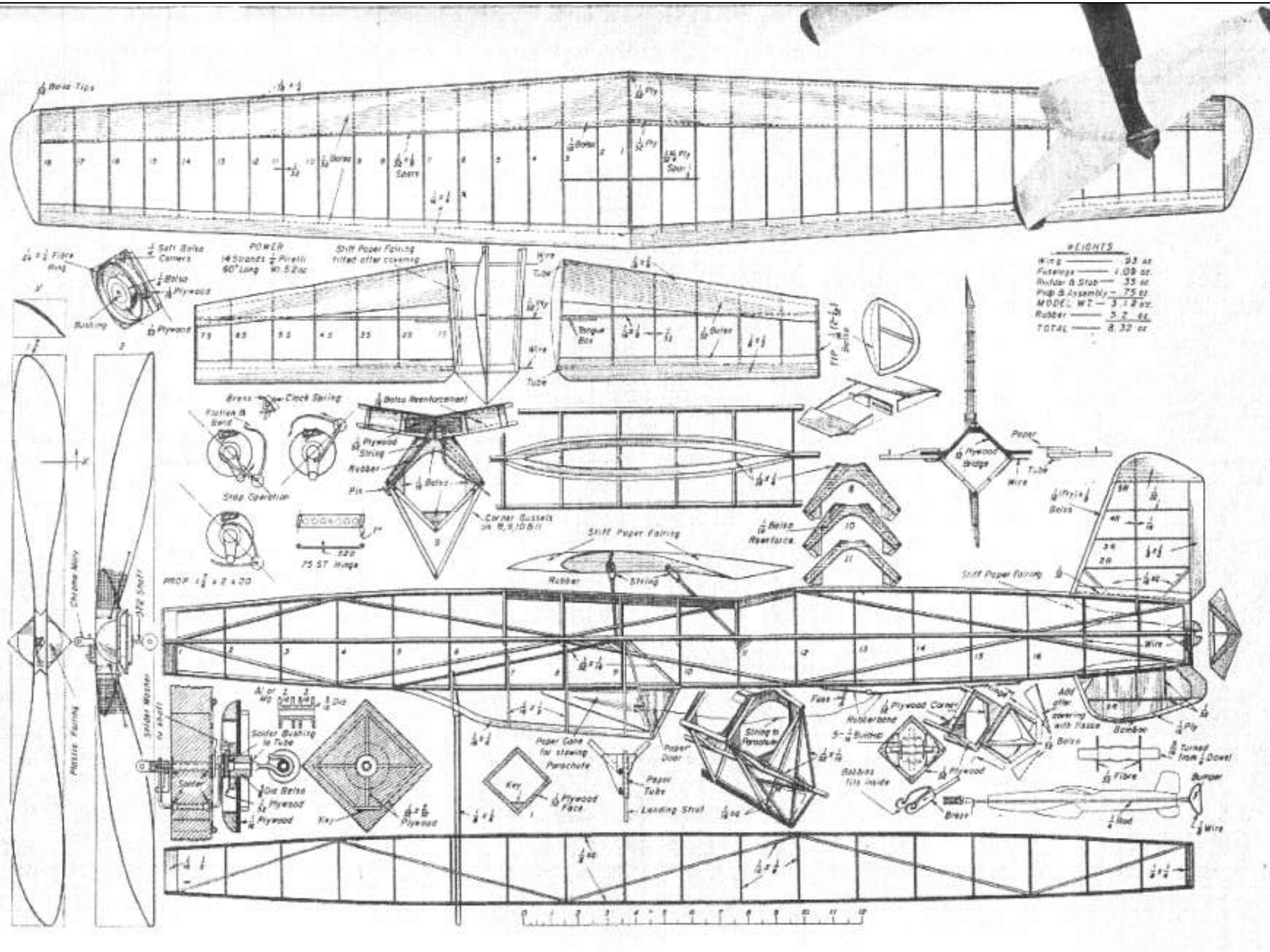
the general tone was in accord with the plan. Everitt was described as being a civilian mechanical design engineer for the U.S Navy, and his background was reflected in the detail design for the model.

Power was 16 strands of 1/4" Pirelli, 60" long, and as the distance between hooks was only 35", pre-tensioning had to be used in conjunction with the freewheeling /folder mechanism. The balance point was 40-45%.

The *Model Aircraft* article also quoted a curious mixture of Imperial and metric weights for the various components, which was incomplete, but *Air Trails* had a complete list, in ounces:

Wing.	0.93
Fuselage.	1.09
Rudder and Tailplane	0.35
Propeller.	0 .75
	3.12
Rubber.	5.20
	8.32oz

Model Aircraft quoted times of around 4 1/2 minutes on 800 turns, after a motor run of 85-90 seconds. One thousand turns gave a motor run of 1 minute 53 seconds, with the possible maximum turns available being around 1350.


1/8 Balsa Tips
1/16 x 1/4
1/32 Spars
1/32 Ply
1/16 Ply Spar
1/64 x 1/2 Fibre Ring
Bushing
1/4 Soft Balsa Corners
1/8 Balsa
1/8 Plywood
1/32 Plywood
POWER
14 Strands 1/4 Pirelli
60" Long Wt. 5.2 oz
Stiff Paper Fairing fitted after covering
Wire
Tube
Tongue Box
TIP 1/16 Balsa
WEIGHTS
Wing — .93 oz.
Fuselage — 1.09 oz.
Rudder & Stab — .35 oz.
Prop & Assembly — .75 oz.
MODEL WT. — 3.12 oz.
Rubber — 5.2 oz.
TOTAL — 8.32 oz.
Brass
Clock Spring
Flatten & Bend
Snap Operation
1/16 Balsa Reenforcement
1/32 Plywood
String
Rubber
Pin
1/16 Balsa
Corner Gussets on 8, 9, 10 & 11
.020
75 ST Hinge
PROP 1 7/8 x 2 x 20
Stiff Paper Fairing
Rubber
String
1/16 Balsa Reenforce.
1/32 Plywood Bridge
Paper
Tube
Wire
1/4 Ply x 1/8 Balsa
Stiff Paper Fairing
Chrome Moly
.072 Shaft
Plastic Fairing
Solder Washer to shaft
Al. or Mg.
1/16 Dia
Solder Bushing to Tube
Solder
1/8 Dia Balsa
1/32 Plywood
1/16 Plywood
Key
1/16 x 3/32 Plywood
1/8 x 1/8
1/16 x 1/8
Paper Cone for stowing Parachute
Key
1/32 Plywood Face
Paper Door
Paper Tube
Landing Strut
1/16 sq
String to Parachute
1/32 x 1/16
Fuse
1/32 Plywood Corner
Rubberband
5 - 1/16 Bushings
Bobbins fits inside
1/32 Plywood
Brass
Add after covering with tissue
1/32 Balsa
Bomber
1/16 Ply
1/32
3/16 Turned from 1/4 Dowel
1/32 Fibre
Bumper
1/4 Rod
1/16 Wire
1/8 sq
1/16 x 1/8
1/8 x 1/8
0 1 2 3 4 5 6 7 8 9 10 11 12

Aarne Ellila (Finland) 1952

Aarne Ellila of Finland won the Wakefield Finals in 1949 and 1950 flying a geared slabsider. It was said that in 1949 he flew a model that was ten years' old, but in 1950 he produced a new design which demonstrated a very high performance under still-air conditions. By virtue of Ellila's repeat victory, Finland was again the host for the 1951 Finals, and Ellila built another new model. This followed the same design approach which he had used previously. The fuselage was lengthened, with incidence settings of seven degrees for the wing and three degrees for the tail. Another change was to the wing structure, as spars were eliminated, and reliance placed on leading edge sheeting. This caused a problem at the Finals, as in a photographic session before the event, a strong gust of wind broke the wing in three places, necessitating frantic repairs prior to the contest.

In place of the calm, non-thermal conditions which 1950 had experienced and which were normal for the site, 1951 encountered a meteorological depression which produced cloudy skies and strong drift, allied with the constant threat of rain. Ellila's performance in the event was below his normal immaculate standard, as he had caught a severe chill which hindered his capacity to operate. In the first round, after a 'false start', he could achieve only 2:10. The second round was almost a repeat of the first, in that the model touched down after a low altitude circuit at 6.9 seconds, and though eligible for a false start , the model bounced off and made a long flight, terminating with being lost in the surrounding forest. Although found the next day, it was too late for the third round. Ellila thus had an aggregate of 136.9 seconds, and 47th place out of 51 contestants.

In 1952, by virtue of Stark's 1951 victory, the Finals were held at Norkopping, Sweden. Thermals were very evident, and had a major effect on the results. Ellila was again on the Finnish team, and flew the same design which he had used in 1951. This produced three excellent flights of 4:00, 4:16 and 4:39 for an aggregate of 12:55 and third place. The model was a development of the 1950 design, with a differently shaped fuselage, but the wings, tailplane and fin remained the same apart from changes in structure. This was to be Ellila's last foray into International competition, and he retired after having flown in four consecutive Wakefield Finals. Places of 1st, 1st, 47th and 3rd indicate just how good he was.

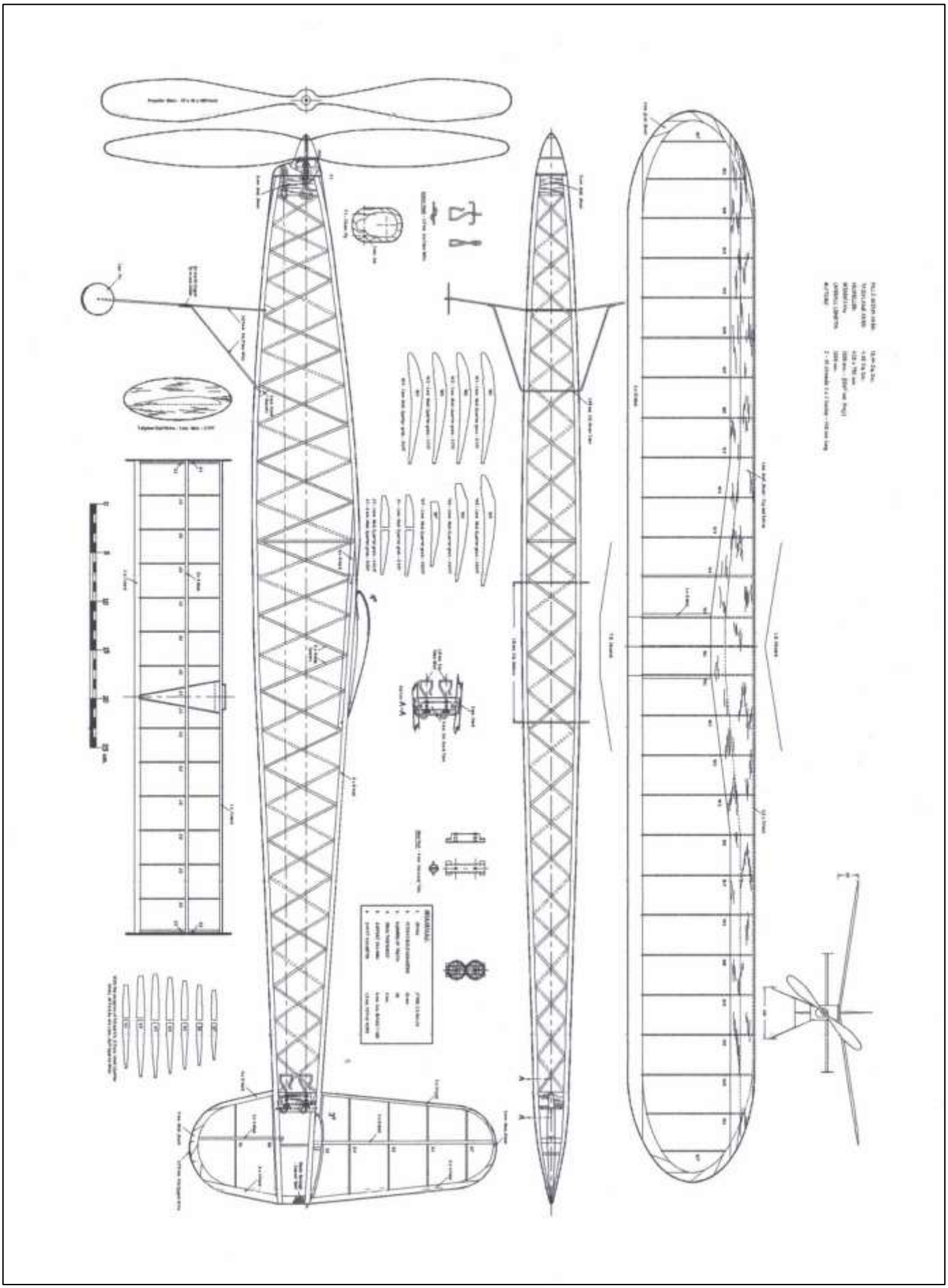
The basic fuselage of the 1952 model was 1050mm long and had a maximum cross-section of 112mm x 60mm. In profile, the lower longeron was very slightly curved, while the upper longeron was a series of straight lines. Longerons were of 5mm x 5mm medium strip. In a development from the 1950 model, the spacers were ordered in a full Warren Girder structure, and consisted of 2mm x 4mm medium strips. The nose was built up with 3mm sheet to provide a smooth entry, being rounded on the top and bottom to fair into the spinner incorporated in the propeller. A fixed landing gear consisting of 1.25mm wire was fitted with 32mm wheels made of 1mm ply. Track of the undercarriage was 210mm. A removeable return gear assembly was located in the rear of the fuselage, just in front of the tailplane. The gears were 20mm in diameter, with a 2mm thickness, and probably emulated the 1950 model in being made from brass, with holes being drilled for lightening purposes. Distance between hooks was 910mm.

The single fin and underfin were of similar shape to the 1950 model, but an additional rib was incorporated in the upper fin. A solid main spar of 3mm x 8mm was employed, used with symmetrical section ribs cut from 1mm soft quarter grain sheet.

In planform the wing followed the layout of the 1950 model, with a span of 1100mm. The constant chord inner section was 130mm, and the tips had a curved profile, constructed from 3mm sheet. Ribs were of 1mm quarter grain sheet and were pitched at 40mm. While the name of the wing section was not specified, it bore a resemblance to that employed in the 1950 model, and featured a slight undercamber. The leading edge was 2.5mm x3.0mm, while the trailing edge was 3mm x 15mm. Leading edge 1mm sheeting was employed, being 15mm wide on the lower surface, and 25mm on the upper surface, although the sheet widened to 30mm and 45mm respectively, in the centre section of the wing. The flat centre section sat on top of the fuselage, and was held on by rubber bands which were attached to bamboo dowels passing through the fuselage. Straight dihedral totalling 85mm was employed.

The tailplane was straightforward, being rectangular in planform and measured 490mm in span, with a chord of 90mm. Ribs were of 1mm medium quarter grain sheet, and were pitched at 35mm. The section was a thinned Clark Y, with a flat bottom. Like the fin, a sold spar of 3mm x 8mm was used, which necessitated two-piece ribs, in conjunction with a leading edge of 3mm x 3mm, and a trailing edge of 2mm x 6mm. Twin elliptical end plates of 1mm sheet were fitted to the tailplane tips. The tailplane sat on top of the fuselage and was held on by rubber bands.

A double-bladed freewheeling propeller of 480mm diameter was employed, carved from a 39mm x 46mm block. Ellila used his customary internal clutch based on Garami principles, which allowed the propeller to be readily removeable. While the weight of the model was not quoted, power was 14 strands of 6mm x 1mm Dunlop rubber, arranged in two motors, each 910mm long, which meant that they were taut between hooks. Such an arrangement would have had a potential in excess of 1500 turns, and a correspondingly long motor run. The model was probably in the five-minute class when flown at Jamijarvi under the generally experienced still air conditions of the site.



Part 1 Cliff Montplaisir's 1952 Wake (United States of America)

One of the better-known American Wakefield fliers in the 1950's was Cliff Montplaisir. He qualified for three American teams and placed 10th in 1952, 12th in 1953 and 13th in 1956. While a three-view of the 1956 model was featured at p.82 of the *1957-58 Frank Zaic Yearbook,* no details of the earlier models were ever published.

In 1977 I wrote to Cliff to see if he retained any details of these models, and he replied with photocopies of his original working drawings together with some notes on his design philosophy.

The 1952 design was conceived in January 1952, with the first version flying in April, and then the changes came. In the *1957-58 Frank Zaic Yearbook,* after being impressed by the performance of the American long models at the 1951 Finals, Cliff described how he was seeking the potency of a 'long job' in calm air, but with the ability to take the wind if the occasion arose. He was ultimately able to do this by having two separate and distinct tail incidences and thrust adjustments – one for calm and one for wind – a method worked out after innumerable tests in all kinds of weather.

Among the changes, the original NACA 6409 section wing was discarded for a new wing with a Davis aerofoil. The initial single bladed folding propeller was changed for a two blade, 20" x 30" pitch folder. Every calm evening Cliff took a 20-mile drive to the flying field, and with his wife as holder, proceeded to test fly intensively. Cliff always used a D/T while testing, and initially did know if he had a 'dead air' 4-minute Wakefield. As Cliff neared maximum turns (this was in the days before winding tubes, and maximum turns were never used), he was forced to use heavy thread bracing from under the fuselage to the polyhedral break, in order to keep the wing from folding under the power burst. He also added turbulators to the wing tip panels, in order to prevent tip stalls on the glide. Another challenge with the long fuselage was to carry out safe R.O.G's.

Cliff eventually built two models to his final 1952 design. The fuselage length was 61 3/4", with 54 1/2" between hooks. He used 16 strands of 1/4" Dunlop rubber 52" long. Rubber weight was 4.45 oz.; while the structure weighed 3.95 oz., for a total flying weight of 8.4 oz. Component weights were 1.82 oz. for the fuselage, and 0.83oz for the wing, leaving inferred weights of 0.90oz for the propeller and 0.40 oz. for the tail.

In testing Cliff found the model to be very consistent, and estimated that about a 4:45 average could have been obtained in 'dead air'. The model progressed through a very gusty Eliminator to qualify for the East Coast Semi-Finals, where it placed second to gain a berth on the last 6-man Wakefield Team.

The 1952 Wakefield Finals were held at Norrkoping, Sweden on 13 July. After delays owing to rain, the contest eventually started at 2.30 a.m. Initially conditions were not good with a strong drift, and subsequently thermal activity developed in the second and third rounds. Cliff had flights of 203, 261 and 153 seconds, for an aggregate of 617 seconds and 10th place. A photograph of the model is on p.394 of the September 1952 issue of *Model Aircraft.* Writing in the October 1952 of *Model Aircraft,* Ron Warring in his article 'Technical Report on the Wakefield' stated:

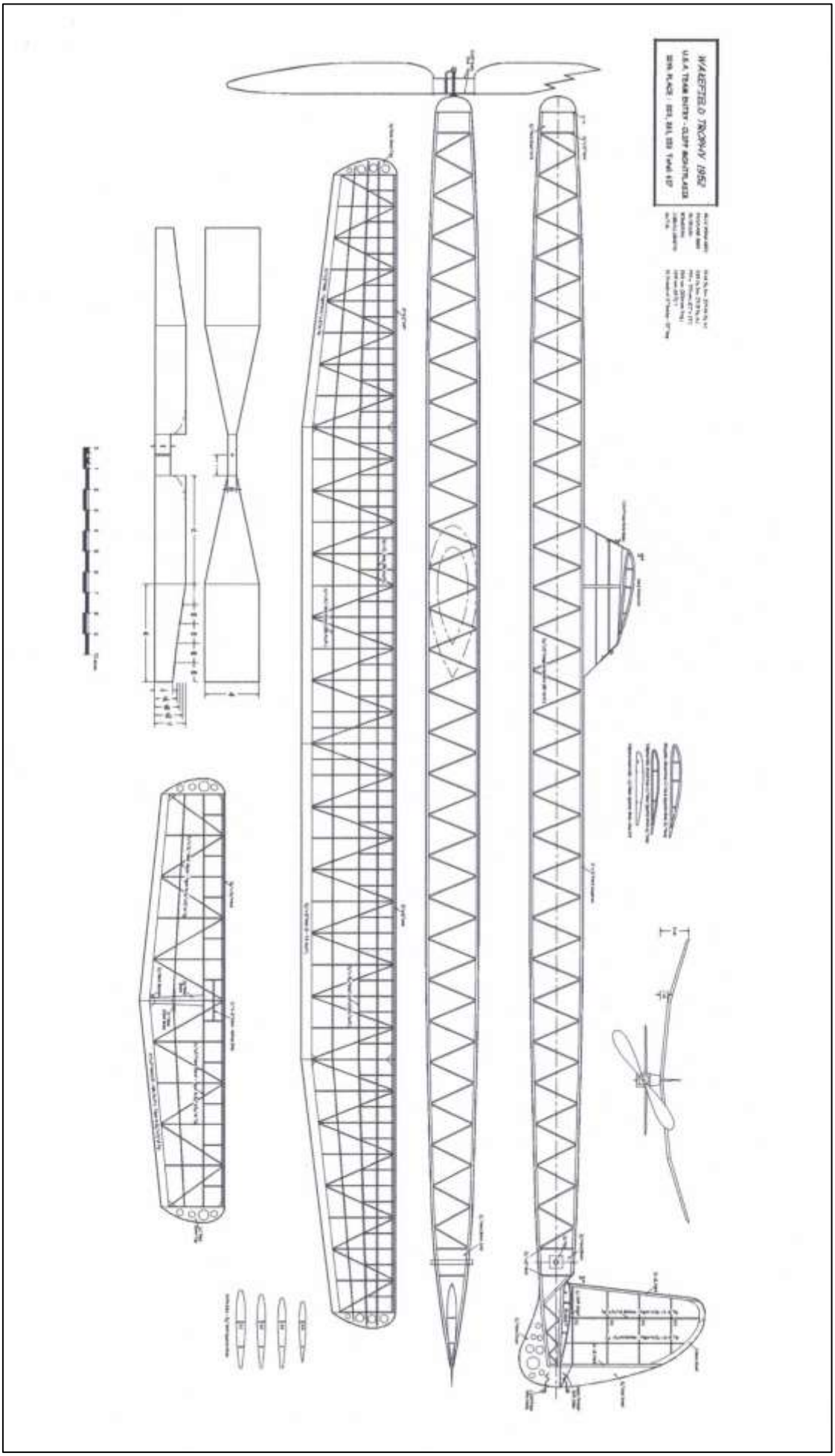
The only other American model to place high was the long fuselage job by Montplaisir. It had a beautifully built airframe, again down to a very low weight… The strength of the light, long fuselage with Warren girder construction was demonstrated by an incident which occurred well downwind during the course of the second-round flights. Returning with my own model, Montplaisir's long fuselage Wakefield was identified gliding in over the top of a row of trees. The air was extremely turbulent and reared the model up into a stall. From a height of over one hundred feet it then put its nose down and came straight in in a vertical dive…a remarkable demonstration of the poor stall-recovery characteristics of models with the centre of gravity aft of the trailing edge! --- I was more than surprised to find that the only damage resulting was that the wing pylon had sheared off the fuselage. The fuselage structure itself was virtually undamaged and the model was soon repaired and completed its third-round flight.

Later in the same article, at p.474, Warring assessed the top 16 competitors in the event, allocating a nominal 'still air' time for each model, and then checking actual times against the nominal time to see if

the models were affected by vertical air movement. Warring estimated that Montplaisir's model had a still air nominal time of 3 3/4 - 4 1/4 minutes, and suggested that the model received thermal assistance on the second flight, but encountered a down draft on the 3rd.

During 1953 Cliff again qualified for the U.S.A. Team, and flew at the Cranfield finals. Initially he intended to fly his 1952 design, but a premature undercarriage retraction led to a damaged prop, and he was forced to use his 1953 model for all official flights. A photograph of the 1952 model is shown at p.506 of the October 1953 *Aeromodeller.*

The 3-view of the model has been drawn up on CAD from Cliff Montplaisir's original drawings by Mike Glaister of the Victorian Free Flight Association of Australia.


WAKEFIELD TROPHY 1952

Part 2 - Cliff Montplaisir's 1953 Wakefield

In his article 'Technical Report on the Wakefield' in the October 1952 issue of *Model Aircraft*, Ron Warring commented that the most significant fact about the contest was that nine out of the first twelve models were geared.

Cliff Montplaisir obviously took this fact to heart, and allied it with his difficulty in handling his long 1952 Wakefield. His 1953 design was conceptualised on a flight from Richmond, Virginia to Chicago in January 1953. When completed, Cliff thought that the model looked attractive and had good proportions, utilising a shortened diamond fuselage with geared motors. Cliff had also switched to Pirelli rubber from Dunlop, using two 80-gram motors driving a 22" x 30" propeller. In his initial concept he had planned to use a Cheesman 30-1.25-12 wing aerofoil, but reverted to the Davis 5 section, as used on his 1952 model.

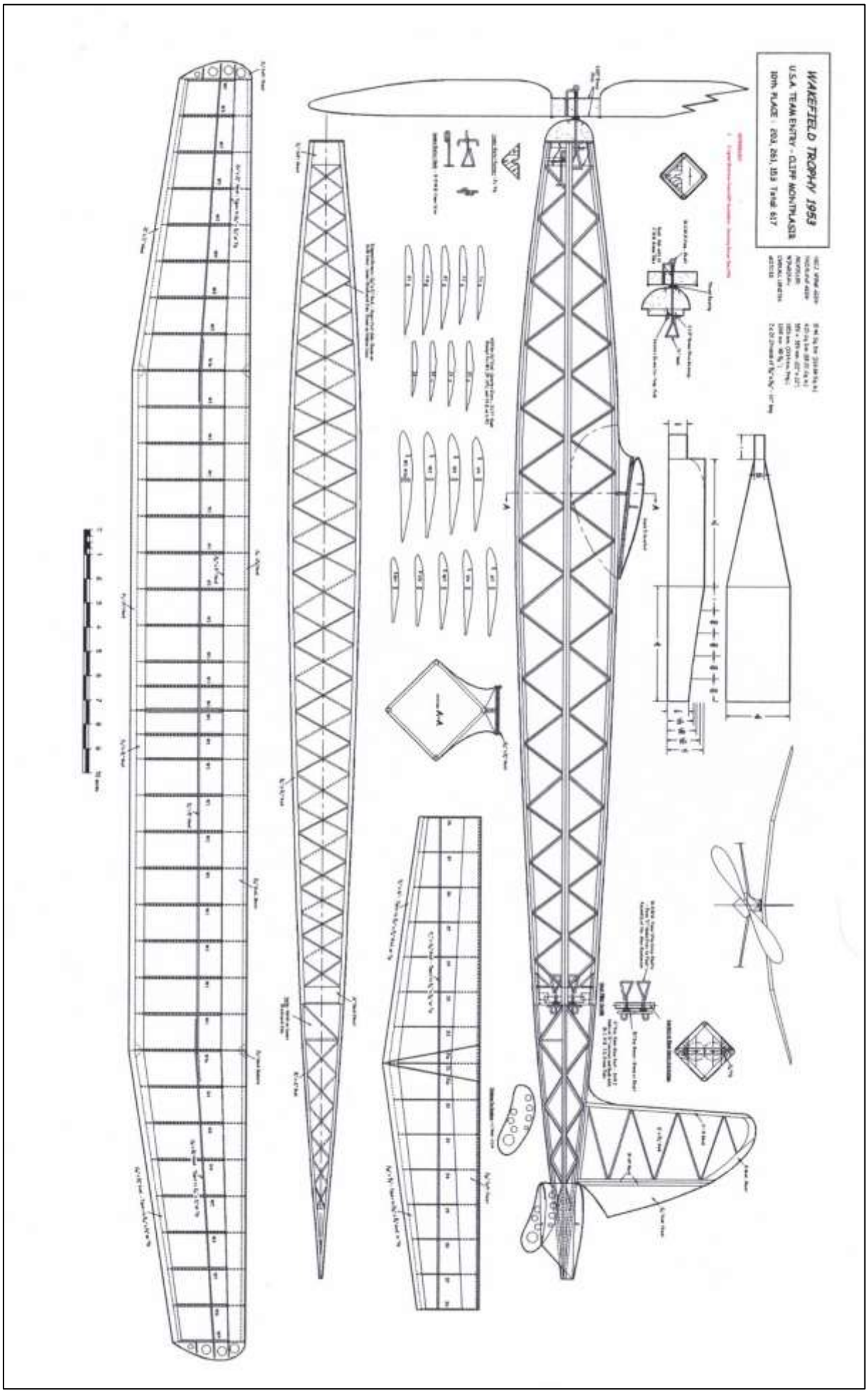
Getting the two powerful motors wound, without crushing something, was regarded as a job for a half dozen experienced hands! Cliff originally had trouble handling the high power, but a switch to a right-left flying pattern, zero incidence on the wing, with minus three degrees on the stab finally fixed the problem, and the model really performed. This trim was that employed by contemporary Californian Wakefield fliers such as Bilgri and Foster.

A breakdown of the weights for the model illustrates the quality of Cliff's construction as well as the materials to which he had access.

	Estimated	Actual
Wing	0.75	0.67
Fuselage	1.35	1.17
Gears	0.36	0.37
Tail	0.35	0.21
Propeller	0.80	0.85
Model Weight	3.61oz.	3.27oz.

At the 1953 Finals, held at Cranfield, Cliff placed 12th with flights of 5.00, 4.02, and 5.00 for an aggregate of 14.02. He formed part of the victorious United States team, with the other members being Joe Foster, George Reich and Carl Hermes.

With the change to an 80-gram rubber limit for the 1954 rules, Cliff never flew the 1953 model again. Mike Glaister of the Victorian Free Flight Society has drawn up the accompanying CAD 3-view from Cliff's original working drawings.


WAKEFIELD TROPHY 1959
U.S.A. TEAM ENTRY - CLIFF MONTPLASIR
10th PLACE - 201, 251, 183 Total 617

Carl Hermes 1953 (United States of America)

The magazine *Model Aircraft* used to run a regular monthly column by Bill Dean called 'Model Talk'. In this column, Dean, who was designing for Keilkraft at the time, used to cover models which he thought that his readership would find particularly interesting.

In the January 1954 issue at p.14 Dean opened 'Model Talk' with a feature on Carl Hermes' 1953 Wakefield 'The Method'. Hermes had flown the model at the Cranfield 1953 Finals, and the design had immediately attracted Dean. He was so impressed that he stayed up late on the eve of the contest and prepared a detailed 3-view. In what was an unusual approach for an American model, Hermes had employed geodetic flying services and a tapered vee-dihedralled wing. The fuselage was slabsided and a 22" x 22" Bilgri folding prop was fitted. Despite the model not performing to Dean's expectations in the contest, he was still convinced that Hermes had one of the best models at Cranfield. The contest flights were 2.25, 4.08 and 4.22 for an aggregate of 10.55 and 31st place.

The photograph of Hermes' model in 'Model Talk' made a lasting impression on me, and I developed a desire to obtain more information about the model. The January 1954 'Model Talk' was one of the last which Dean wrote for *Model Aircraft,* as shortly thereafter he emigrated to the United States of America, eventually setting up a bookselling business in New York, specialising in aviation books. In the late 1970's I wrote to him, enquiring if he retained any details of the Hermes' model. I received a very gracious response, but the shift to New York from England, combined with several changes of address in New York, meant that Dean did not retain any details of the model, and could not help me.

Disappointed, but not defeated, I cast around to see if I could locate Carl Hermes' address. At the time the magazine *Model Builder* was running a plan for his power design, the 'Hayseed' so I wrote to them to see if they could assist. Back came a response with Carl's address, so I was one step closer. In early 1981 I wrote to Carl, and he replied with a 3-view and accompanying letter. He did not retain any plans, but he did have the original templates for the ribs, with the rest coming from photographs and sketches. He also enjoyed the re-creation and felt that it was like building the model all over again.

The wing and tail were both difficult to build, with the ribs initially being 'roughed in', and carved to shape afterwards, while the spar notches were added later. The fuselage was designed for gears, but these were not used, and a straight, braided 14 strand motor was employed instead. The long motor caused problems, and Carl never did learn how to wind it without constant bunching. At the time Carl was living in Texas and nobody in Texas and Oklahoma, including such well-known modellers as Herb Kothe, Bob Dunham, Dave Kneeland and George Aldrich were employing gears. When Carl got to Cranfield and saw Joe Foster's model perform, he knew what he had been missing. Another point of differentiation was that Carl flew his model right/right, while Foster flew right/left.

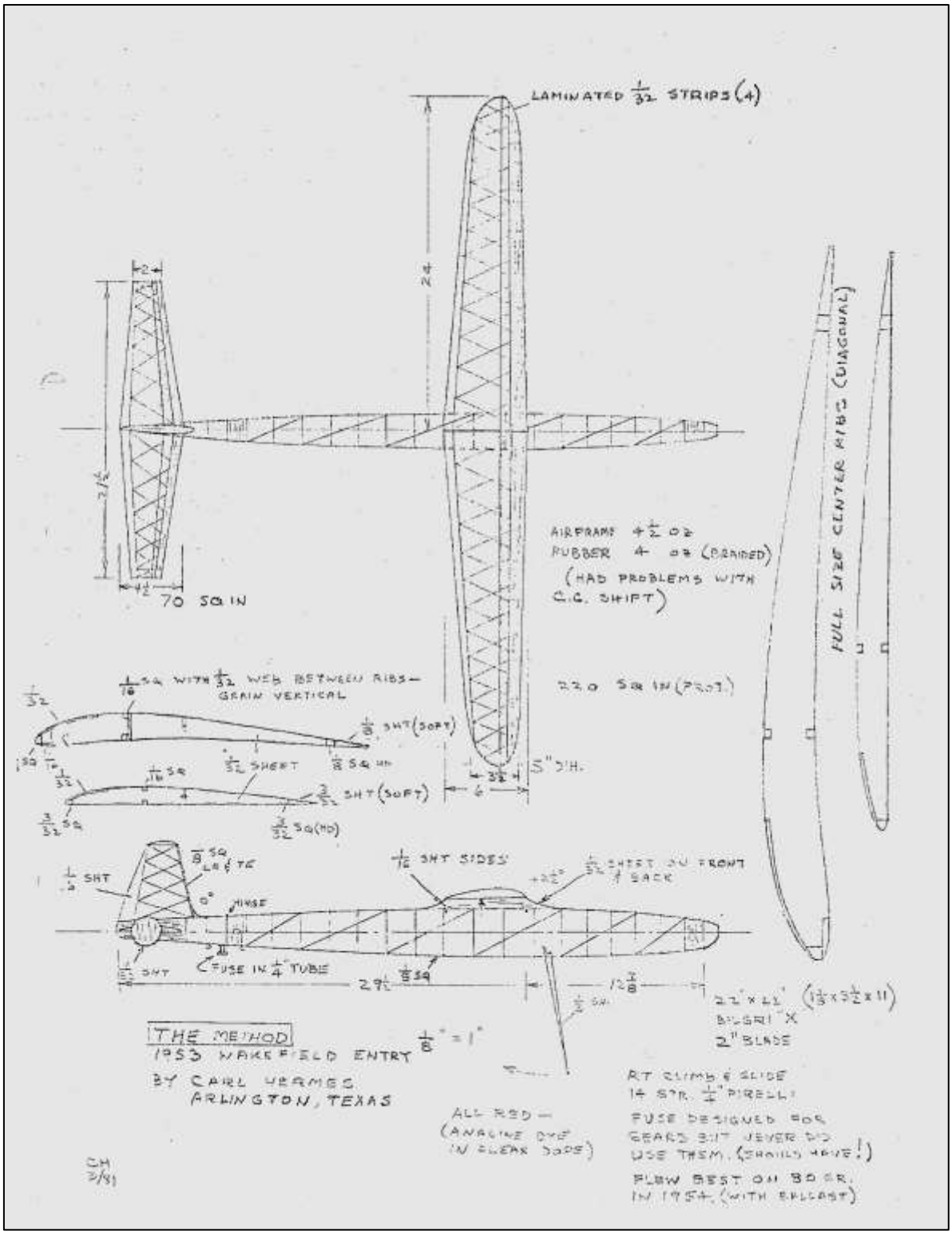
With the introduction of the 80-gram rubber maximum in 1954, Carl modified the model to the new rules by fitting an increased pitch prop (35 inches) and ballasting up to 8.2 ounces. The original airframe had weighed 4.5 ounces, so about 0.9 ounces of ballast was required. By contemporary American standards the model was heavy, as Foster's 1953 team model weighed only 3.25 ounces including gears. However, the quoted weight appears inconsistent with Carl's first 50-gram Wakefield described in the *1957-58 Frank Zaic Yearbook* at p.79, which had a structural weight of 3.64 ounces, and required 2.8 ounces of ballast to bring it up to the minimum weight requirement. In its modified condition the model flew very well and was lost in a Texas booming thermal during the 1954 Wakefield Trials.

The legacy of 'The Method' was reflected in Carl's later Wakefields. In the *1959-61 Frank Zaic Yearbook* at p.126, Carl's 50-gram Wakefield employed the same wing and tailplane layout, albeit with a sheet fuselage. By this time, he had reverted to straight ribs on the wing, but retained geodetic construction

for the tailplane. A subsequent version of this model, which employed a flapped wing, was published as a full-size plan in *Model Airplane News* as the ‘Olympia’.

Mike Glaister of the Victorian Free Flight Society has drawn up plans for ‘The Method’ in CAD, but no other sources exist currently.

Carl Hermes was a very capable modeller. He created a number of memorable models, particularly the ‘Hayseed’ and ‘The Method’, and represented the United States of America on both its Wakefield and Nordic teams.



George Reich (U.S.A.) 1953

Luck is always an element in a free flight contest, whether good or bad. How somebody reacts to luck can reveal the essential character of that person, and this was the case at the 1953 Wakefield Finals at Cranfield.

The person concerned was George Reich, a member of the United States team. After a straightforward maximum in the first round, disaster occurred in the second round. As the October 1953 *Aeromodeller* reported at p.597 'George Reich (U.S.A.) gave a wonderful show of sportsmanship when his airborne model disappeared behind an obstruction and he was clocked off at – as a glance at the watches showed – 4:59. This odd second later cost George a place in the fly-off, but his philosophical acceptance earned him friends for life.'

George did in fact max. during the third round, to end with an aggregate of 14:59 and eventual fourth place. A photograph of him, together with his model, appears on p.595 of the October 1953 *Aeromodeller.* This was the first occasion on which he had represented the United States of America at a Wakefield Finals, but he had been a successful competitor at American domestic contests since the late 1930's, flying as a member of the Cleveland Balsa Butchers club. Several of his designs had been published in the modelling press, with the perhaps best known being the 'Double Feature' in the June 1940 *Air Trails*, which was featured in two sizes, the smaller being a Class C Fuselage rubber model, which has proven extremely popular in SAM contests during recent years. The larger was a Wakefield size version, which has not been as popular. Another successful design was his power model 'Albatross', which has also been equally durable.

A common characteristic of George's designs was that they were straightforward and practical, without any unnecessary sophistication, and all the proportions tended towards a conservative approach. This was again illustrated in his first post-war Wakefield design in the April 1948 *Flying Models*.

George's 1953 model always interested me, and I eventually wrote to him in the late 1970's, to see if he retained any details of the model. I received a most gracious reply, handwritten in a neat script, together with an A5 size three view of the model. George did not retain any other plans, so I filed the three-view in the incomplete project file.

But in 2003 I attended the United States SAM Champs in Claremore, Oklahoma. One morning on the flying field, I was in a group discussion with a number of American modellers. As we spoke, one of the group said 'That's George Reich', as a slim figure strolled past us. Needless to say, I vacated the group, and walked over to George, introducing myself. We had a most enjoyable discussion for a few minutes before Jim O'Reilly, of Old Time Plans, and later a SAM President, joined us. The talk eventually came around to George's 1953 model, and Jim offered to draw it up in CAD, if George could supply any photographs to accompany my three-view. George later searched his archive, coming up with two excellent photographs, and produced some sketches of the model's details. From this chance discussion, and subsequent correspondence between Jim and George, Jim was able to produce full-size plan which is now in his plans service, together with an accompanying short kit.

The fuselage was of Warren girder construction and was relatively short because of the use of geared motors, being only 42" long. The wing and tailplane were of constant chord, with the latter being of a higher aspect ratio, as the chord was only 3". In contrast with contemporary Californian Wakefields, two under surface spars were employed on the wing, rather than the multi-spar approach favoured by Foster and Bilgri. Another difference was the 20" diameter double bladed folding propeller, with a pitch of 22", whereas the Californian models utilised a larger diameter.

The weight of the finished model was as follows:

Wing	0.70	
Tailplane	0.24	
Fuselage	1.40	
Propeller	0.94	
Gears	0.38	
	3.66	
Rubber	4.80	2 motors 14 strands 1/4” 28” long
	8.46 oz.	

When compared with Foster’s ‘Power/Weight’ (1953 winner) and Bilgri’s ‘Drifter’ (1952 finalist), each of which weighed 3.25 oz. and utilised 6oz. of rubber, George was more conservative, but produced a model that had an overall weight which was 3/4oz. less. On balance, there was probably not too much performance differential between the two approaches.

Because of my own involvement in the reincarnation of the design, I felt obliged to build my own version. This proved to be pure enjoyment, as the model was easy to trim, tractable and had an excellent performance. On full turns it could do five minutes with ease, so I was most impressed. It was also a practical design for a geared model. Many of the geared models from the 1950-53 era were tight for room at the nose and around the rear gear assembly, and very often it is not a simple proposition to use a winding tube. George’s 1953 design has ample room for a winding tube, allowing a reduction in one level of complexity.

George’s next team place was for the 1958 Wakefield Finals, which was held again at Cranfield. He placed 28th, with flights of 150, 161, 100, 180 and 73 seconds, for an aggregate of 664 seconds. Plans for this model, which was essentially the ‘Max Maker’, were published in the *1959-61 Frank Zaic Yearbook.*

However, his crowning achievement came at the 1961 Finals at Leutkirch. He won a three-person fly-off with a time of 210 seconds, and the warmth of the congratulations which he received more than made up for the disappointment of 1953. George was flying his ‘Max Maker’ which had been published as a full-size plan in the April 1961 *Model Airplane News.* He qualified for his final American team place in 1969, but an arm injury forced him to forego his position in favour of the first reserve, Frank Parmenter.

George married Doris Korda, the sister of Dick Korda, who won the Wakefield Trophy in 1939. This was the first and only instance of brothers in law winning the trophy. George died in 2008, at the age of 87.

Apart from George, the only other Wakefield winner to whom I have spoken has been Joe Foster. I met him at the 1993 World championships held at lost Hills. He retained fond memories of his 1953 winner, and contemplated the possibility of flying it again in Nostalgia events.

I had the opportunity to hold the Wakefield Trophy in 1993 at the World Championship Dinner at Bakersfield. The Trophy had been charged with a very pleasant Californian zinfandel, and as I sipped, I could only recall the words of Coleridge from *Kublai Khan,*

‘For he on honey-dew hath fed,
And drunk the milk of Paradise’.

5891 Rockport Lane
Fairview Park OH 44126
November 25, 2003

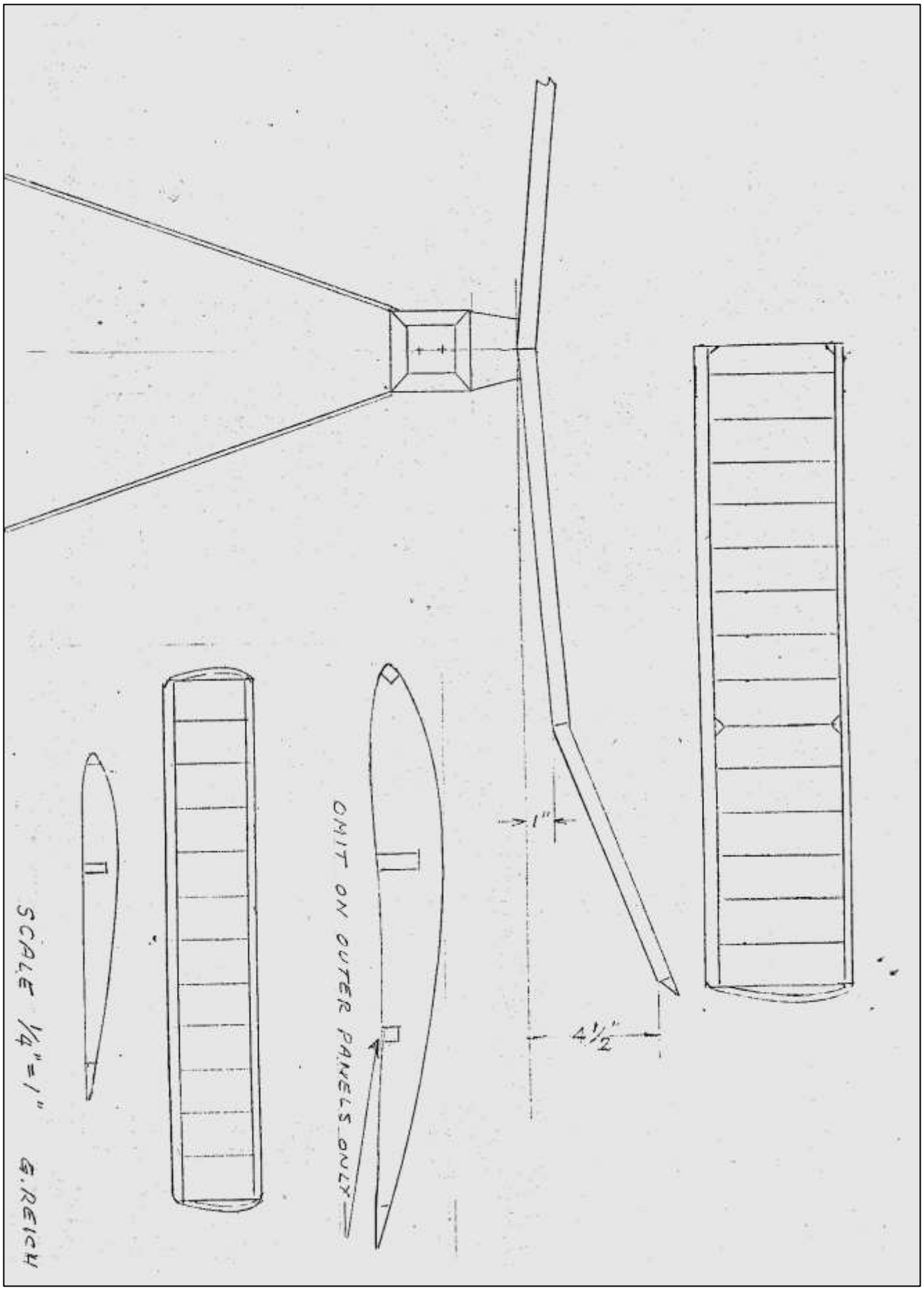
Dear Devon,

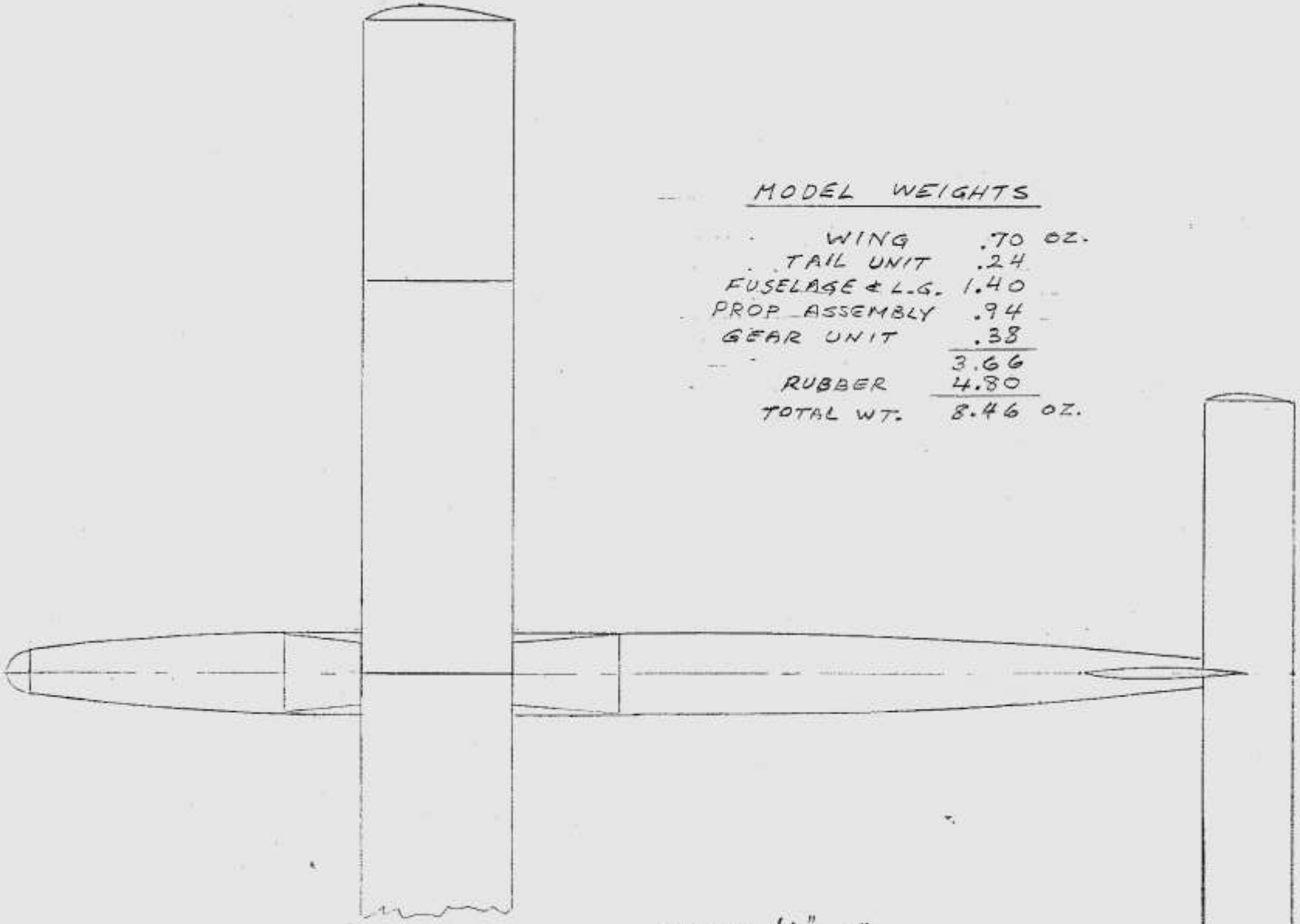
First of all I'm sorry we didn't talk in greater length at Claremore, especially about Wakefields that interest you.

At any rate, after researching my files in detail including information on test flying and construction from an old note book, I've come up with the sketches and pictures of my '53 Wakefield that are enclosed for you. The pictures really help a great deal to provide construction details. By the way, I'm sending this same information to Jim O'Reilly and it will be interesting to see what he does with it.

I hope you have a pleasant holiday season and a good year ahead!

Best regards,
George Reich


1"
4½"
OMIT ON OUTER PANELS ONLY
SCALE 1/4"=1"
G. REICH



MODEL WEIGHTS

WING	.70 OZ.
TAIL UNIT	.24
FUSELAGE & L.G.	1.40
PROP ASSEMBLY	.94
GEAR UNIT	.38
	3.66
RUBBER	4.80
TOTAL WT.	8.46 OZ.

SCALE 1/4" = 1"

G. REICH

E.W. Evans (England) 1953

In the twenty-year period from the mid-1930's to the mid-1980's, one of the best Wakefield flyers in England was E.W. (Ted) Evans. He had opened a model shop in Northampton in 1937, and although he had to close the operation when he served in the R.A.F. during the Second World War, on demobilisation he resumed business activities and active Wakefield flying. His first post-war design was the 'Jaguar', flown by Roy Chesterton to success at the Finals at Akron in 1948. The 'Jaguar' was followed by the relatively more conventional 'Clipper' in 1949, and then in 1950 came the 'Vansteed' which saw Evans on the Great Britain Wakefield Team for the first time. He placed second to Ellila of Finland at Jamijarvi, with an aggregate of 660 seconds, some 72 seconds behind the winner. All these designs had the common feature of a diamond fuselage, while the wings were of straight dihedral. Freewheelers were used at first, but the 'Vansteed' utilised a feathering propeller in a first for competitive purposes. After this came the 'Skylon', another diamond which used gears in conjunction with a feathering propeller, and placed 9th in the 1952 Wakefield Finals in Sweden with an aggregate of 10:21. This was Evans' second team place, and he again qualified in 1953 with a top placing and a perfect score at the Trials held at Digby on 7 June 1953.

He flew his latest design, which was never named, and which continued the development trend he had followed since the war. The fuselage was a diamond, with the wing set on a low pylon. Straight dihedral continued to be employed, combined with a single fin, but there were two developments which Evans had not employed before. First was a freewheeling / folding propeller, which was combined with a retracting undercarriage actuated by the propeller fold.

Evans employed almost every device possible to reduce weight, resulting in a model which could cope with flight loads, but was locally fragile to accidents. In the fuselage Evans used diagonal longerons of 1.5mm x 4.5mm, together with spacers of only 1.5mm x 1.5mm. All ribs, whether in the wing, tailplane or fin carried lightening holes, which reduced the weight of the 1mm sheet used for these components. There was no separate leading edge to the wing, and the leading edge comprised the junction of .8mm sheets on the top and lower rib surfaces. To make the ribs as stiff as possible, Evans employed hard quarter grain sheet, and also used hard grade for the longerons and spacers.

The basic fuselage was 1250mm long, with a maximum cross-section of 60mm x 40mm. Average pitch of the spacers was 45mm, with diagonal bracing being employed for strength in the front six sections. The pylon was 30mm high at the leading edge, and set at 4 degrees of incidence. All the pylon formers were built up from 1.5mm x 1.5mm strips. Aft of the pylon, cotton cross-bracing was employed back to the rear motor anchorage.

Forward of the pylon, the fuselage shape changed from a square to a hexagon. The objective was to form a channel into which the undercarriage leg could retract. This leg was made of 1.5mm x 3mm strip, and the sides were covered with 0.8mm ply. The leg was held down while the propeller rotated, but propeller fold initiated a trigger on the exterior of the nose which allowed the undercarriage to retract. The front fuselage would have been a nightmare to build, with the shape constantly changing and assembly in the air from 1.5mm x 1.5mm strips being required, coupled with the fitting and adjustment of the retracting leg system. There must have been a high potential for disaster, but with scrupulous attention to detail, Evans made it work.

The rear of the fuselage was detachable, and was Located by three pins. It was rubber loaded with a dual purpose in mind – first to hold the tailplane assembly in position, and second to tip the tailplane for D/T actuation.

By contrast with the fuselage, the wing was relatively straightforward. In planform it echoed Evans earlier 'Clipper' and 'Vansteed', with a constant chord Inner section, and blunted curved tips. Span was 1197 mm, while the constant inner chord was 125mm. Straight dihedral was 120mm. Ribs were pitched at 27mm. There were four upper surface spars of 1.5mm x 1.5mm, spaced equally to 35% chord, and a single 1.5mm x 1.5mm lower surface spar located under the rear top spar. All spars were of hard balsa. Diagonal spacers of 1.5mm x 1.5mm joined the two rear spars, while the rigidity was enhanced by vertical braces of 3.0mm x 0.8mm situated midway between each rib. The trailing edge was 2mm x

10mm of hard stock. While the wing was held on by rubber bands attached to pylon hooks, wire wing struts were also used. These struts were anchored to the fuselage with rubber bands. The name of the wing section was not specified, but it could have been based on the Benedek series which Evans had utilised previously.

The tailplane was straightforward, and featured a slight taper on both the leading and trailing edges. Total span was 468mm, with the centre chord being 102mm and the tip chord 89mm. Ribs were pitched at 30mm.The leading edge was 3.5mm x 5mm hard and the trailing edge 2.5mm x 6mm medium hard. There were two spars of 1.5mm x 1.5mm hard at one-third chord, which were joined by 0.8mm x 1.5mm vertical braces located midway between each rib.

The fin and underfin were of the same basic structure as the tailplane, with the entire upper fin being offset to supply a right turn. Located in the lower fin were two 0.56mm wire skids, 40mm apart, to supply the second and third points for the R.O.G. requirement.

The double-bladed folding propeller was 610mm diameter x 1000mm pitch, and was carved from a 50mm x 38mm block. While the noseblock was solid balsa, it featured on the rear face an adjustable 1mm ply guide, on which sidethrust could be altered against a scale marked on the back of the noseblock. On the front of the noseblock was a laminated ply propeller fold cam, and a 0.71mm locking wire. The propeller fold system required the propeller to freewheel for one or two revolutions, while the latch pin was rotated into a position where it followed the ply cam until it contacted the 0.71mm wire, and latched between the wire and the bottom surface of the cam.

All of this was powered by 20 strands of 4mm x1mm Dunlop, 1400mm long. Because of the freewheel / fold system, it was necessary for the motor to be corded.

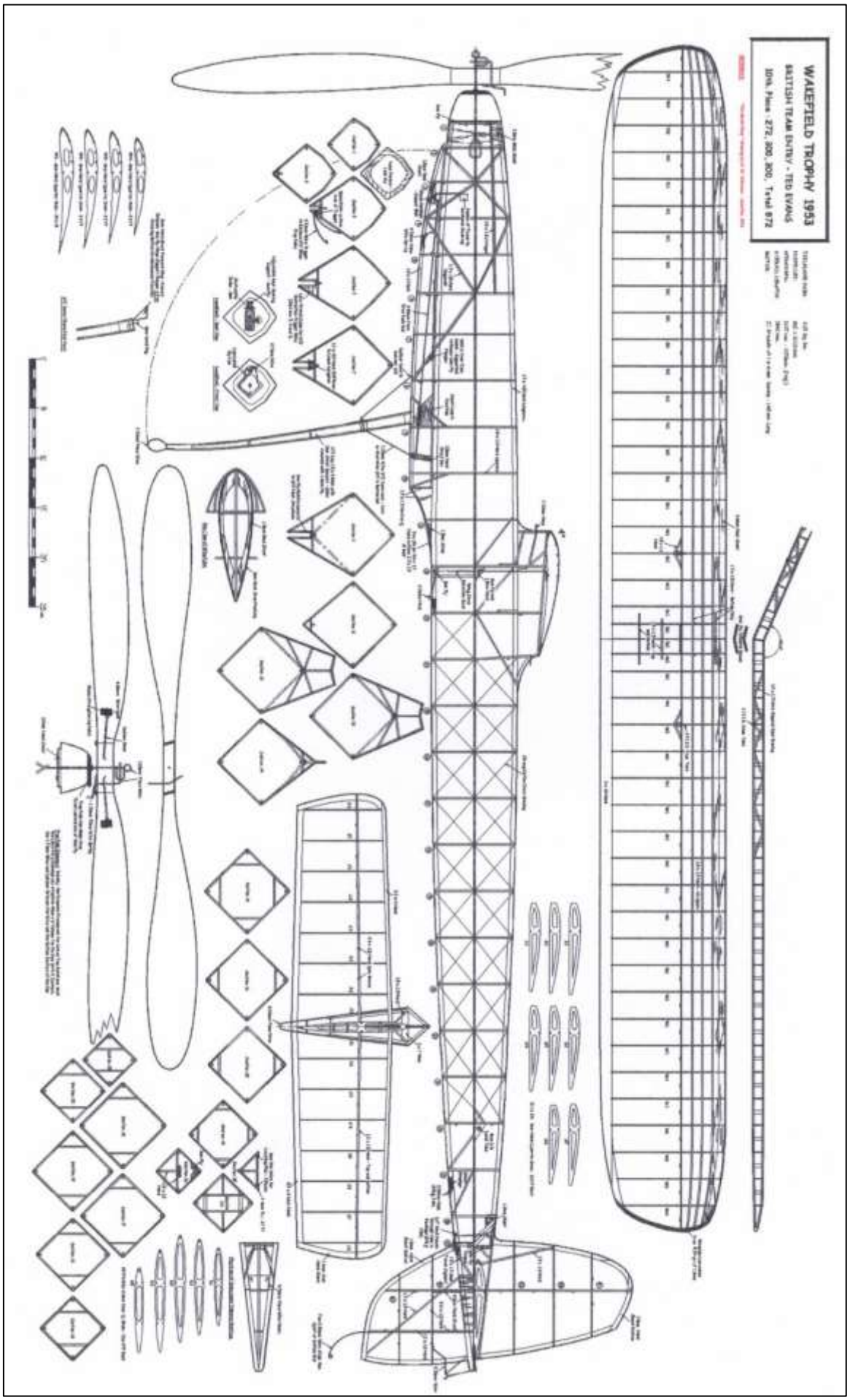
No balance point was indicated on the plan.

At the 1953 Finals Evans recorded flights of 4:32, 5:00 and 5:00 for an aggregate of 14:32 and 10th place. The October 1953 *Aeromodeller* report at p.594 stated that ‘the model was clocked off at 4:32, while still at a good height, by the very honest and conscientious timekeepers. Unfortunately, the machine was well in sight of many spectators, and was seen to D/T at exactly 5:00 while still a hundred feet or so up’. The model was covered in white and orange tissue, which was not a high visibility scheme, and could well have contributed to the timekeepers experiencing difficulties.

Although plans for this design have been available for some 30 years, I have never seen any references to a modern replica having been built. This does not surprise me, as the constructional requirements are complex, and the model would be fragile to handle. However, the performance would be superb.

With the changing of the rules in 1954 to restrict the maximum rubber allowance to 80 grams, Evans produced another magnificent design which featured a streamlined sheet fuselage, but he did not qualify for the Wakefield Finals, and after this time lost interest in Wakefield models. But his positions of 2nd, 9th and 10th from the three Finals in which he competed, indicate that he was of the highest standard.

The attached plan is a CAD drawing produced by Mike Glaister, but full-size plans are still available from The Model Shop in Northampton. They also hold plans for other Evans’ Wakefields, including the ‘Victrace’, ‘Jaguar’, ‘Clipper’ and ‘Vansteed’. No plans have been drawn for the ‘Skylon’ or the 1954 design, the models for which still exist. It would be wonderful if a permanent record for these two historic designs could be created.


WAKEFIELD TROPHY 1953
BRITISH TEAM ENTRY - TED EVANS
10th. Place - 272, 200, 200, Total 672

Alan King 1959

Alan King of Australia won the Wakefield Trophy in 1954 at Long Island, N.Y. with a perfect score of 900 seconds. In earlier years he had placed high in several Australian Nationals flying his 'Flying Pencil' power models, and at Long Island he also placed 5th in the F.N.A. Power Championship flown a day earlier than the Wakefield event. King's Wakefield winner was a conventional design based around a diamond fuselage with the wing mounted on a wire parasol; a parallel chord tailplane with geodetic construction, and twin fins. A single bladed folder was employed.

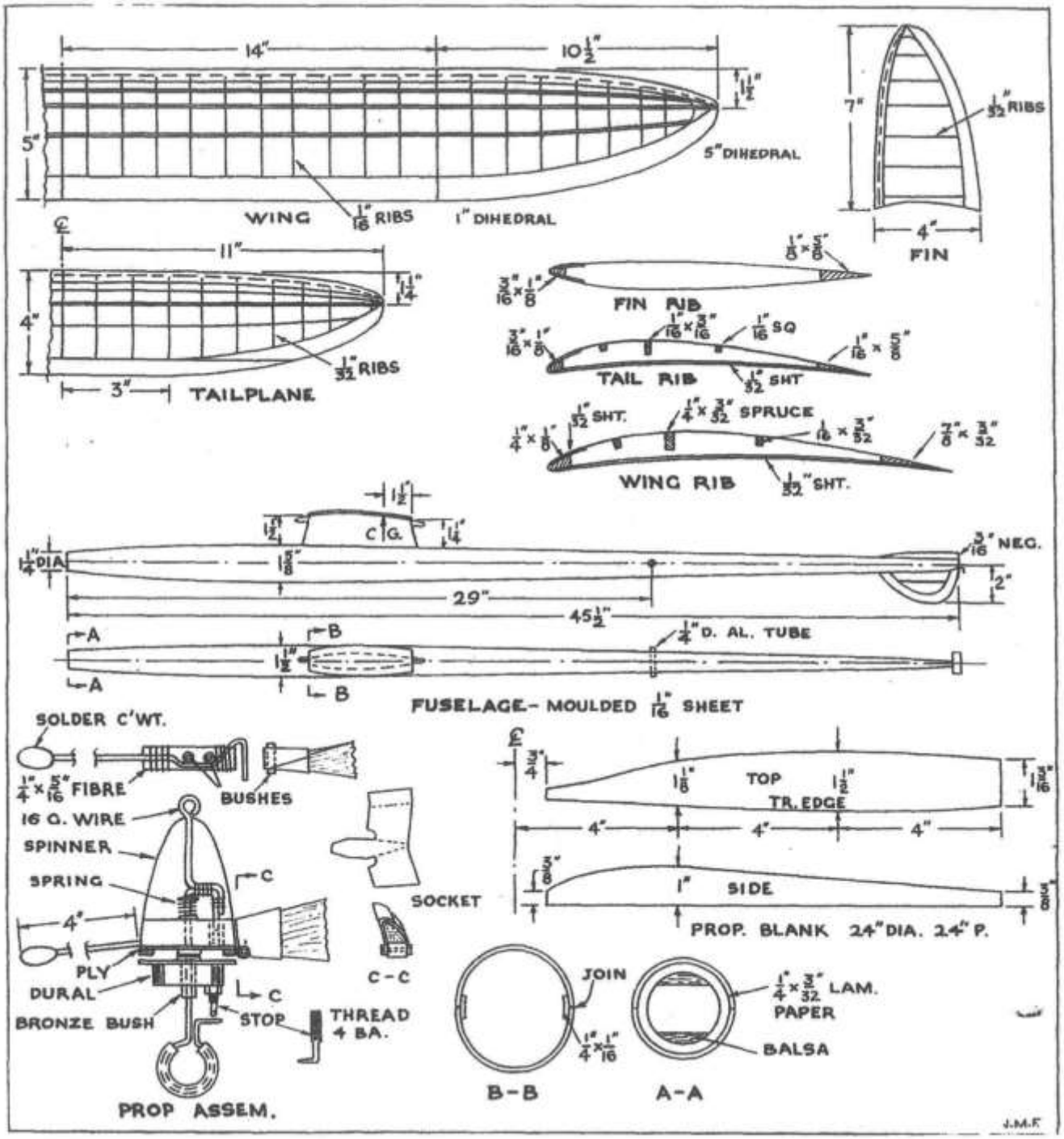
King continued to develop his design in collaboration with Bond Baker, another Australian modeller, who went on to win the 1958 Wakefield contest at Cranfield, flying his 'Woomera' design. The 'Woomera' used the same basic approach as King's 1954 model, with the wing being mounted above the fuselage on a wire parasol, and a twin fin tailplane was employed, together with a single bladed propeller. However, the fuselage was completely different, being constructed of 1/16" sheet balsa on a mould. This mould was half the depth of the finished fuselage, and was shaped from straight grained pine with a flat underside. The two fuselage half shells were made from flexible, straight grained balsa, which were soaked in boiling water, then taped around the mould and left to dry. After drying, the two half shells were joined horizontally with an internal 1/4" x 1/32" strip.

In 1959 King used the mould as the basis for his new design. The parasol wing mount was abandoned for a built-up pylon. A similar single bladed propeller of 24" diameter and 24" pitch was used, probably to the same block dimensions as the 'Woomera'. Jim Fullarton writing in *Aircraft,* described King as a relentless perfectionist for whom nothing was too much trouble in order to obtain the desired effect. As an illustration of this, the wing and tail were both assembled on a special board, contoured to match the underside of the aerofoil, and in the case of the wing, joined in segments to the correct dihedral. The underside of both the wing and tail were covered with light 1/32" sheet which was first pinned down to the board, and then the ribs and spars were assembled on top of the sheet.

A long, thin motor of 11 strands 1/4" x 1/24" Pirelli rubber was used, which gave a 70 second motor run. This enabled the model to record four maximums at the 1959 Wakefield Finals, and only damage caused by breaking rubber prevented a probable fly-off place.

Alan King died in early 1961, and this model was his last Wakefield. It was featured in the Australian magazine *Aircraft,* December 1961, with a construction article and plan from Jim Fullarton.

There was a sequel to this story. Alan was married to a New Zealander, and after his death, his widow returned to her family in New Zealand. As part of the transfer, in late 1964 a model box containing the last of Alan's models was shipped to Wellington, and local modellers had the opportunity to inspect the contents. Alan's last Wakefield was included, and I can confirm that the workmanship on the model was absolutely superb. The propeller was a surprise, with the blade being extremely flexible, no doubt contributing to the extended motor run. After the inspection of the models, the box was delivered to Alan's widow.


14"
10½"
5"
5" DIHEDRAL
WING
1/16" RIBS
1" DIHEDRAL
7"
1/32" RIBS
4"
FIN
11"
4"
3"
TAILPLANE
1/32" RIBS
FIN RIB
TAIL RIB
1/32" SHT
WING RIB
1/32" SHT.
1/4" x 3/32" SPRUCE
1/32" SHT.
C.G.
1¼" DIA
1⅝"
29"
45½"
3/16" NEG.
2"
1/4" D. AL. TUBE
FUSELAGE- MOULDED 1/16" SHEET
SOLDER C'WT.
1/4" x 5/16" FIBRE
BUSHES
16 G. WIRE
SPINNER
SPRING
4"
PLY
DURAL
BRONZE BUSH
STOP
THREAD 4 BA.
PROP ASSEM.
SOCKET
C-C
TOP
TR. EDGE
SIDE
PROP. BLANK 24" DIA. 24" P.
JOIN
1/4" x 1/16"
B-B
1/4" x 3/32" LAM.
PAPER
BALSA
A-A
J.M.F.

Bob Dunham (U.S.A.) – 1954

One of the better-known rubber fliers in the United States during the 1940's and 1950's was Bob Dunham of Tulsa, Oklahoma, and a member of the Tulsa Glue Dobbers. He had a number of published designs, including the 'Pogo Stick' (*Model Airplane News* July 1951), and the 'All American' (*Air Trails Annual 1952*), as well as three views of various designs published in *Air Trails* and *Frank Zaic Yearbooks.*

In 1953 he developed a design using gears with twin motors weighing 4oz in total, which placed high in a number of competitions. With the change in 1954 to a maximum of 80 grams for the rubber weight allowance, Dunham retained the gears but reduced the rubber to the new maximum level. Each motor became 18 strands of 3/16" x 1/30" TRL 23" long before breaking in.

Performance remained high and he placed first in the 1954 Wakefield Eliminations with 14:30 aggregate, then first again in the Semi-Finals with a perfect 15:00 aggregate. In the Wakefield Finals held on Long Island, NY on 26 July 1954, Dunham placed fifth with an aggregate of 835 seconds. His flights showed a progressive improvement with a sequence of 120, 175, 180, 180 and 180 seconds.

In the *Aeromodeller* report on the Finals (October 1954, p.522) Dunham's model is described as 'a simple slab high-wing with twin fins', but this was not quite correct as the *Aeromodeller* correspondent confused the relatively large tailplane tip fins with twin fins. Dunham had only the one model which he flew in all Wakefield events in 1953 and 1954.

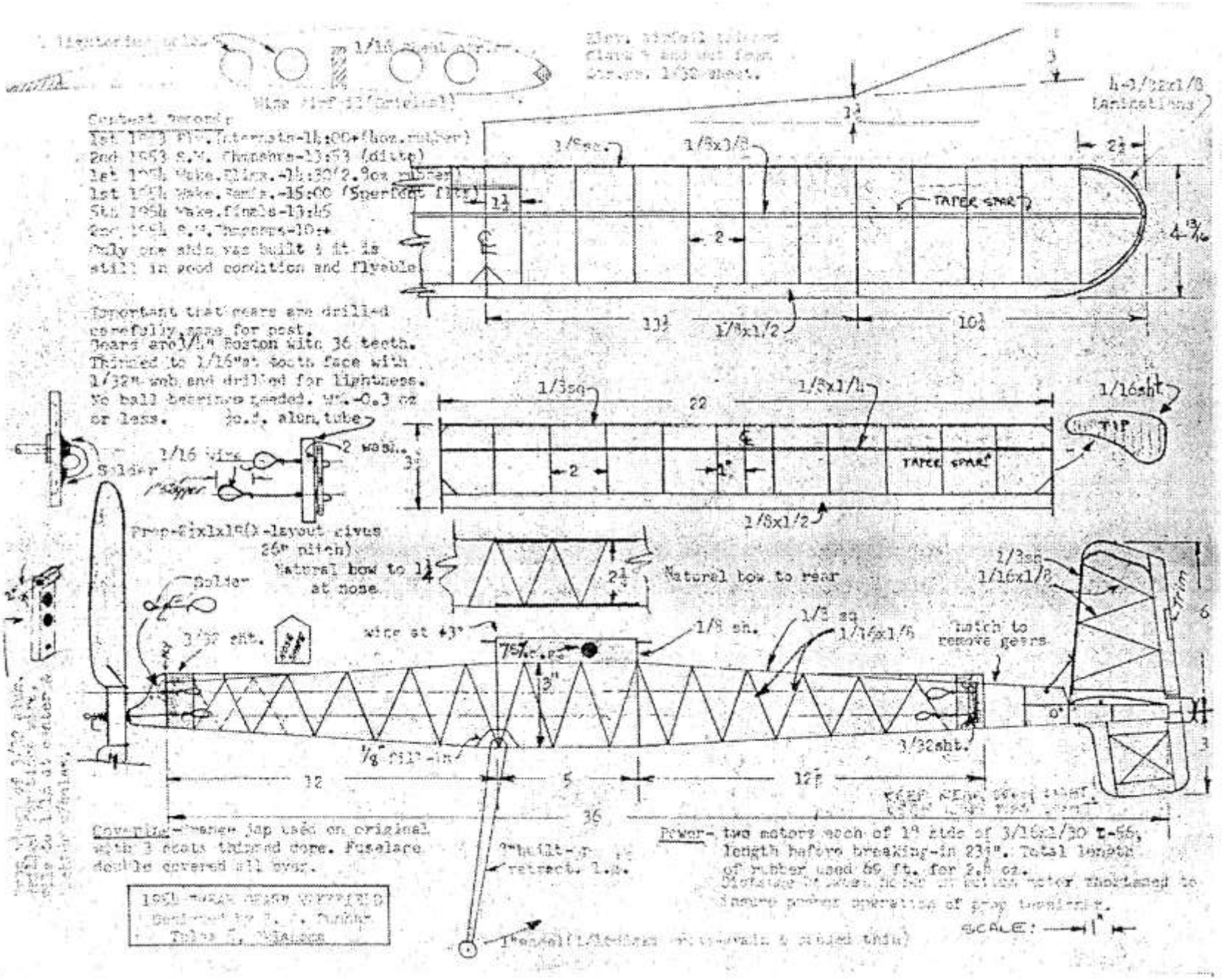
Remnants of the 'Pogo Stick' approach can be seen in the 1953/4 Wakefield, with an almost identical wing and tailplane shape and structure being employed. The wing section was original, with 1/16" sheet ribs, in which four circular holes of 1/4" diameter were cut for lightening purposes. Tips were wound from 1/32" x 1/8" laminations, rather than built up from sheet. A single tapering spar on the lower surface was used. With the tailplane, a Clark Y type section was employed, in conjunction with 1/32" ribs. The 1/16" sheet tip fins were larger than the 'Pogo Stick', and not symmetrical in shape, but it is difficult to envisage their being used to supply a third point for ROG purposes unless a wing low attitude was adopted for take-off.

The fuselage was rectangular in cross section, and utilised Warren girder construction for maximum stiffness. Longerons were 1/8" x 1/8", used in conjunction with 1/8" x 1/16" spacers. A low wing pylon of 1/8" sheet, and the built-up undercarriage leg, were pure Bilgri, as was the adoption of diagonal construction on the single fin, which combined with a large underfin. A 75% balance point was used, which dictated the placement of the wing pylon. At 36" long, the fuselage was significantly shorter than the contemporary Californian geared Wakefields of Bilgri and Foster, but Dunham used proportionately less rubber in his approach.

A double-bladed folding propeller was employed, carved from a 2 1/4" x 1" x 18" block with an X-layout to give 26" pitch. The gears were 3/4" diameter with 36 teeth, and were mounted on a 1/4" O.D. aluminium tube with a total assembled weight of .3oz.

Covering was orange Jap tissue, with the fuselage being double covered.

Apart from the gears, Dunham's approach was very conventional, and undoubtedly resulted in a stable, good performing model. His was not the only geared model flown at the 1954 Finals, as Blomgren (1952 Winner) and Baxter (USA) also flew examples.


Contest Records
Only one ship was built & it is still in good condition and flyable
Important that gears are drilled carefully, gear for post.
Gears are 1/4" Boston with 36 teeth. Trimmed to 1/16" at both face with 1/32" web and drilled for lightness. No ball bearings needed. Wt.-0.3 oz or less.
TAPER SPAR
TIP
1/16sht
Natural bow to rear
Natural bow to 1 1/4 at nose
Prop-6ix1x16(-layout gives 26" pitch)
Solder
3/32 sht.
wire at 43°
1/8 sh.
Catch to remove gears
3/32sht.
Covering-Chinese jap used on original with 3 coats thinned dope. Fuselage double covered all over.
Power- two motors each of 19 side of 3/16x1/30 T-66, length before breaking-in 23 1/2". Total length of rubber used 66 ft. for 2.8 oz.
SCALE:

Arne Blomgren (Sweden) 1954

After winning the 1952 Wakefield Trophy, Blomgren employed the same model again at the 1953 Wakefield Finals. His flights were 5.00, 4.40 and 5.00 for an aggregate of 14.40 and 7th place.

For 1954 the Wakefield specification was again changed, and an 80 gram rubber weight restriction was introduced. This requirement dictated a fresh approach, and Blomgren came up with a new design.The 1954 design obviously exhibited the heritage of its predecessors, but incorporated a number of detailed changes.

Perhaps the most significant decision was the retention of return gears. Each motor was a maximum of 40 grams, with a distance of 520mm between hooks. However, the total fuselage length was 1100mm, which meant that the tail boom aft of the rear motor anchorage was relatively long, at 480mm. The fuselage was a rectangular slabsider back to the gear mounting, and featured a removeable tail boom. In the motor section, longerons were 4 x 4mm, and the spacers 4 X 2mm, pitched at 40mm. With the abolition of the fuselage cross-section requirement, the maximum cross-section was only 75 X 50mm. In the tailboom, longerons were 3 x3mm, with the spacers also reduced to 3 X 1.5mm. Another weight reduction feature was the changing of the shape from a rectangular section to triangular at the tail, with the two lower longerons being joined for the rear 160mm. The wing was rubber banded to the top of the fuselage, sitting on two balsa rails which were tapered to set the wing incidence. Because the ROG requirement still applied, twin 1.5mm wire legs plugged into aluminium tubes located in the fuselage, and terminated with 35mm wheels. The gears were mounted in a 12mm Durval tube, in which holes had been drilled for lightening purposes.

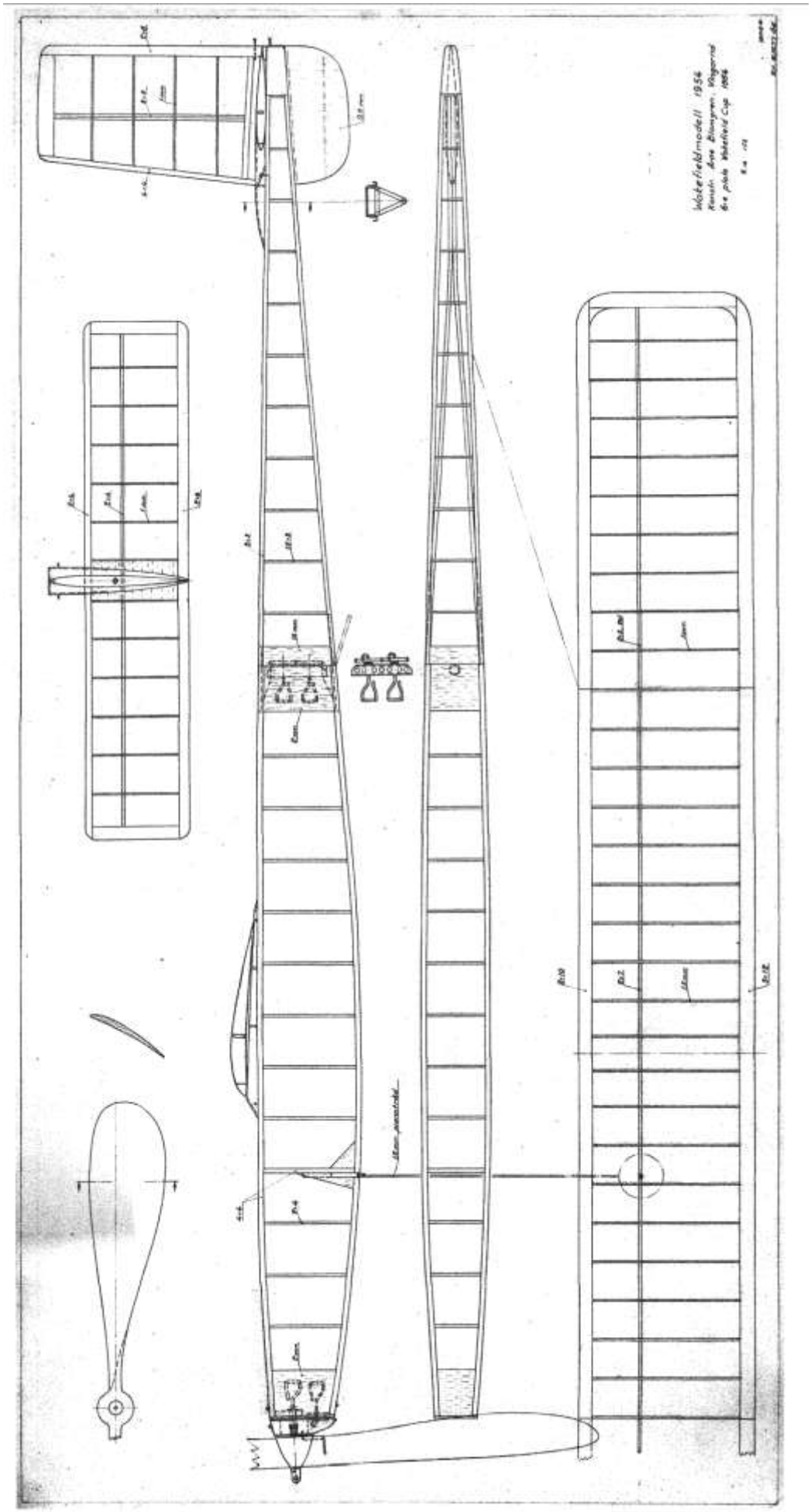
Blomgren used the same wing platform as on his 1952 design, but extended the span slightly while retaining the same chord. Span was increased by 80mm, while the flat centre section was deleted, with the dihedral retained at the same amount, notwithstanding the additional span. The same wing section was retained, with 1.00mm ribs, but in place of the two internal 2 x3mm spars, a single internal spar of 2 x7mm was substituted.

With the increased wing area, coupled with the longer tail moment, tailplane size was reduced. The twin spars replaced by a single internal spar of 2 x3mm. Ribs were again of 1.0mm sheet, but the 1952 flat bottomed section was replaced by a symmetrical section.

A single fin, together with underfin, was retained, with the two spars of the upper fin being replaced by a single spar of 3 x3mm set on the diagonal. The lower fin had no spars and was made of .8mm sheet, with two ribs, reminiscent of his 1950 collaborative design with Rune Andersson, the Tempo.

Blomgren retained his freewheeling propeller, which appeared to be identical with that used in the 1952 model. No mention is made on the plan of the motor size, and it could well have been the 14 strands of 6.00mm rubber used in the 1952 model.

At the 1954 Wakefield Finals held on Long Island, New York, Blomgren had flights of 180, 146, 180, 128 and 180 for an aggregate of 814 seconds and 6th place. A photograph of the model is on p.522 of the October 1954 *Aeromodeller.* This was Blomgren's last foray into international competition.


Wakefieldmodell 1954
Konstr. Arne Blomgren, Vingerna
Ex pilot Wakefield Cup 1954

Henry Cole 1955 – HC8

One of the best-known rubber modellers in the United States of America since the 1940's has been Henry Cole. Henry or 'Hank' has been a member of the Oakland Cloud Dusters and had his first published design in *Model Airplane News* in May 1941. This was the 36" span 'Stratosphere', which featured a streamlined fuselage, fairing into a spinner, with a double-bladed folding propeller, and a polyhedral wing. The design was claimed to have a very good climb which led to the name of the model. The plan was later re-drawn full size, and published in the July 1980 issue of *Model Builder* magazine.

Some two years later Cole produced a successor design which was published in *Air Trails* as the 'Smoothie'. The 'Smoothie' was a larger model than the 'Stratosphere', being of approximately Wakefield size, but followed the same general design philosophy. It had a streamlined fuselage faired into a spinner, but straight dihedral was employed instead of polyhedral, and twin fins were set at the ends of the tailplane. The tailplane itself was larger than the 33 1/3% allowance in the contemporary Wakefield formula. Although the design was published in the middle of the Second World War, it was recognised as having considerable potential, and a number were built for Old-Time competition in the U.K. during the 1960's and 1970's. Jim O'Reilly in his Old Time Plan Service has re-drawn the plan full size, and a short kit is available to complement the plan.

Segue forward another ten years, and Hank's first published Wakefield design was the 'O-SO-LONG' Wakefield in *Air Trails.* Hank was an aeronautical engineer, and always applied creative thought to his designs, so that when the 1951 Wakefield rules replaced the $L^2/100$ formula with a fixed fuselage minimum cross section, he came up with an elegant approach. Whereas the $L^2/100$ formula had tended to restrict fuselage length, there were now no such constraints and Hank produced a fuselage that was 66" long, which resulted in a balance point some 2" aft of the trailing edge. When combined with a long rubber motor, performance was excellent and resulted in Hank winning the United States Nationals Wakefield event in 1951.

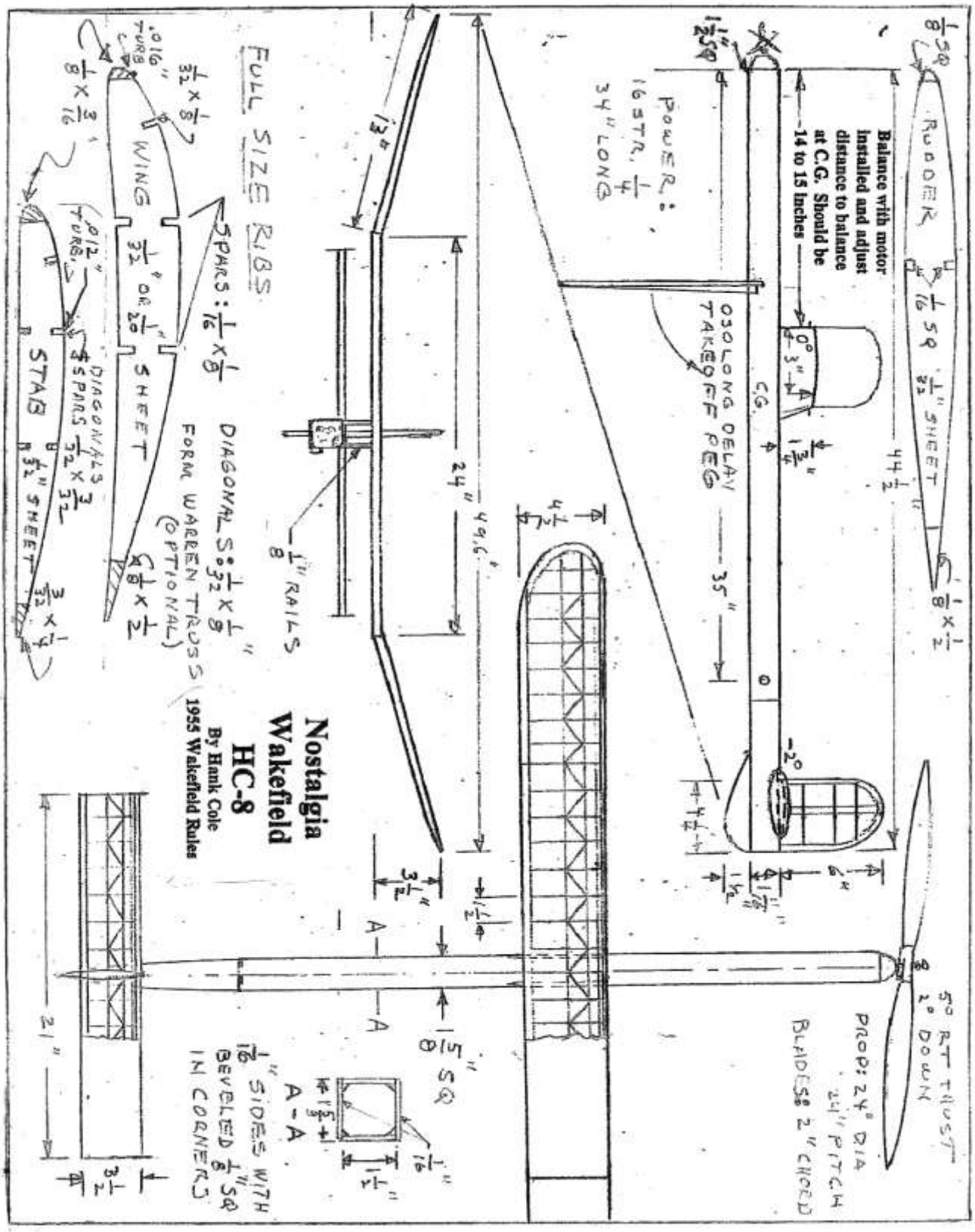
This success saw *Air Trails* purchase the rights to the design and to publish the plan in their March 1952 issue, pp.39-41. Hank did not have the opportunity to check the plan before publication, and there were a number of errors in the published version. Chief of these was the placing of the two wing spars on the top surface of the aerofoil section, whereas the correct placement was below the top surface as the spars were completely inset.

When the 'O-SO-LONG' was first flown by Hank in Californian contests, fellow Cloud Dusters members quickly saw the potential in the design. First off the mark was Joe Bilgri, who produced his equally potent 'Duster' within about three weeks. He was followed shortly after by Joe Foster, who placed in the United States Wakefield team flying his equally long model.

Hank continued with long fuselage models for another two years, while Bilgri and Foster adopted a geared approach with a shorter and less fragile model. Even Hank admitted that the carnage rate with long models was horrendous, particularly with a ROG requirement on windy days. He used to demolish models with alarming frequency, and this was used as an opportunity to test various design approaches. While a single-bladed folder was drawn on the published plan for the 'O-SO-LONG', Hank used other propellers, and regularly flew with a double-bladed folding propeller as his preferred option.

Plans for the 'O-SO-LONG', together with a short kit, have been reissued by Jim O'Reilly. With its extreme dimensions, a considerable quantity of balsa is used in the design, and it is critical that careful selection of materials is carried out, or the model will be overweight. However, practicality still has to be considered against performance, and Hank thought that a 4 oz. structure was a good balance, although he could build them lighter. His Nationals winner weighed 4 1/2oz, but he had built versions down to 3 1/2 oz.

With the introduction of a maximum 80 grams rubber weight in 1954, the ‘long’ Wakefield concept exemplified by the ‘O-SO-LONG’ became obsolete. Hank’s approach to the new rules was quite conservative although his ‘HC8’ showed traces of its ‘O-SO-LONG’ ancestry. Perhaps its greatest claim to fame was that Hank employed the same 24”x 24” propeller used on the ‘O-SO-LONG’.



Alan Barnes (New Zealand) - 1955

Gustav Samann's comprehensive victory in the 1955 Wakefield Finals undoubtedly created an incentive for other modellers to follow his approach. One of these modellers was Alan Barnes, who created his own version of Samann's model 'Hornisse', which he flew successfully over a number of years and allowed him to compete in the 1958 Wakefield Finals.

A three-view of 'Hornisse' appeared at p.631 of the December 1955 *Aeromodeller* , and subsequently a plan was published in the March 1957 issue of *Model Airplane News.* This plan was extremely detailed, and a not unreasonable assumption would infer that it was submitted for inclusion in the *Model Airplane News* full size plan service, which did not happen. A similar situation occurred with Mike Gaster's 1955 power winner 'Gastove', but Lindner's 1955 A2 winner 'Spinne', did make the plans service. Probably commercial considerations were the determinant.

Barnes probably used the *Model Airplane News* plans for inspiration, as prior three-views did not offer the detail of this later plan. In general, he adhered to the 'Hornisse' dimensions, but made structural changes, and converted the wing from straight dihedral to polyhedral.

The fuselage was identical to 'Hornisse' in length and cross-section, but instead of sheet construction, Barnes used a built-up approach. Longerons and spacers were 1/8" x 1/8", with a Warren girder structure being adopted for the sides. These sides were joined by a mixture of straight and diagonal spacers. After assembly, the fuselage was covered completely with 1/32" sheet. A small built-up pylon located the wing position in a similar manner to 'Hornisse', but the structure was different. However, the fin and underfin were identical in all respects – shape, size and construction. The same applied to the early versions which required an undercarriage, for which the 'Hornisse' details were again utilised.

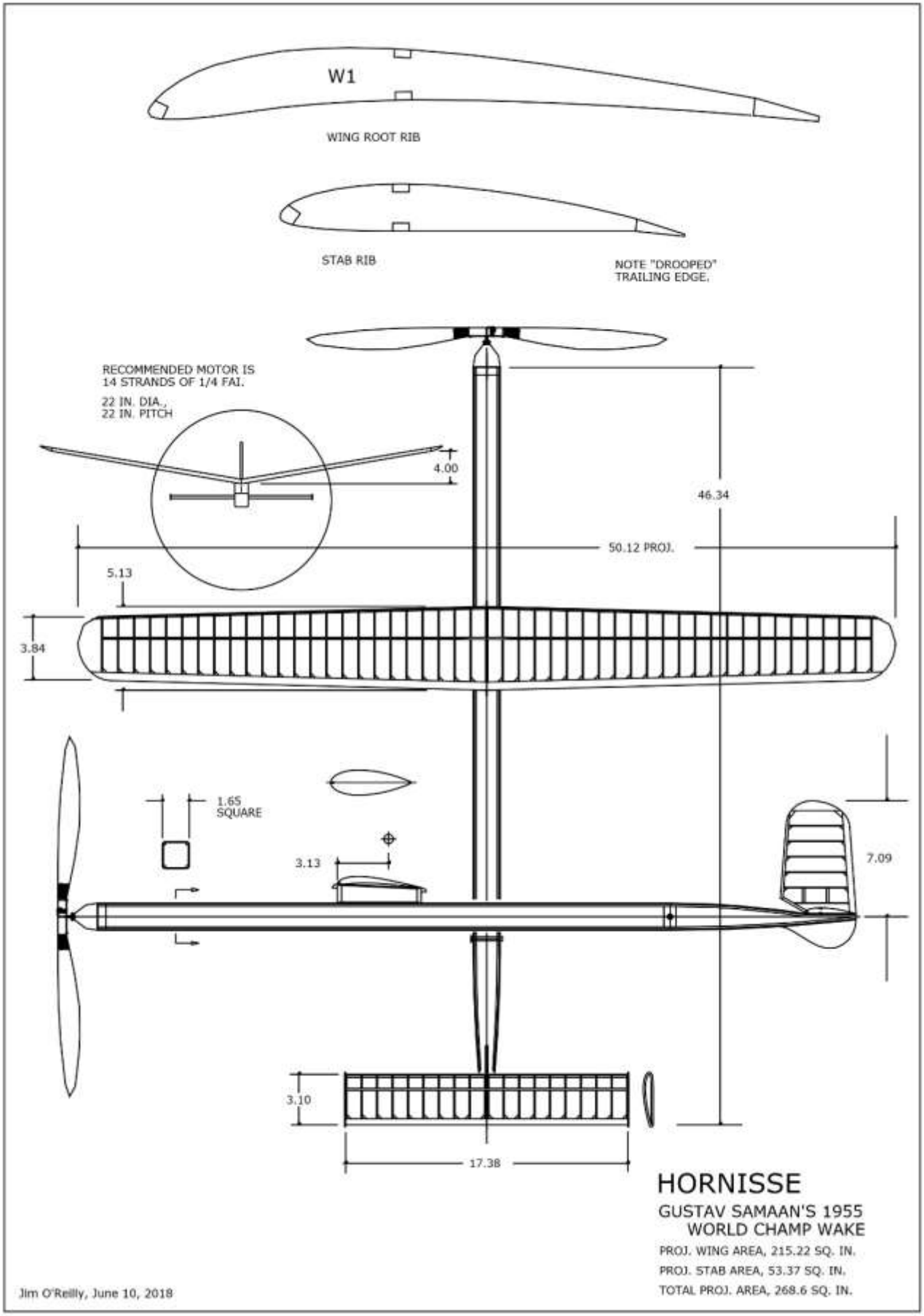
It was in the wing planform and structure that the most significant changes took place. The 'Hornisse' parallelogram geometry, straight taper and straight dihedral was abandoned for a polyhedral wing, with a constant chord inner section, combined with tapered tips which had a straight leading edge and all the taper occurring on the trailing edge. Barnes substituted an NACA 6409 section in place of the Benedek on 'Hornisse', as well as employing a sheeted leading edge, which was used in conjunction with two spars. The upper surface spar was 1/8" x 1/16", while the lower spar at 40% chord was 1/8" x 1/8". Ribs were of 1/32" sheet, and each rib was fitted with a 1/32" sheet gusset in the same manner as 'Hornisse'. The tip dihedral of 4" equated 'Hornisse', while the dihedral at the inner break was 1".

The tailplane was pure 'Hornisse', save that a 60% Clark Y section was used in place of a flat-bottomed section which had the trailing edge elevated by 1/16". Ribs were again made of 1/32" sheet and gusseted.

Barnes used a 22" x 22" double-bladed folding propeller of his own design, and chose between two sizes of motor. In calmer air he preferred 12 strands 1/4" Pirelli 40" long, while in windier conditions he used 14 strands 1/4" Pirelli 34 1/2" long. To accommodate these motors, he built in different motor peg locations, and even followed this practice when the rubber allowance was reduced to 50 grams, and then to 40 grams. In these cases, he used 14 strands 1/4" Pirelli 21 1/2" long for 50 grams, and 16 strands 1/4" Pirelli 16" long for 40 grams.

Barnes was a contestant at the Wakefield Finals held on 4 August 1958 at Cranfield. His model was proxy flown by D. Latter, and recorded flights of 88, 129, 125, 145 and 92 seconds for an aggregate of 579 seconds and 42nd place.

After his participation in the 1958 Finals, Barnes flew only rarely, and this was the reason for his modifying the basic 80-gram Wakefield design so that it could be flown with progressively smaller motors. In his private life Alan was an extremely skilled engineer, and in later years he employed his skills in hotting up engines as well as providing a repair service. He died in the early years of this millennium, and his Wakefield is his only model for which details have been recorded.


W1
WING ROOT RIB
STAB RIB
NOTE "DROOPED" TRAILING EDGE.
RECOMMENDED MOTOR IS 14 STRANDS OF 1/4 FAI.
22 IN. DIA., 22 IN. PITCH
4.00
46.34
50.12 PROJ.
5.13
3.84
1.65 SQUARE
3.13
7.09
3.10
17.38
HORNISSE
GUSTAV SAMAAN'S 1955 WORLD CHAMP WAKE
PROJ. WING AREA, 215.22 SQ. IN.
PROJ. STAB AREA, 53.37 SQ. IN.
TOTAL PROJ. AREA, 268.6 SQ. IN.
Jim O'Reilly, June 10, 2018

Lee Renaud (U.S.A.) Triple Threat 1955

‘Like a graceful marsh bird in flight’. That was how Bill Winter, the master caption-writer described a photograph of Lee Renaud’s ‘Triple Threat’ in the June 1955 issue of *Model Airplane News’.* Bill was famous for his pithy aphorisms, but nothing has ever equalled his ‘Ever VTO’ed half a horse’ when describing a photograph of Bob Hunter VTO’ing a Satellite 1300 in a 1956 *Model Airplane News* article.

In the early 1950’s Lee Renaud was a respected free flighter, and a member of the New England Wakefield Group. He had designed the ‘La Sorra’ which was published in the July 1953 *Air Trails*, and later in the *1953 Frank Zaic Yearbook.* ‘La Sorra’ was published in the last year of the Wakefield rules which allowed an unrestricted rubber allowance within the total weight specification. The design was also unusual for the time in that the fuselage was constructed completely of 1/20” sheet, whereas the use of built-up fuselages covered with tissue was almost universal. Renaud claimed that sheet fuselages could be constructed as lightly as the built-up type, as well as being stronger and easier to handle. ‘La Sorra’ was a slabsider, with a polyhedral wing and twin fins, and was fitted with a double-bladed folder.

By 1955 Renaud had progressed, but was suffering from a lack of building time. He came up with a novel answer, producing a design which had three applications. The basic model was a Wakefield, but by building two further fuselages, the same wing and tail would allow flying in PAA-Load and free flight gas. In the power events, a McCoy .049 diesel was recommended in PAA-Load, while in gas a high thrust line approach was adopted using an Atwood .049 or .051, which allowed flight in two classes. While it was relatively common in the U.K. during the Second World War to adapt rubber models to towline glider, Renaud’s ‘Triple Threat’ is the only published example which I have seen which embraces three disciplines.

In the accompanying magazine article, Renaud explained his design philosophy, which bears repeating even though sixty years have elapsed. He felt that the most important feature of any contest model was consistency. Any aerodynamic approach which detracted from consistency was not worthwhile in his estimation, and came at the expense of stability, making the model more difficult to fly. Similarly, streamlining often made a model hard to build and repair, so clean functional lines with a careful alignment of all surfaces were more than adequate for contest purposes. In his opinion, good stable mounting platforms were more important than a slight reduction in frontal area.

The ‘Triple Threat’ featured a long tail moment, with the objective of improving stability and glide performance. The wing and tailplane were of medium-high aspect ratio, with the tailplane being 38% of wing area. A high wing location, mounted on a pylon, was used in conjunction with a moderately high dihedral to give good spiral stability. The balance point was a long way back, being 1/2” in front of the trailing edge, but with only 2 degrees incidence Renaud claimed that longitudinal stability was adequate. A sheet fin, permanently fixed to the fuselage, ensured that adjustments were fixed. A modified NACA 6410 wing section was used with a 9% Clark Y tailplane section, which was a combination which Renaud had found to give good results when used with sheeted leading edges. Another common contemporary practice was the full-geodetic structure to the wing and tailplane, which was justified on the grounds of being warp-proof.

The diamond fuselage motor section was 36" long, with a constant cross-section of 1 1/2”. There were no longerons, but 1 /8” x 1/8” spacers were pitched along the structure at varying distances apart, typically 4 - 4 1/2”. The tailboom was 10” in length, and tapered to infinity in a profile triangular shape. It was joined permanently to the motor tube, to produce a fuselage with an overall length of 46”. The wing sat on a streamlined built-up pylon, which was 1 1/2” high. This pylon had one internal former, and the sides were vertical 1/32” sheet. A retracting undercarriage, located on the bottom of the diamond, had a leg of hard 1/16” sheet in V-form 12” long, and was actuated by an over centre rubber band. The 3/32” sheet fin was located in front of the tailplane, and was fitted with an anti-warp strip and moveable rudder, as well as a small cut out to act as a limit stop for DT purposes. There was also a 3/32” sheet

lower sub-rudder, which was relatively shallow but extended 8” to the leading edge of the fin. A substantial 1/16” sheet tail platform, measuring 4” x 1 1/2”, gave stability to the tailplane mounting.

The wing had an overall span of 46”, with an inner section chord of 5”. Span of the inner section was 13”, with the outer section measuring 10”. While the chord of the inner section was constant, there was taper on both surfaces of the outer section, resulting in a tip chord of 3 3/4”. Ribs were of 1/20” sheet quarter grain balsa, and were allied with a leading edge of 3/16” x 3/16”, a single upper spar of 1/4” x 1/16” at one-third chord, and a trailing edge of 1/2” x 1/8”. Leading edge covering of 1/32” sheet extended back to the spar. Ribs were pitched at 2 1/2”. One distinctive feature not highlighted in the accompanying article, was the use of a sharp leading edge. Dihedral at the inner break was 1 1/4”, while the total tip dihedral was 4 3/4”.

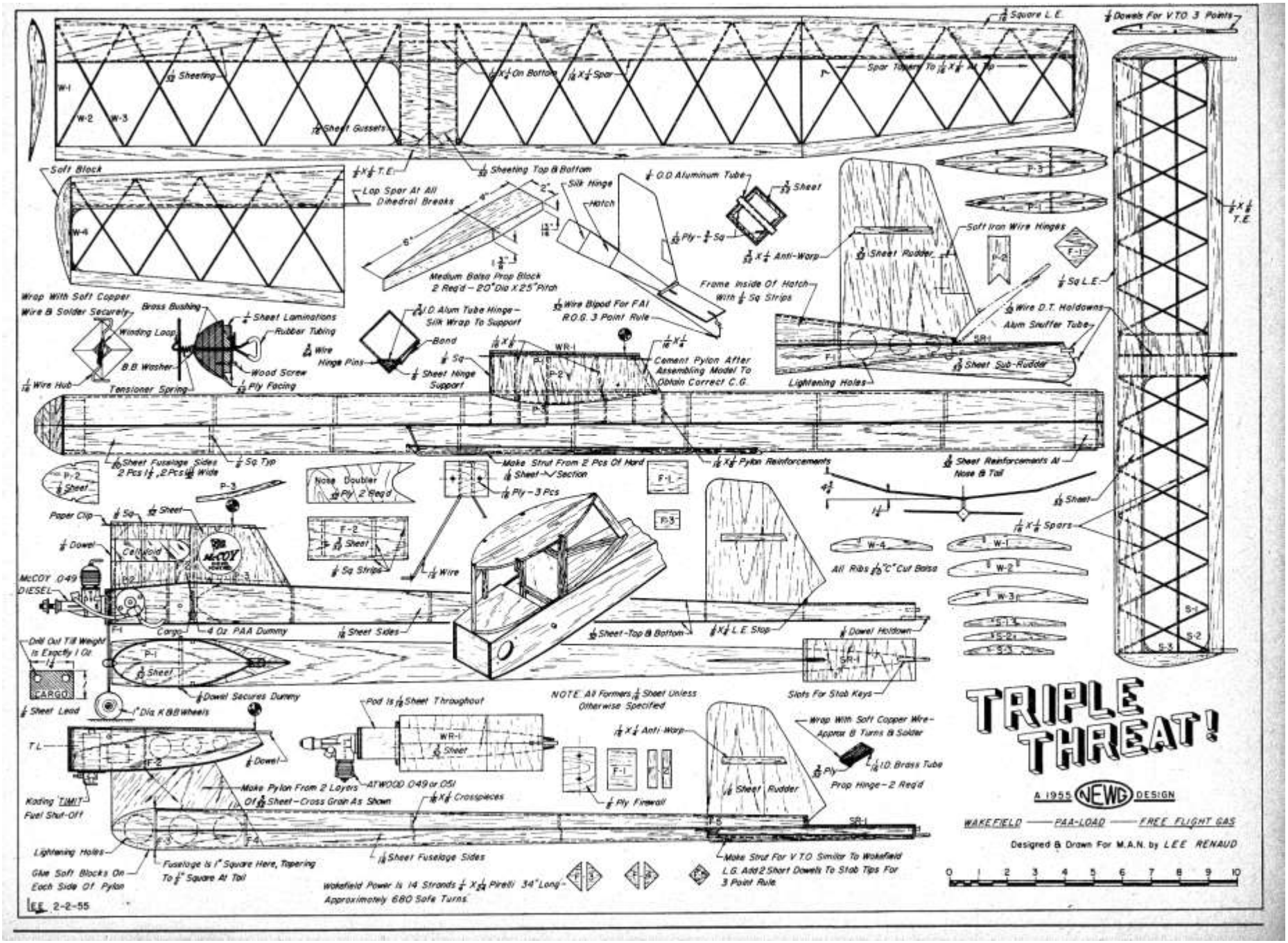
The tailplane was rectangular in shape, with a span of 22” and a chord of 3 3/4”. Ribs were again 1/20” sheet, with the leading edge being 1/8” x 1/8”, and the trailing edge 1/2” x 1/8”. There were two spars of 1/16” x 1/8”, the front one on the upper surface and the rear spar on the lower surface. Upper surface 1/32” leading edge sheeting extended back to the spar. The tailplane tilted for D/T purposes.

A two bladed folding propeller of 20” diameter x 25” pitch was employed. This was assembled on a 3/64” diameter wire hub, and in the days before winding tubes, a reverse ‘S’ hook was used on the shaft. A spring and wood screw initiated the folding action.

All components of the model, including the propeller, were covered with jap tissue. After covering, the pylon was cemented in place to give the correct balance point. Renaud stressed the necessity for keeping all components true, apart from the wing tips which should have an equal amount of 3/16” washout built in.

Power was 14 strands of 1/4” x 1/24” Pirelli, 34” long. Slight down and right sidethrust was applied to the upper left side of the noseblock for initial power adjustment, while a 100’ glide circle was obtained with rudder trim tab and tailplane tilt. The choice of a right or left glide circle was offered, but the tilted tailplane on the plan was set for a right turn. With 650 turns on the motor, the propeller run was 50-55 seconds, and the dead air total time in excess of 180 seconds.

‘Triple Threat’ was one of the early designs published to the restricted rubber specification, and represented a sensible approach with conventional proportions, as well as state of the art thinking.


TRIPLE THREAT!
A 1955 NEWG DESIGN
WAKEFIELD — PAA-LOAD — FREE FLIGHT GAS
Designed & Drawn For M.A.N. by LEE RENAUD
Square L.E.
Dowels For V.T.O. 3 Points
Sheeting
Sheet Gussets
On Bottom
Spar
Spar Taper To
Soft Block
T.E.
Sheeting Top & Bottom
Lap Spar At All Dihedral Breaks
Silk Hinge
Hatch
O.D. Aluminum Tube
Sheet
Ply
Sq
Anti-Warp
Medium Balsa Prop Block 2 Req'd – 2.0" Dia X 2.5" Pitch
Frame Inside Of Hatch With Sq Strips
Wire Bipod For FAI R.O.G. 3 Point Rule
Soft Iron Wire Hinges
Sheet Rudder
Sq L.E.
Wire D.T. Holdowns
Alum Stuffer Tube
Sheet Sub-Rudder
Lightening Holes
Wrap With Soft Copper Wire & Solder Securely
Brass Bushing
Winding Loop
Sheet Laminations
Rubber Tubing
Wire Hinge Pins
Wood Screw
Ply Facing
B.B. Washer
Tensioner Spring
Wire Hub
O.D. Alum Tube Hinge – Silk Wrap To Support
Bond
Sq
Sheet Hinge Support
Cement Pylon After Assembling Model To Obtain Correct C.G.
Sheet Fuselage Sides 2 Pcs 1/8, 2 Pcs 1/16 Wide
Sq Typ
Make Strut From 2 Pcs Of Hard Sheet – V Section
Pylon Reinforcements
Sheet Reinforcements At Nose & Tail
Nose Doubler
Ply 2 Req'd
Ply – 3 Pcs
Paper Clip
Dowel
Celluloid
McCOY 049 DIESEL
Cargo
4 Oz PAA Dummy
Sheet Sides
Sheet-Top & Bottom
L.E. Stop
Dowel Holdown
Drill Out Till Weight Is Exactly 1 Oz
CARGO
Dowel Secures Dummy
Sheet Lead
1" Dia K&B Wheels
Spars
All Ribs "C" Cut Balsa
Slots For Stab Keys
NOTE: All Formers Sheet Unless Otherwise Specified
Pod Is Sheet Throughout
Wrap With Soft Copper Wire – Approx 8 Turns & Solder
I.D. Brass Tube
Prop Hinge – 2 Req'd
Make Pylon From 2 Layers Of Sheet – Cross Grain As Shown
ATWOOD .049 or .051
Crosspieces
Ply Firewall
Sheet Rudder
Kading TIMIT Fuel Shut-Off
Lightening Holes
Glue Soft Blocks On Each Side Of Pylon
Fuselage Is 1" Square Here, Tapering To 1/2" Square At Tail
Sheet Fuselage Sides
Make Strut For V.T.O. Similar To Wakefield L.G. Add 2 Short Dowels To Stab Tips For 3 Point Rule
Wakefield Power Is 14 Strands 1/4 X 1/32 Pirelli 34" Long – Approximately 680 Safe Turns
LEE 2-2-55