

Straight and Level

Wing loadings and 'Ruddyrators' — all in a day's work for Peter Russell

WHY NOT VINTAGE R/C? . . . enquires Ted Fergus, a modeller of long standing who originated in the North East but later emigrated South to the land of plenty.

Ted, who has corresponded with S&L before, was one of a number of modellers whose letters were sparked off by those recent articles appearing under the possibly slightly glibiose title "Genesis of Radio Control". His particular interest was in the bit about the "Rudevator", a device of the later forties which gave, in theory, at any rate, both rudder and elevator functions from a single vane controlled by the then normal four-pawl escapement. Basically, it consisted of a angled vane free to rotate about its lateral axis. In "neutral" it did just that, having no effect on the trim of the model, but often creating a bit of low frequency, high amplitude vibration. The escapement was modified so that, not only could it be stopped at any of the four 90 degree positions, but in the stopped positions, the "star wheel" moved along its shaft so as to engage a crank on the end of the vane's shaft. In this way, the shaft could be stopped in the vertical position with the vane inclined either left or right, and in the horizontal position to give elevator. On stopping the signal, the vane was released to rotate in the slipstream.

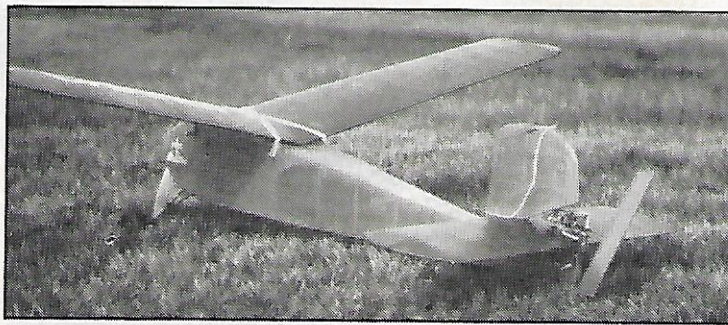
Which is Ted's problem. He has built a Dick Schumacher (one of the co-inventors of the Rudevator) "Charm" and fitted a home cooked unit that he made many years ago.

In a gentle breeze, the rudevator tab rotates nicely, as advertised. With the engine running, however, it tends to stop.

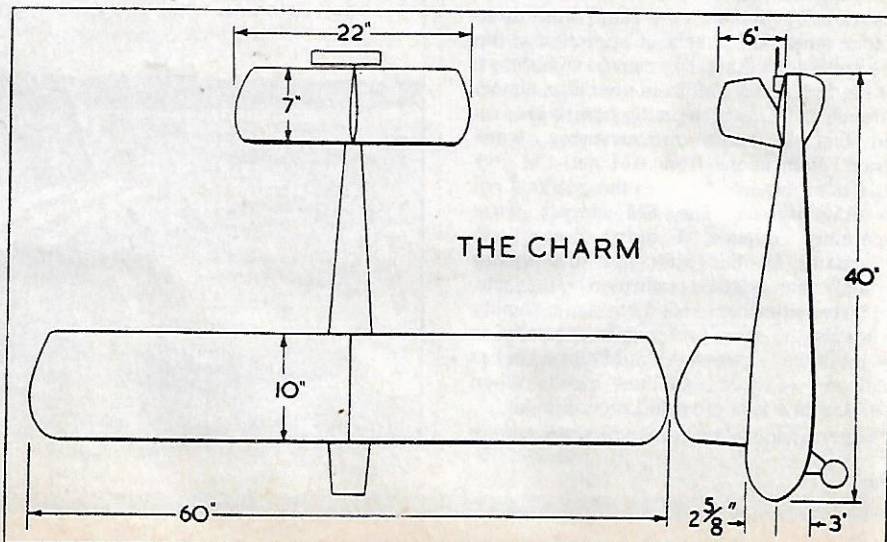
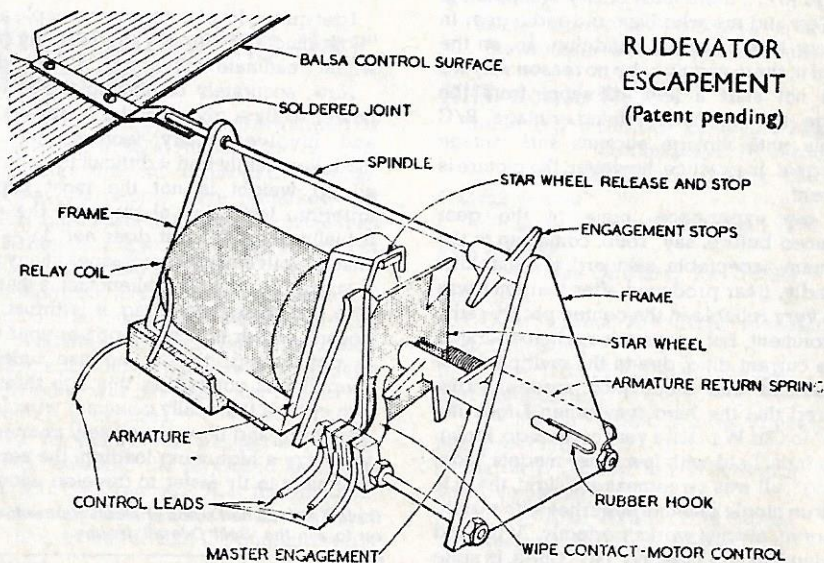
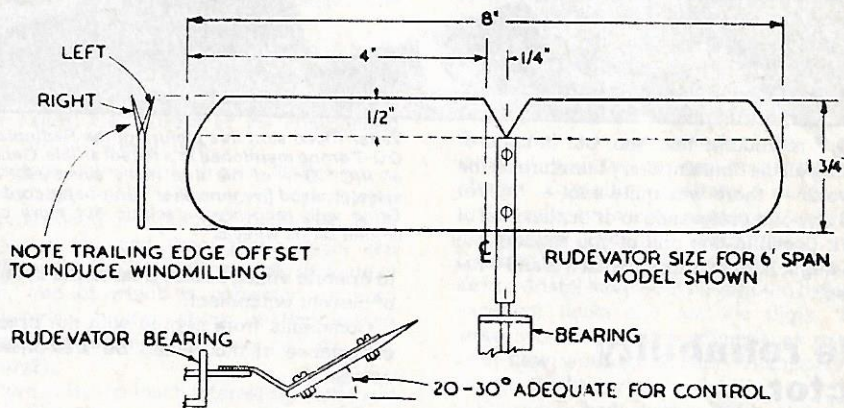
Ted says that since I was competing in the 1949 Nationals R/C event — without success — I presumably saw winner Chuck Doughty's Rudevator in action, can I comment?

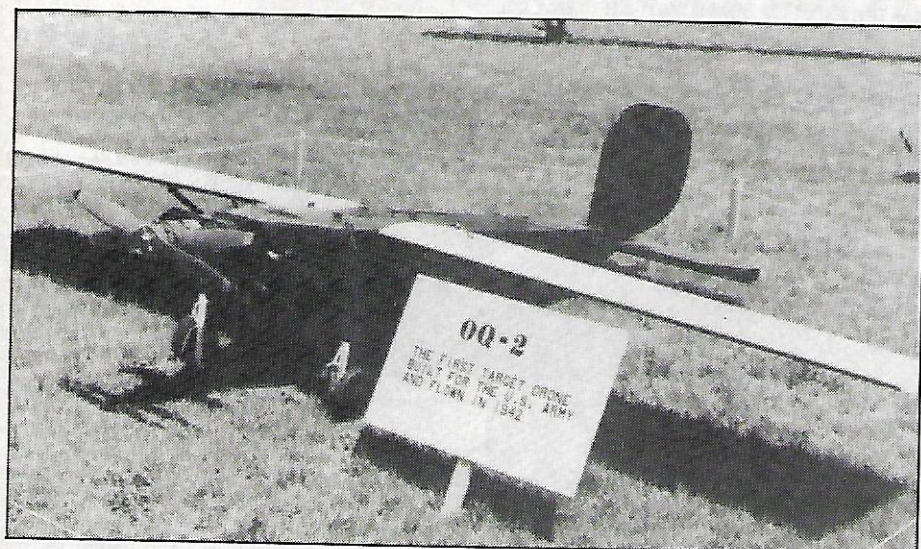
Well, I not only didn't compete in the 1949 event, I wasn't ever there, but I did see Chuck performing in the 1950 event, which he also won, and as far as I can remember, the rudevator rotated merrily, engine on or off, though the fact that there was a gale of wind blowing throughout the period of the 1950 Nats. might have had something to do with it! Possibly of more significance is the fact that the rudevator vane on Ted's model — see picture — is a good deal bigger, proportionately, than the ones I remember, and also, the ones I remember had either little angled tabs — *Flettner-rudder* if you like — on the trailing edges of the rudevator, or, in some cases extended span wise from the tips, presumably to promote windmilling.

Another point that puzzles Ted is the reference in an article in the contemporary Warring/Dean "Model Aviation" magazine which shows a crashed rudevator model with a caption . . . "before the importance of the strip rake was realised". "What the heck is a strip rake?" demands Ted.



Ted Fergus built this Schumacher 'Charm' and equipped it with a 'rudevator' system as used on the original. Having some trouble getting the vane to rotate. Looks a bit big to me, Ted.





Yes, I remember that, too, but in spite of scouring all the contemporary literature on the radevator — there was quite a lot — I never found any other reference to or explanation of it. Is it possible that one of you readers out there might have an idea of what it is and what it does?

The reliability factor

Coming to the wider question of "why not vintage R/C", there must be lots of modellers like Ted and me who have old radio gear in more or less operable condition, so, on the face of it, there seems to be no reason why we could not start a new off-shoot from the vintage movement by flying vintage R/C models with vintage engines and vintage radio gear. In practice, however, the picture is different.

In my experience, none of the gear produced before, say, 1960, comes up to the minimum acceptable standard of reliability. Secondly, gear produced after that time was often very reliable in the contemporary radio environment, but snags arise when operated in the current ditto, due to the multiplicity of frequencies and modulation modes. I discovered this the hard way when I took my "242" to Old Warden a year or two ago. Flown at the local field with few other models "conflicting", all was sweetness and light, the O.S. Minitron single channel superhet with matching servo, always works perfectly. At the Old Warden Vintage meeting, per contra, in spite of having the frequency to itself, it went mad as soon as I switched it on. There were three or four other AM27 sets in operation at the time and I don't think they caused any bother, but the five or six FM35s in operation almost certainly did. One of the radio boffins present said that, in some circumstances, weak "stray" emissions from AM and FM sets could combine into beats to the detriment of the AM signals. The FM signals were apparently immune. I didn't pretend to understand all this stuff, but the theory certainly seemed to be confirmed by the facts, and I have since heard of other people coming up against the same problem. Incidentally, as you might have guessed, the Minitron set has continued to give excellent results when operated in a less crowded environment.

So, my advice is, be very careful if you seek

Valter Ricco sent this picture of the Radioplanes OQ-2 drone mentioned in a recent article 'Genesis of R/C'. One of the first really successful R/C vehicles, used five tone filter 'bang-bang' controls. Fitted with recovery parachute but more often landed on its wheels.

to operate vintage radio gear in the company of current equipment.

Comments from people with the practical experience of this would be welcomed, of course.

How much power?

I get quite a lot of letters from people asking, "How much power will I need to fly my 'x' which I estimate will weigh 'y' pounds?"

Now, accurately estimating the amount of power to fly a given model is always tricky and involves many factors, and some modellers might find it difficult to believe that all up weight is not the most important criterion. Just think about what the engine actually does. What it does *not* do — in the case of conventional aeroplanes at any rate — is supply *lift*. Another salient fact is that it isn't bhp that overcomes drag, it is thrust, and it doesn't matter how much power your engine is developing, this is no use unless the propeller is converting this into thrust. The two criteria that really count are wing loading and drag, and they are closely connected. If you have a high wing loading, the aeroplane will have to fly faster to develop enough lift,

Dave Kerswell had some anxious moments with his 'Avenger' at the recent RR Hucknall meeting, but went on to win the 'Best Overall' trophy.



and as we all know, drag is proportional to the square of the speed, so relatively small increases in speed can result in quite big increases in drag. Since it is the amount of drag that decides how much thrust will be needed, it is easy to see that trying to estimate the power required to fly a model on the sole "given" factor of estimated total weight, is quite unrealistic.

To quote a practical example, when I first flew the STOL Mk.1 with the "Sea Pup" electric motor, the results were very so-so. I then built a new wing, identical with the Mk.1 but with an extra eight inches of span, and this transformed the performance into the "quite lively, semi-aerobatic" category — in spite of the fact that the weight was a bit higher than before.

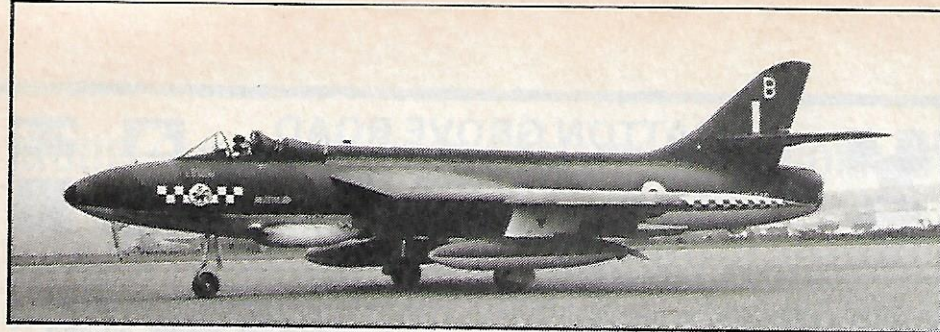
I understand Dipl. Ing. Kurt Tank had to do something similar with the early Fw 190 when, after a few prototypes had been built with the "small" wing, a slightly bigger wing, later standardised for all 190s, was tried and found to give a significant all-round improvement in handling and performance, including maximum speed.

So what about wing loading?

Which logically leads into the other frequently encountered query, "What do you think would be the maximum permissible wing loading for my 'x' project?"

Again, an impossible question because of the many factors involved, not the least of which is the purely subjective factor of what the pilot will consider to be acceptable in the way of handling qualities.

But to give a practical example, Chris Gold in one of his recent letters, explains in his vividly realistic way, of how far he has gone. he says, "You have no doubt seen the bigish Ducted Fan scale models that Jan Molmark and I have developed, the limiting factor of which has been the fan diameter which dictates the physical size of the final product. This has been an important factor in the case of the *Hunter* — see picture — which came out at 85in. long! Despite careful weight control the final take-off weight (which includes smoke gear) is nearly twenty pounds, which gives a wing loading of 47 ounces per square foot, a figure which would have made me cringe a few years ago!



Chris Golds' Hunter FGA 9, span 64in. LOA 85in. AUW 20lb, with Rossi 81 turning Byron fan. Has working drag parachute and smoke generating gear.

In spite of which, given an adequate supply of concrete — which Abingdon has — and 40 degrees of flap, it gets off in about 120 yards and flies beautifully and very much like the real thing". Chris goes on to say what it feels like flying the real one with 400 gallons of external fuel and finishes with a few more pearls of wisdom "as you know, the speed at touchdown with full size aircraft, particularly jets, is critical to within a few knots. Too fast and you won't stop before the far hedge, too slow and you won't arrive at the near hedge. With much less accurate indication of and control of speed with the model, is it any wonder that we see so many flick rolls on final — and immediately after take-off, for that matter?

So could I make yet another plug for flaps? Steeper approaches, lower stalling speed, less float, engine operating in a rev. range that makes more precise control possible. Just plain common sense, wouldn't you say?"

Yes, Chris, I would. I have long believed that *all* aeroplane should have flaps, plus, the other-*bee-in-my-bonnet*, washout.

Shorts

Most of the letters arriving recently have been concerned, like the one mentioned earlier, with the "Generals of R/C" articles. No fewer than *eleven* readers sent newspaper cuttings showing a youthful Marilyn Monroe apparently fitting the propeller to one of the opposed twin two-stroke Righter engines of the OQ-2 drones made by Reginald Denny's "Radioplane" company as it was then.

Also on the subject of the OQ-2 is a charming letter from Romea & Juliet country, — Padova — by Valter Ricco who says he is a regular reader of S&L and has been modelling since the '40s, is a SAM-Italy member and still has a few "Mighty Midgets" and escape-ments, and so on. He also sent — of great interest to me, at any rate — the only colour picture I have ever seen of the OQ-2. As you can see, this is the variant with the contra-

rotating propellers. A quite unnecessary elaboration, you might have thought.

Valter goes on to say, referring to the "Genesis" article, "I wish more of today's R/Cers had this sort of background, because understanding the whys and wherefors of development greatly adds to the enjoyment of the hobby and helps us to understand how much we owe to the pioneers".

Thanks for the kind remarks, Valter — that's pretty good English that you write, too! If any English enthusiasts would like to correspond with Valter, his address is: via Pomponazzi 20/2, 35124 Padova, Italy.

Another letter comes from J. T. Robson of Sunderland, who sent some fascinating material concerning the RAE developed RPVs as we would call them these days, and mentions that he has built models of some of them, one of which is currently adorning "Chippy's" model shop in Sunderland (remember when I used to call on you, Chippy?).

There is far too much interesting stuff to do justice to it this time, but I've got it earmarked for a later S&L.

A disappointing day at Hucknall

Over the years the Scale event organised by the Rolls Royce MAC at Hucknall has become a major national event in the R/C calendar. Indeed several people have remarked that there are more scale models at Hucknall than at the Nationals, a comment on the veracity of which I am unwilling to make.

September 6th had another excellent turnout in spite of an intimidating weather forecast which predicted an occluded front going through at about lunch time. So flying activity in the morning was intensive, just in case the forecast was accurate!

It was. All flying was washed out in the afternoon, including the proposed aerobatic display with the Cranfield "A.1" that my outfit was putting on. Allen Wade brought the A.1 in just as the rain started and the conditions got

so bad that he had to leave it there, and we collected it the following day.

The R.R. club had, as usual, a magnificent array of trophies to present for eight different categories of scale model, and, as a result of getting a bit of a hustle on before the rains came, managed to get all the leading contenders flown and were so able to get decisions in all eight.

As you will see, Dave Kerswell repeated his early success in the "Best overall" category with his superior TBM Avenger, but had a very nasty moment when the engine failed to come up to speed in a go-around giving agonising seconds of drifting towards the trees in a semi-stalled attitude. There was a sharp intake of breath when Dave got it sorted out!

Brian Gowland's Fw190 A4 and Alan Walker's Sabre were the fastest models there, appropriate in the case of the 190 as the Anton-vier was the fastest of the A series when it had the undercarriage doors on. Martin Fardell's Spartan Cruiser flew realistically and sounded nice with the three two-strokes (nearly!) synchronised, while Derrick Brunt's Avian monoplane and John Kidd's Bristol have both been noted before for excellent finish and realistic flight. There were two Bristol M.1B monoplanes present, both flew well, but Martin Wilkinson's was judged the better of the two.

Everyone had departed by about 1430 which was a great pity since many had come quite a long way.

The day after when we went to collect the A.1, the weather was perfect, of course!

R.R. scale fly-in

Merlin trophy (for best model of a Merlin or Griffon powered aeroplane)

— Malcolm Watton, Spitfire VB.

Overall winner

— Dave Kerswell, Grumman TBM.

Best military

— Brian Gowland, Fw 190 A4.

Best Civil

— Derrick Brunt, Avro Avian monoplane.

Best multi-wing

— John Kidd, Bristol Fighter.

Best multi-engine

— Martin Fardell, Spartan Cruiser.

Best pre-1918

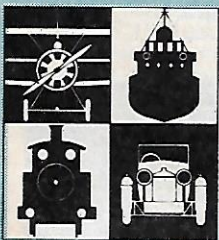
— Martin Wilkinson, Bristol M.1B monoplane.

Best ducted fan

— Alan Walker, F.86 Sabre.

Better luck next time, RRMAC!

57th Model Engineer Exhibition



A reminder that there is still time to enter your model for the forthcoming Model Engineer Exhibition to be held at the Wembley Conference centre from January 1st to January 9th.

Classes for flying model aircraft include:-

D1 Non-scale flying models of all types (a) free flight, (b) control-line and (c) radio control.

D2 Scale flying models of all types except radio control, i.e. rubber, glider, power or control-line.

D3 Scale radio control flying models.

D7 Unconventional model aircraft — flying models which do not conform to the traditional fuselage design of a tractor airscrew, wing, tail surfaces on a central fuselage and which do not otherwise qualify for the other competition classes.

The judges look for the finesse of construction, clean workmanship, practical as well as experimental detail and neatness of the covering and finish. They also have to relate the intricacy of work involved in small models with the volume of effort required to

make larger projects. They look for accuracy (wings free of warps, tail units which align symmetrically with wings) in construction, neatness of the work (no excess glue, rough wood showing through covering, uneven edges, etc) and good overall finish and colouring.

Self-designed entries obviously gain valuable points but it has been known for exceptionally well made commercially available designs to win medals.

Judging criteria for the Model Aircraft Classes include "ingenuity" where working features and other novel and innovative aspects of construction will be rewarded, and "Fidelity" where, in the case of scale subjects, the model's overall success at portraying a miniature replica of a full-size aircraft will be judged.