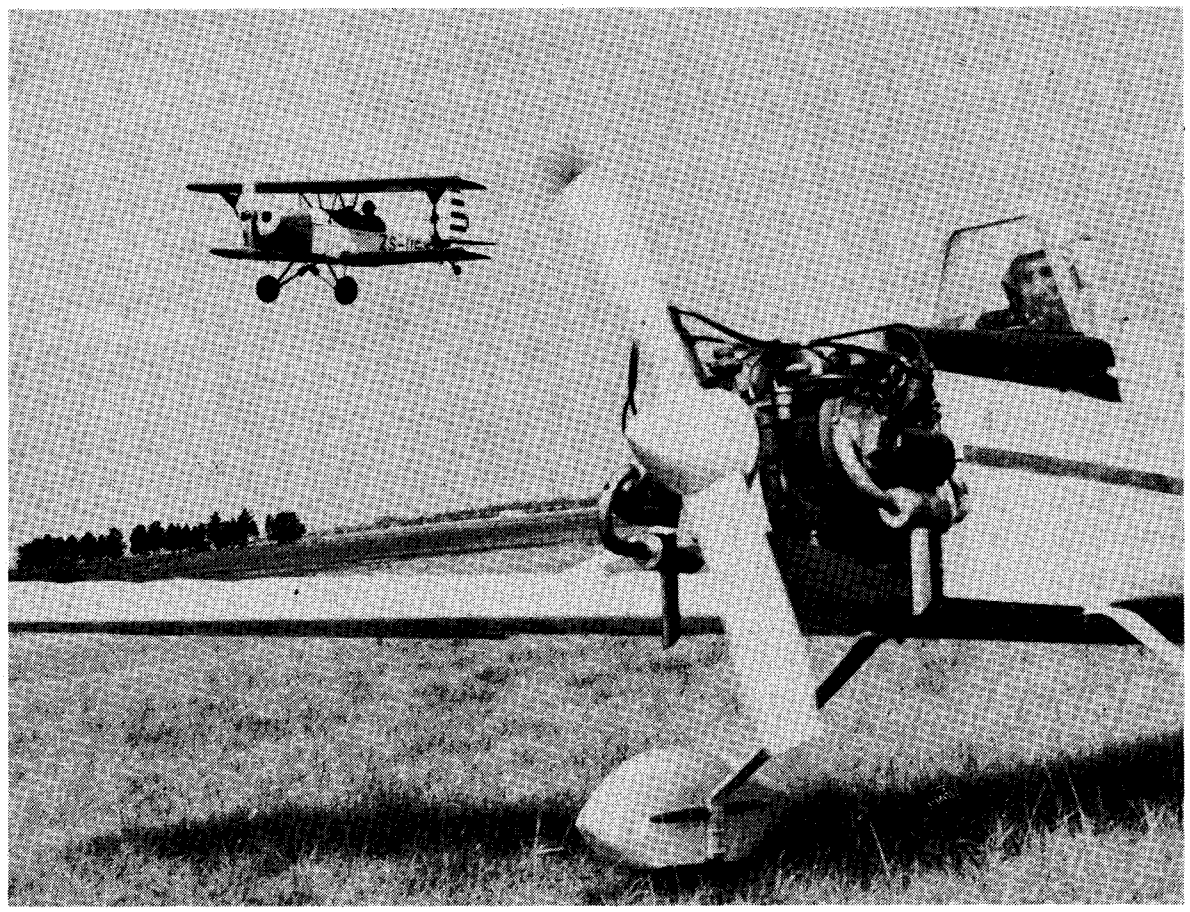
HOMEBUILT

JOURNAL OF THE EXPERIMENTAL AIRCRAFT ASSOCIATION OF SOUTHERN AFRICA



VOLUME 1 — NUMBER 8

JUNE 1974

ON THE COVER

Barrie Walker's E.A.A. Biplane roars past as Ton Maneschyn lines up his VP-1 for take-off.

STATEMENT OF POLICY

The Experimental Aircraft Association of Southern Africa is a body representing individuals involved in the construction and operation of homebuilt aircraft and the restoration of antique aircraft.

Subscriptions of R4,00 per year include affiliated membership of the Aero Club of South Africa and quarterly issues of "Homebuilt".

Editor: S. Crutchley

CORRESPONDENCE

All correspondence to the Association should be addressed as follows:

The Secretary, E.A.A. of S.A.
21 Charles Boniface Road
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EDITORIAL

Handling the duties of Secretary/Treasurer and Editor has involved a tremendous amount of time and work during the past two years, but it has also given me great pleasure to be able to do something positive for a cause which is very dear to my heart. It is with very mixed feelings, therefore, that I have decided to stand down at the forthcoming A.G.M. and enjoy a breather.

It has been a wonderful experience seeing the Association grow from a paid up membership of thirty in 1972 to its present strength of well over two hundred, but more than this, it has been a pleasure to meet and get to know so many enthusiastic and dedicated people. With loyalty such as I have seen all around me there can be no doubt that E.A.A. of S.A. will continue to go from strength to strength.

One very humbling fact which I learned early in the game is that one cannot do it alone. It is only the support of the members that can make any venture a success. This has been especially true in the case of our news magazine Homebuilt. It has only been the enthusiastic response of the membership that has permitted it to exist at all. It is the contributions from the members that fill the pages, not the editor.

When we took the plunge and printed the first issue of Homebuilt in September 1972 we called it Volume 1 Number 1. In truth the income from the small number of members was totally inadequate to finance such an expensive undertaking and we did not envisage being able to continue much beyond that point. However, we had not reckoned with the response that we were to receive from homebuilders throughout the country, and it was soon evident that we had enough support to justify reducing our rather slender resources still further by having Number 2 printed.

By the time Number 5 was printed the membership had grown to a stage where the income from subscriptions was able to cover the costs of the four issues per year without recourse to the remaining reserves. In these inflationary times the costs of printing are rising steadily, but even so, providing our Association continues to grow at its present rate (and I see no reason why it should not) there should be no need to increase the membership subscriptions.

Homebuilt can fill an important role in the development of homebuilding in this country and I hope the new Editor will receive the co-operation and assistance from the membership that I have always enjoyed.

The years ahead present a great challenge to those entrusted with guiding the affairs of our Association. On one hand one would like to preserve the informal and friendly atmosphere that is possible in a small association such as we have today, but on the other hand if one is to protect the interests of the individual homebuilder it will require weight of numbers and a sophisticated administrative organisation.

The amount of administrative work that has to be attended to in order to keep our Association going is already reaching the stage where volunteer-labour is strained to the limit. It will not be possible to continue in this fashion unless the work load can be spread considerably. With this in mind I intend proposing at the A.G.M. that the office of Secretary/Treasurer be split into two separate positions. In due course it may even be desirable to remove the responsibilities of Editor from the shoulders of the Secretary. This latter step would be at the discretion of the Committee and would not require ratification at a general meeting.

It has been most gratifying to observe the interest that Mr Paul Poberezny, President of E.A.A. International, has shown in our activities. He has seen fit to frequently offer words of advice and encouragement to us, and to endorse these sentiments in a tangible way by sending us several valuable gifts. Thanks to him we now have a full set of E.A.A. Technical Publications as well as an excellent 16mm documentary film for our embryo film library. With the obvious success of E.A.A. International during the short span of twenty one years we cannot go wrong in forging ever closer links with that body.

As retiring Editor I would like to thank all those people who have assisted me in getting Homebuilt out regularly. To each member who has submitted an article or photograph for publication I say a sincere thank you. To John Buchan and Owen Pilcher, who have always done more than their fair share, I wish to say a special thank you. To my wife Trish, who has typed the copy for eight issues of Homebuilt, addressed countless envelopes, assisted with correspondence, and done all of this without complaint, words of thanks are inadequate.

FILM LIBRARY

We are pleased to advise that due to the generosity of E.A.A. International a new 16mm sound/colour movie film has been added to our library. Entitled "E.A.A. Magnificence" this 40 minute documentary cannot fail to impress any aviation-minded audience.

Our library now consists of the following films:-

"1972 E.A.A. Fly-In Homebuilts and Antiques"	Super 8
"1972 E.A.A. Fly-In Warbirds and Aerobatics"	Super 8
"Wonderful World of Sport Aviation"	16mm
"E.A.A. Magnificence"	16mm

LETTERS TO THE EDITOR

Experimental Aircraft Association,
P.O. Box 229,
Hales Corners,
Wisconsin 53130.

Dear Steve,

Thanks very much for your nice letter. Glad the film arrived all right, and that it will be helpful to the chapter.

Keep us posted on the success of your activities, and I some day hope to be able to come and visit you all.

Thanks for the magazines, and I would appreciate being placed on the permanent mailing list. Let me know what it will cost.

My very best to you.

Sincerely,

Paul H. Poberezny,

PRESIDENT.

Oranje Woonstelle 22,
Sasolburg.

Dear Editor,

Herewith a tale of woe in which might lie a lesson for all homebuilders. I have recently finished building a Teenie Two (ZS-UGR), obtained permission to fly and was on the point of doing so, when this lot happened.

The Teenie was hangared in a T-hangar with an American Trainer. I took the trainer out and was quietly(?) instructing on it, when a rubber-necked, non-flying type, entered through the doors which had been left open. This gentleman(?) spied this rare specimen of ironmongery and proceeded to try it on for size. After pushing and pulling every knob and lever, he got out and "felt the compression" Yes, you guessed it, he had the mag on and the throttle wide. The well tuned, twin-carb 1600 VW motor roared into full power, hauled the Teenie over the chocks and into the hangar wall. Result . . . one very splintered propellor, one bent centre section (the left wing hit first), one blown-up motor (it did not stop after shedding the prop), one hole in the wall. Total . . . one write-off. By sheer luck the cause of this mess escaped the whirling propellor, got into his car and got very scarce indeed.

The lesson? Oh, yes, number one: Lock the hangar when you leave, even if only for a minute.

Two: Replace the mag switch (toggle-type) with a key type switch.

Three: Put the fuel shut-off valve in an in-obvious place.

Thanks for this great magazine, how about printing it monthly?

Johan van Garderen.

CONSTITUTION OF THE EXPERIMENTAL AIRCRAFT ASSOCIATION OF SOUTHERN AFRICA.

Article 1: NAME

The name of the association shall be the Experimental Aircraft Association of Southern Africa.

Article 2: LOCATION OF OFFICE

The office of the Association shall be located at the address of the Secretary.

Article 3: OBJECT AND PURPOSE

The aims of the Association shall be

(a) To encourage the construction, maintenance and operation of homebuilt aircraft.
(b) To encourage the preservation and operation of "Classic Aircraft", a term to be accepted as meaning any production aircraft more than twenty (20) years old.
(c) To foster and promote aviation education and to encourage the exchange of information pertaining to the design, construction and operation of homebuilt aircraft.
(d) To provide liaison between aircraft builders and the Commissioner for Civil Aviation.
(e) To encourage and assist where possible the designers of homebuilt aircraft.
(f) To organise a Fly-in of homebuilt and classic aircraft at least once a year.

Article 4: SECTION 1: ELIGIBILITY FOR MEMBERSHIP

Membership will be open to any person in Southern Africa, subject to approval by the Committee.

SECTION 2: EXPULSION OF MEMBERS

Any member deemed undesirable by acts or deeds may be expelled from membership without repayment of any subscriptions. Such expulsion shall be by a 75% secret ballot of the members present at a properly published meeting.

Article 5: DUES

The dues will be determined by the committee and will be renewable annually.

Article 6: CONSTITUTION OF THE COMMITTEE

(a) The Committee shall consist of the following office-bearers:-

Chairman	A representative on the Aero Club of South Africa
Vice-Chairman	A Provincial Representative of each of the four provinces of South Africa
Secretary/ Treasurer	A representative of each neighbouring country where the Association has at least ten members.

(b) The committee members shall serve for the period between Annual General Meetings which will take place at the Annual Fly-in.
(c) Any vacancy occurring in the Committee will be filled by co-option by the remaining members of the committee from the membership.
(d) Four Committee members shall constitute a Quorum.

Article 7: MEETING OF MEMBERS

(a) Notice of the A.G.M. shall be published in the official journal at least 21 days before such meeting.
(b) Special meetings shall be advertised as in item (a) above, stating in general terms the purpose of such meeting.
(c) A quorum shall consist of at least 25% of the members in good standing.

Article 8: AMENDMENTS TO THIS CONSTITUTION

The constitution may be amended by a majority vote of the members present at the Annual General Meeting.

PROGRESS REPORT ON SPITFIRE RE-BUILD PROJECT.
by Larry Barnett

We are now busy building the elevator. This required the construction of a jig — necessary because the centre of this surface has a trailing edge which is subdivided forward to the mainspar and the whole edge must be true in the horizontal plane.

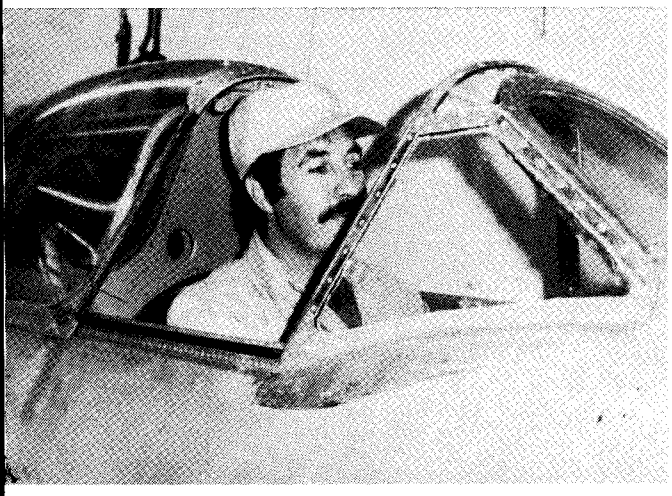
It is very easy to build in a twist. With this particular surface it would have been almost impossible not to build in a twist. The centre section of the trailing edge is thick material ,032" whereas the outboard section is ,025". In the outboard trailing edge are two trim tabs. The edge of these account for almost one third of the main edge.

The next consideration was whether to make a jig which holds the surface horizontally or vertically. Since there is riveting on both sides, I decided to make the jig vertical. Drawings were produced and a jig of steel channel was constructed. The elevator is a single spar channel and has rough overall dimensions of 12' x 4' including the horn balances at each end.

One must remember that we are obliged to stick rigidly to the original design with regard to materials and dimensions. That there were several types of elevators is clear from the drawings. We, building the LF IX E had to use the extended right angled horn with metal covering. There was this type in fabric, there was also the 45° horn also in fabric. The tips gave us a headache as they were 180° curve with the aerofoil shape built in. This meant two halves being shaped and fastened together. Once again, we were assisted and at the time of writing, have in our possession one beautifully made tip and are awaiting the second.

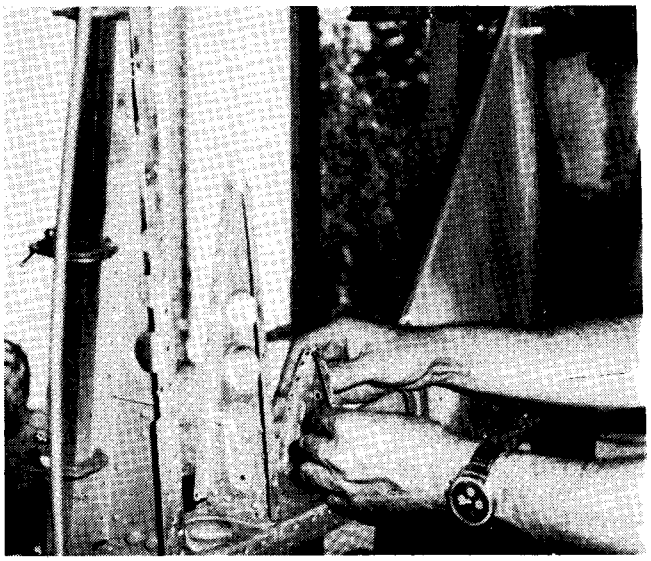
Whilst my workshop is very extensive, I am still an amateur and if it were not for all the wonderful people around the place, we would never have even got this far. Our teacher trained us well but he is an absolute master craftsman of twenty five years experience. While one learns all the time and a lot in five years, one cannot learn experience and must build one's own.

Alan Lurie in the cockpit



However, — the jig was erected — the angles were extracted from the photocopy of the original drawings and the main spar was applied to the jig. It must be remembered that whatever part is fitted, mainspar included, to the jig, it all has to be scrupulously cleaned, crack tested, etched, primed and painted. Should any component be unusable and a new one manufactured, the raw material must be according to specifications as given on the drawing. The material is cut to blanking size. A die is made with female section. The material is heat treated, then applied to die and shaped, lightening holes cut if required, heat treated again and normalised. Now crack testing is done by one or other accepted method. If the part made is in order, etching, priming and painting is carried out. The part is checked for dimensions using limits on drawings then, if within accepted limits, is applied to jig. Should there be a mistake the whole process after the die-making stage is repeated until the exact requirements are met.

The jig with elevator ribs in position



Most of the time we are able to use the original parts and manufacture of components is not required. The skin, however, is always replaced except in two cases on the fuselage where it was found that the original skin was acceptable. The rivets are always replaced with modern equivalents. The reason being that from experience, we have found that a rivet might test right but can be found faulty in the centre which is not exposed. We are forever manufacturing new bucking bars, often simply to place only one or two rivets. An observation we have made is that should a component be thoroughly coated with old dirty grease, it will be in excellent condition — that in fact grease preserves dural even better than any other coating.

The observations we have made in our time will be, I am sure, of great help to others and from time to time, I will write about them.

Finally, let me say once again that if it were not for the other unsung heroes, this project would not have been possible. They are true blue-blooded enthusiasts.

BUILDING THE EVANS VP-2

by Stan Hewitt

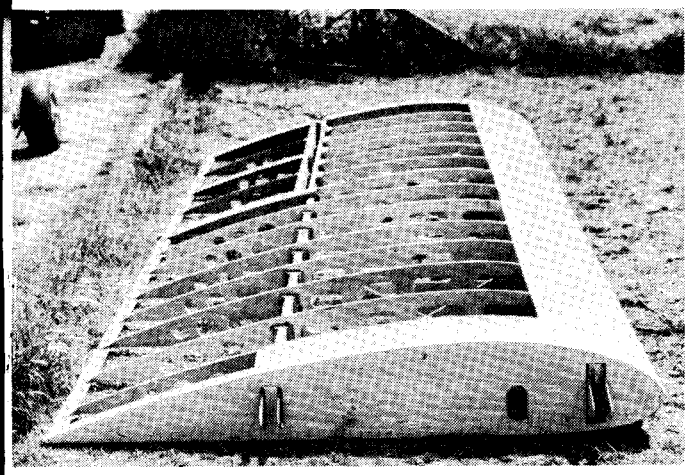
Sometime during the beginning of 1972, I happened to walk into the C.N.A., and there staring at me from the cover of a Mechanix Illustrated magazine was a beautiful little red and white Evans VP-2.

While still playing around with radio controlled model aircraft I toyed with the idea many times of building a scale Evans VP-1. After giving up radio control modelling I obtained a set of plans for the full size VP-2. The full-size aircraft is in reality no more than an oversized model and would, I thought, be an excellent first project.

Having a couple of aviation minded kids determined the choice of aircraft. It had to be at least a two seater, and what fitted the bill better than the Evans VP-2? After getting hold of all the VP-2 literature I could lay my hands on, I was sold on the idea.

Construction was started at the beginning of September 1972. I'm sure we're all past masters in the art of scrounging, so I don't have to elaborate on this point. Having access to some fine machinery simplified things considerably.

The reasons behind this line of thought were twofold. Firstly, with limited finances, simplicity, ease of construction and availability of materials were of prime importance and, secondly, this would determine whether my ability matched



my enthusiasm without too much capital outlay. (Since building the VP-2 this far, I now feel I can tackle anything). Everything given was gratefully accepted irrespective of weight or size, as swops can always be arranged afterwards.

Most of the VP's construction calls for marine plywood, Douglas fir (Oregon) and white pine, with some spruce thrown in here and there (i.e. wingspars, longerons etc.).

Marine ply, Oregon, white pine and birch are available at our local timber yards if we only look hard enough. Spruce and 1/16 inch aircraft plywood require somewhat more diligent searching or, in some cases, importing.

Wetton timbers in the Cape had some lovely spruce and M. Tickton and Co., also in the Cape, could supply 1/16 inch plywood.

Getting an import permit for R500 was no problem, and I found it far easier to import some of the hardware and certain little hard to get items.

The undercarriage I imported directly from Metal Masters in the U.S.A. The undercarriage presented only one problem. Because of its shape it would have been too costly to have had it sent by air, so it came by ship. This took a bit longer, but then patience is the name of this game.

My aircraft is now completely constructed, and all that remains is the covering and finishing off, then I'll give the motor all my attention (and available funds).

Hopefully my next report will be on test flying and the flight characteristics of the Evans VP-2.

BUSMAN'S HOLIDAY

by Steve Crutchley

During our recent camping holiday in the Cape we were fortunate enough to be able to meet a number of members who live in that province.

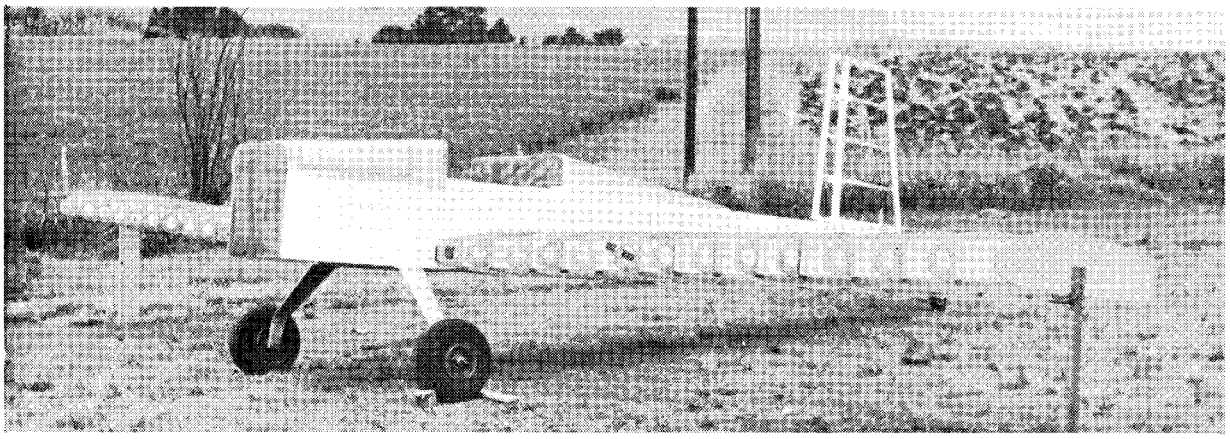
After setting off from Pietermaritzburg our first stop was Ivan Ferreira's farm just outside Kokstad. Ivan and his wife Grace share their farm with a herd of dairy cattle and a VP-2 project. The work-shop was specially built for the job and judging by the good workmanship on the VP-2 and Grace's comments about the time spent in the workshop Ivan is taking the whole thing very seriously.

Some 950 hours of labour had gone into the VP-2 at the time of our visit and as can be seen from the photograph construction is well advanced. The intended powerplant is a VW-Revmaster 2100, now on order from the States. As this was the first VP-2 that I have seen "in the flesh" I found it most interesting.

The wing ribs are stack-sawed from plywood and the main and rear spars are simply spruce planks, so the basic wing structure is about as straightforward as can be. Something that strikes one immediately is the depth of the aerofoil section. In order to cater for the additional strength required for a two seater Bud Evans opted for a 15 per cent thickness aerofoil in place of the 12 per cent aerofoil used on the VP-1. Together with the large chord of the wing this permits the use of very deep spars.

It does ones heart good to see a homebuilder's enthusiasm undaunted by distance from so called civilization. Nearly two hundred kilometres from the nearest large city, Ivan is producing a superb homebuilt.

Ivan Ferreira's VP-2 Project



After spending a few days in East London (waiting for the petrol stations to open) we set course for Port Elizabeth and there spent a busy hour doing a ten minute tent pitching operation. As usual the wind was blowing in that otherwise lovely city.

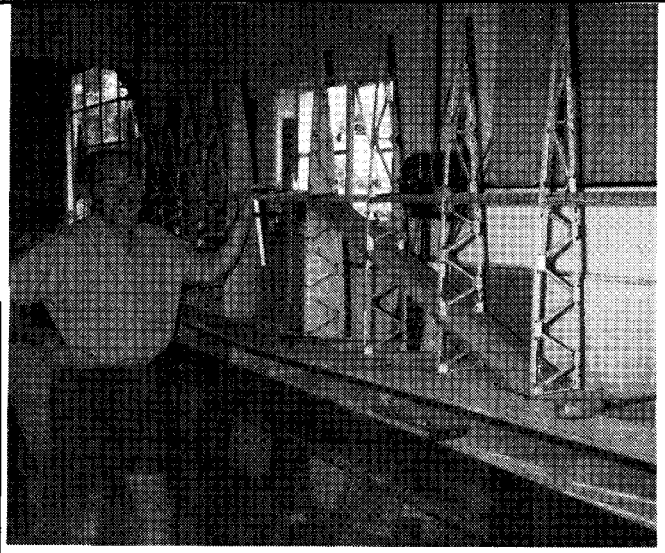
A phone call to Hoekie Baldwin at work gave us the latest news in that area, and in the evening Tosh Sillis called at the camp for a chat. We heard first hand about his mishap in Tosh's Termite which had resulted from a rapidly overheating motor on a hot day just prior to our arrival. It became a case of landing before the motor seized up completely and it was plain unfortunate that the surface of the field chosen was soft enough to tip the Termite on its back. In Tosh's own words "Any crash you can walk away from is a Good crash! " Although obviously disappointed he had lost no time in starting the repair of the damaged wing and tail section.

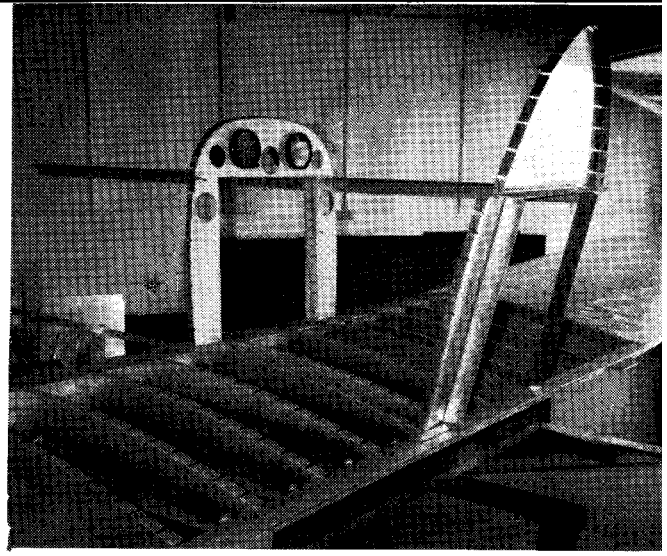
From P.E. we pressed on to Plettenberg Bay where we spent several days enjoying the sun and crystal clear water. Watching the sea gulls soaring above the waves reminded me of a passage in Ann and Lorne Welch's book entitled "The Story of Gliding". It goes like this:-

"Some remarkable flying was done along the coast in 1923. A local schoolteacher, Ferdinand Schultz, built himself a glider even more primitive than a primary glider. It had neither seat belts nor proper foot rests. He was unable to use it at the Rhöne meetings as it was not sound enough technically. When he heard that Germany had lost the world duration record to France he had himself launched and remained airborne over the dunes for 8hrs 42mins, winning the record back for his country.

Several attempts were made to beat distance records in the lift provided by the sea wind as it blew over the dunes. On one remarkable flight Schultz soared along the sand to a point 36 miles away. Since the dunes were irregular he had gaps to cross, which he managed by careful and sensitive flying, sometimes almost brushing a wing along the sand. He discovered that by flying over the surf itself, just above the swell, the glider would stay airborne supported by the air pushed up by the waves. He explored even further the lift which existed above heavy surf and used it to soar just above the waves a hundred yards out to sea". . . And we think WE know a lot about flying!

Next stop was Cape Town, where, after the usual round of sightseeing, we decided to look up the Directory of Homebuilders and track down some homebuilders. It turned out that there was a member living just down the road from where we were staying in Tokai. The welcome Trish and I received from Rick and Margie Leibbrandt made us realise just how wonderful our E.A.A. members are. I had with me the documentary film we had made at the 1973 Annual Convention and Rick very kindly agreed to





get the local chapter together to see it and to have a chinwag. I was thus able to meet Doc Bergamasco, Kevin Powell and Geof Ritchie and to once again say hello to Mike Mullis, Oliver Morton and Avron Bane.

Before leaving Cape Town we were also able to enjoy a wonderful evening with Eric Wroth and his charming family, as well as a braai with Frank and Jenny de Jongh. It was really great to see these old friends again. Come on Frank, let's see that Currie Wot get off the ground.

The highlight of our return trip to Sleepy Hollow (as the Philistines amongst us are wont to call it) was the weekend we spent in P.E.

Right here and now I want to thank Hoekie for the time and mileage he spent on my behalf. First we went to Uitenhage to see Tosh and his Termite'("see – nice small pieces – easy for carrying about") and then on to Klaus Winter's workshop to see the beginnings of his Turbulent. It is obvious that Klaus has been inspired by Hoekie's masterpiece and he is receiving a lot of sound advice and assistance from the maestro. At that stage the largest single piece of the project was the wing spar with the aft-ribs attached. The workmanship is magnificent. It was interesting to see someone else with a great big hole knocked through the garage wall to make room for the length of the wing – it made me feel quite homesick.

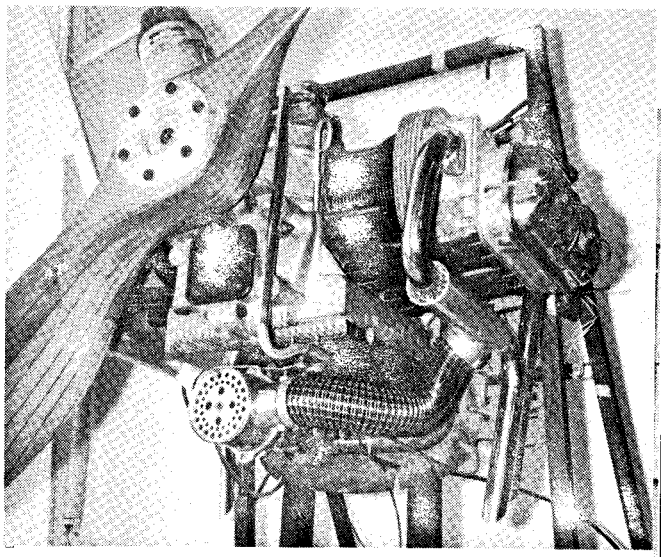
From there we went to Uitenhage airfield for a look around and a quick chat with John English who was instructing on his Cessna 120. John mentioned that he would be prepared to put his private airstrip, about midway between Uitenhage and P.E., at the disposal of the E.A.A. for a future fly-in. I hope the new Committee will follow this up as in many respects it would be ideal for such a function.

Next was a visit to Harry Huyzers workshop in P.E. to view his Teenie Two project. The standard of workmanship is high and the several modifications made appeared to me to be a great improvement on the original design. The converted VW motor has already been run and is fitted with a beautifully made Huyzers Special 50 dia. by 40 pitch broad blade propellor. The carburettor heat system was particularly intriguing as the control is by means of two perforated concentric plates which can be fractionally rotated relative to one another to cut off the flow of cold air and cause warm air to be drawn into the carburettor.

In the evening Hoekie and June suffered an invasion of their magnificent home by all the local members who gathered to see the film and to have a chat.

In closing one can but mention how wonderful it is to be miles from home and yet still among friends. That is what our Association is all about.

top left:
Klaus Winter's Turbulent wing spar and ribs
top right:
Harry Huyzers' Teenie Two taking shape
lower right:
The VW Motor with perforated circular discs of the carb heat system



Aircraft	Seats	General Description	Construction	Power	Span ft-ins
Ace Scooter	1	Wire-Braced High Wing, open Cockpit	Spruce, Ply, Fabric	VW-1500	28-0
Acey Deucy	2	Parasol Wing, Tandem open Cockpits	Steel Tube, Wood, Frabic	Cont/Lyc 65 hp	32-0
Aerosport Quail	1	Cantilever High Wing, enclosed Cockpit	Aluminium Alloy	VW-1600	24-0
Aerosport Rail	1	Cantilever Low Wing, Twin engine Pusher	Aluminium Alloy	Aerosport 25 hp	23-4
Aerosport Scamp	1	Biplane, TEE-Tail	Aluminium Alloy	VW-1600	17-6
Baby Ace	1	Parasol Wing	Steel Tube, Wood, Fabric	Cont/Lyc 65 hp	26-5
Bakeng Duce	2	Parasol Wing, Tandem open Cockpits	Steel Tube, Wood, Fabric	75-150 hp	30-4
Bantam	1	Cantilever Low Wing, Tricycle undercarriage	Aluminium Alloy	60-100 hp	18-5
Bede BD-4	2/4	Cantilever High Wing, Enclosed Cabin	Aluminium, Fibre Glass	108-200 hp	25-7
Bede BD-5B	1	Cantilever Low Wing, Tricycle undercarriage	Aluminium Alloy	Hirth 40-70 hp	21-5
Bede BD-6	1	Cantilever High Wing, enclosed Cockpit	Aluminium Alloy	Hirth 70 hp	21-5
Bowers Fly Baby	1	Wire-braced Low Wing, open Cockpit	Spruce, Ply, Fabric	65-100 hp	28-0
Breezy	2	Strut-Braced High Wing, Tandem exposed seats	Steel Tube, Wood, Fabric	Cont. 90 hp	33-0
Cassutt	1	Mid Wing Sport/Racer	Steel Tube, Wood, Fabric	85-150 hp	15-0
Corby Starlet	1	Low Wing, Semi-Aerobatic	Steel Tube, Wood Fabric	VW-1600	18-6
Daphne	2	Strut-braced High Wing, side by side seats	Steel Tube, Wood, Fabric	85-100 hp	26-3
Davis DA-2A	2	Cantilever Low Wing, Side by Side seats	Aluminium Alloy	65-100 hp	19-3
Dyke Delta	4	Delta Wing, Retractable Undercarriage	Steel Tube, Fibre Glass	Lyc. 180 hp	22-0
EAA Acro Sport	1	Competition Aerobatic Biplane	Steel Tube, Wood, Fabric	100-180 hp	19-7
Evans VP-1	1	Strut Braced Low Wing, Simple Construction	Spruce, Ply, Fabric	VW-1300	24-0
Evans VP-2	2	Strut Braced Low Wing, Side by Side seats	Spruce, Ply, Fabric	VW-1700	27-0
Falconar F-11	2	Cantilever Low Wing, Side by Side seats	Spruce, Ply, Fabric	65-100 hp	27-6
Jodel D-9	1	Cantilever Low Wing	Spruce, Ply, Fabric	VW-1200	23-0
Jurca Tempete	1	Cantilever Low Wing, No Dihedral	Spruce, Ply, Fabric	65-125 hp	19-6
Jurca Sirocco	2	Low Wing, No Dihedral, Retractable	Spruce, Ply, Fabric	85-150 hp	21-6
Midget Mustang 1	1	Cantilever Low Wing	Aluminium Alloy	Lyc. 125 hp	18-6
Midget Mustang 2	2	Cantilever Low Wing, Side by Side seats	Aluminium Alloy	Lyc. 165 hp	24-10
Mini Ace CA-61	1	Cantilever Low Wing	Spruce, Ply, Fabric	VW-1600	27-6
Pazmany PL-2	2	Low Wing, Tricycle Undercarriage	Aluminium Alloy	108-150 hp	28-6
Pazmany PL-4	1	Low Wing, Folding outer Panels	Aluminium Alloy	VW-1600	26-8
Pietenpol	2	Parasol Wing, Tandem Seats	Spruce, Ply, Fabric	Ford/Corvair	29-0
Pitts Special	1	Competition Aerobatic Biplane	Steel Tube, Wood, Fabric	125-180 hp	17-4
Rand KR-1	1	Low Wing, Retractable Undercarriage	Wood, Foam, Epoxy	VW-1200	17-2
Renegade	1	Midwing Sport/Racer	Steel Tube, Wood, Fabric	VW-1500	16-0
SE-5A	1	Replica WW-1 Biplane	Spruce, Ply, Fabric	85-100 hp	23-4
Smith Termite	1	Parasol Wing	Spruce, Ply, Fabric	VW-1600	26-0
Sonerai 1	1	Cantilever Mid Wing Formula V Racer	Steel Tube, Aluminium	VW-1600	16-8
Sonerai 2	2	Mid Wing, Enclosed Tandem Cockpit	Steel Tube, Aluminium	VW-1700	18-8
Steen Skybolt	2	Aerobatic Biplane	Steel Tube, Wood Fabric	180-250 hp	24-0
Stephens Akro	1	Mid Wing Competition Aerobatic Monoplane	Steel Tube, Wood, Fabric	Lyc. 180 hp	24-4
Stewart Headwind	1	Strut Braced High Wing	Steel Tube, Wood, Fabric	VW-1600	28-3
Super Emeraude	2	Cantilever Low Wing, Semi-Aerobatic	Spruce, Ply, Fabric	Cont. 100 hp	26-5
Taylor Monoplane	1	Low Wing	Spruce, Ply, Fabric	VW-1500	21-00
Taylor Titch	1	Low Wing Sport/Racer	Spruce, Ply, Fabric	40-90 hp	18-9
Teenie Two	1	Low Foldable Wing	Aluminium Alloy	VW-1500	18-0
Thorp T-18	2	Low Wing, Side by Side seats	Aluminium Alloy	125-180 hp	20-10
Turbulent	1	Low Wing	Spruce, Ply, Fabric	VW-1200	21-6
Van's RV-3	1	Low Wing, Ultra High Performance	Aluminium Alloy	100-150 hp	19-11
Whing Ding	1	Ultra Light Biplane, Simplified Construction	Spruce, Ply, Fabric	Mac 101A 12 hp	17-0
Wittman Tailwind	2	High Wing, Enclosed Cabin	Steel Tube, Wood, Fabric	85-140 hp	22-6
Zenith	2	Cantilever Low Wing, Tricycle undercarriage	Aluminium Alloy	90-160 hp	23-0

Area sq ft	Empty lb	Gross lb	Cruise mph	Stall mph	Climb ft/min	Kit	Brochure	Plans	Address (U.S.A. unless otherwise stated)
115	390	625	75	34	600	yes	$2	$25	Ace Aircraft MFG. Co., 106 Arthur Rd., Asheville, N.C. 28806
155	750	1275	87	30	650	no	$1	$20	J. C. Powell, 4 Donald Drive, Middletown, R.I. 02840
84	466	750	100	40	500	yes	$5	$27	Aerosport Inc., Holly Springs Airport, Holly Springs, N.C. 27540
81	380	650	66	42	—	yes	$3,50	$39	Aerosport Inc., Holly Springs Airport, Holly Springs, N.C. 27540
105	450	725	85	42	700	yes	$5	$37	Aerosport Inc., Holly Springs Airport, Holly Springs, N.C. 27540
112	575	950	100	35	1200	yes	$2	$29	Ace Aircraft MFG, Company, 106 Arthur Road, Asheville, N.C. 28806
138	985	1450	115	38	1500	yes	$2	$40	Bakeng Aircraft, Box 2607, Everett, Wash 98203
75	535	790	115	52	1000	yes	$2	$75	Bill Warwick, 5727 W. Clearsite, Torrance, Calif 90505
102	1080	2000	174	63	1400	yes	$4,50	$50	Bede Aircraft Inc., Newton Municipal Airport, Newton, KS. 67114
47	3355	660	229	55	1920	yes	$5	nil	Bede Aircraft Inc., Newton Municipal Airport, Newton, KS. 67114
55	375	650	140	50	900	yes	—	nil	Bede Aircraft Inc., Newton Municipal Airport, Newton, KS. 67114
120	605	924	110	45	1100	no	$1	$25	P. Bowers, 13826 Des Moines Way South, Seattle, Wash. 98168
165	700	1200	75	25	500	no	$1,50	$25	Breezy Aircraft, 8748 So. 82 Court, Hickory Hills, Ill. 60457
67	500	950	180	70	2000	yes	$1	$25	Southern Aero Corp., 14100 Lake Candlewood Court, Miami Lakes, Fla. 33014
70	420	650	123	34	770	yes	$4	$70	J. Corby, 86 Eton St., Sutherland, NSW 2232, Australia
130	825	1350	130	45	800	no	$2	$80	Art Szaraz, 419 Centre Rd., Bedford, Ohio 44148
82	610	1125	115	62	400	yes	$2	$110	L. Davis, 3501 Baumann Ave., Midland, Texas 79701
180	1000	1750	170	N/A	2000	no	$3	$125	J. Dyke, 2840 Old Yellow Springs Rd., Fairborn, Ohio 45324
	733	1200	130	50	3000	yes	$5	$60	E.A.A., Box 229, Hales Corners, Wisc. 53130
100	440	650	75	45	600	yes	$3	$45	Evans Aircraft, Box 774 La Jolla, Calif. 92037
130	640	1040	75	45	600	yes	$3	$45	Evans Aircraft, Box 774 La Jolla, Calif. 92037
138	600	1200	120	35	1000	yes	$3	$40	Sturgeon Air Ltd., 36 Airport Rd., Edmonton, Alberta, Canada
97	350	575	80	30	600	yes	$3	$45	Sturgeon Air Ltd., 36 Airport Rd., Edmonton, Alberta, Canada
82	680	880	150	41	1800	yes	$3	$70	Sturgeon Air Ltd., 36 Airport Rd., Edmonton, Alberta, Canada
102	726	1300	162	60	2500	yes	$3	$100	Sturgeon Air Ltd., 36 Airport Rd., Edmonton, Alberta, Canada
68	580	900	200	60	2500	yes	$2	$75	Bushby Aircraft, 848 Westwood, Glenwood, Ill. 60425
97	900	1500	180	57	1800	yes	$2	$125	Bushby Aircraft, 848 Westwood, Glenwood, Ill. 60425
126	606	950	100	47	1200	no	$3	$50	A. Cvjetkovic, Box 323, Newbury Park, Calif. 91320
116	900	1450	136	54	1700	yes	$3	$150	Pazmany Aircraft, Box 10051, San Diego, Calif. 92110
89	578	850	98	48	650	yes	$3	$150	Pazmany Aircraft, Box 1005 1, San Diego, Calif. 92110
145	622	1150	80	45	350	no	—	$15	B. H. Pietenpol, Spring Valley, Minnesota 55975
98	710	1050	140	57	2600	no	$3	$100	Pitts Aviation Enterprises, Box 548, Homestead, Fla. 33030
62	310	600	130	42	700	yes	—		Rand-Robinson, 5752 Whistler, Huntington Beach, Calif. 92649
75	400	700	125	39	1000	yes	$1	$35	Southern Aero Corp., 14100 Lake Candlewood Court, Miami Lakes, Fla. 33014
146	790	1150	90	35	600	no	$3	$50	Replica Plans, 853 Kirkmond Cr., Richmond B.C., Canada
106	500	750	80	35	600	no	—	$15	Wilbur Smith, 1209 N Rosney, Bloomington, Illinois
75	440	750	150	40	1200	yes	—	$50	Monnett Experimental Aircraft, 410 Adams St., Elgin, Ill. 60120
84	506	925	140	45	—	yes	—	—	Monnett Experimental Aircraft, 410 Adams St., Elgin, Ill. 60120
155	1080	1650	130	50	1100	yes	$2	$50	Steen Aero Lab, 3218 S Cherry, Denver, Colo 80222
98	830	1300	130	50	3000	no	$2	$150	Stephens Aircraft, Box 3171, Rubidoux, Calif. 92509
111	433	700	75	35	650	yes	$2	$15	Stewart Aircraft, 11420 Rout 165, Salem, Ohio 44460
117	850	1500	133	50	870	no	$2	$60	E. Littner, Box 272, St. Laurent, Montreal 379, Canada
76	410	620	90	38	950	yes	$1,50	$27	Mrs J. F. Taylor, 25 Chesterfield Cresc., Leigh-on-Sea, Essex, England
71	500	745	155	53	1100	no	$1,50	$37	Mrs J. F. Taylor, 25 Chesterfield Cresc., Leigh-on-Sea, Essex, England
60	310	585	110	50	800	yes	$3	$35	C. Parker, Box 3163, Pensacola, Fla. 32506
86	900	1500	175	65	2000	no	$2	$150	Thorp Engineering, Box 516, Sun Valley, Calif. 91352
80	342	620	85	30	500	yes	$3	$60	Sturgeon Air Ltd., 36 Airport Rd., Edmonton, Alberta, Canada
90	695	1050	171	47	1900	yes	$2	$75	Van's Aircraft, RT. 2, Box 187, Forest Grove, Oregon 97116
98	122	310	45	26	100	no	$1	$11	R. W. Hovey, Box 1074, Saugus, Calif. 91350
90	700	1400	150	55	900	no	$1	$125	S. J. Wittman, Box 276, Oshkosh, Wisc. 54901
106	900	1600	150	55	1300	no	$2	$125	E. Littner, Box 272, St. Laurent, Montreal 379, Canada

MAKING A PROPELLOR FOR A VW MOTOR

by John Buchan, Len Cormac, Owen 'Props' Pilcher

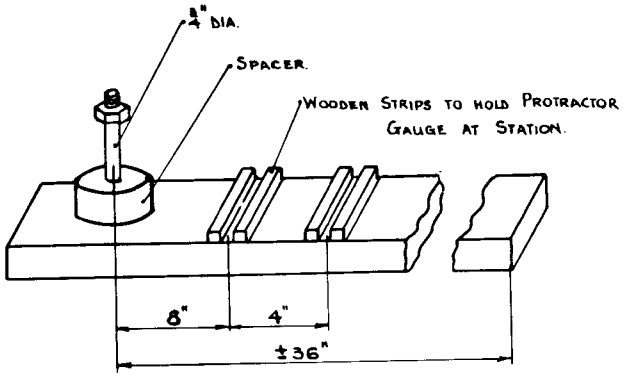
Editor's note:
This article was submitted as a joint venture by the above-mentioned homebuilders. Len made the propellor that appears in the photographs, Owen supplied a major portion of the technical information as well as taking the photographs, and John prepared the text and made the sketches.

Converted VW motors are widely used in the smaller homebuilts but commercially manufactured propellors are in very limited supply, so obtaining a suitable propellor can often be a problem. This article aims to be of assistance by being orientated to the practical issues involved in propellor making.

The basic hand tools required for the project are a small saw, chisel and mallet. These are used for initial removal of surplus material. For subsequent shaping a spokeshave, plane, Surform files and sanding blocks are useful – the exact choice depending largely on personal preference.

Power tools required are a band saw to cut the propellor shape and a drill press for the drilling of the hub.

A protractor gauge is necessary for measuring angles and a carving table as shown in Figure 1 is used during the shaping of the blade profile. The few other items required are mentioned subsequently in the article.



SOME DETAILS OF THE CARVING TABLE.

FIG. 1.

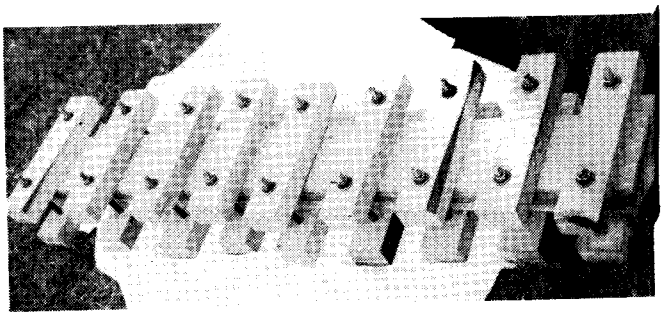
Preparation of Propellor Blank

Suitable types of timber that are obtainable locally include ash, beech, birch and mahogany. The planks used must be selected to ensure no structural defects are present.

The dimensions of the planks used should be approximately 60" x 6" x ½". The finished dimensions of the propellor are in general

Hub diameter	5"
Total diameter	54" – 58"
Thickness	2½"

A general guide is to use a minimum of five laminations. Suitable glues include Aerolite, Aerodux and Cascophen. Pressure during glueing is applied by clamps spaced every few inches as shown in the photograph. These clamps are easily made up from strips of timber drilled to take carriage bolts of the required length.



Marking and Cutting the Blank

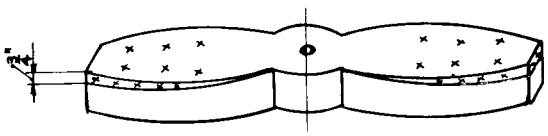
The first step after glueing together the laminations is to mark out the centre point of the blank and drill a ¾" diameter hole centred through this point.

To mark out the blade shape, a template must be used to ensure symmetry and great care must be taken to ensure that the template is carefully aligned to the longitudinal centre line of the blank, thus guaranteeing that the blades are diametrically opposed.

After marking, cut the propellor blank to shape with a band saw.

The next step is to mark out the slope of the rear face of the blades. From full thickness at the edge of the hub, the posterior surface slopes inwards in a linear fashion to a point at the tips, ¼" below this plane. This is illustrated in Figure 2.

The wedge is roughly removed with a bandsaw and then smoothed up with a plane.



THE MARKING OUT OF SLOPE ON THE POSTERIOR SURFACE.

FIG. 2.

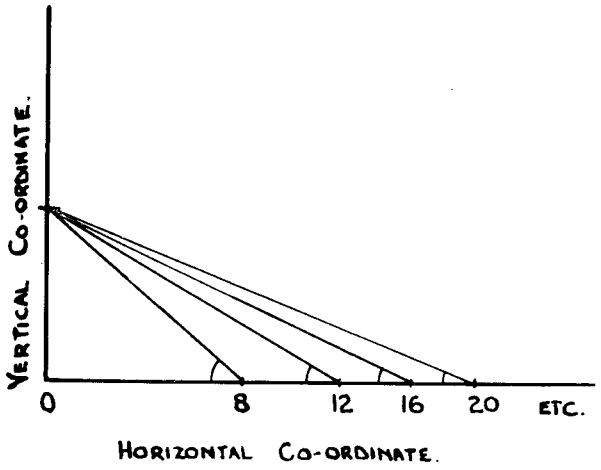
Carving the Blank

The following step is to carve the blade and this can be broken down into two steps. First the posterior surface of the blank is sloped to the appropriate pitch angle. Then using this back surface as a reference, the front face is carved, with the aid of templates, to give an appropriate aerofoil section.

Now to consider propellor pitch and its laying out on the posterior surface. The propellor pitch is commonly expressed in inches and this is the theoretical maximum distance moved forward with each revolution. In practice, for this type of propellor, it is found that the pitch varies between

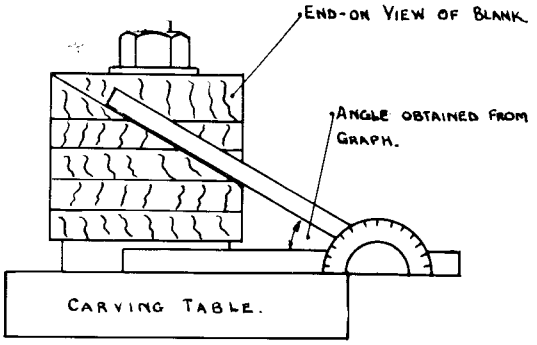
about 26" and 36". The maximum number of engine revs obtained is dependent on the combination of propellor pitch, diameter and blade area and it is worth pointing out that with propellors of this type it is unwise for the tip speed to exceed 580 mph. As a guide the pitch, in inches, may be determined by multiplying the expected cruising speed of the aircraft, in mph, by 1200 and then dividing this by the cruising RPM of the motor. For instance a cruising speed of 90 mph at 3600 rpm would require a pitch of 30 inches. The factor of 1200 assumes a propellor efficiency of approximately 88%, which is applicable to a well designed propellor.

Once the pitch has been selected it is necessary to look at the correlation between pitch expressed in terms of inches and the actual angle of the posterior face of the propellor because it is this angle which is your guide in carving the posterior face. A useful graphical scheme which relates these two is shown in Figure 3 and is approached in the following way. The value plotted on the vertical co-ordinate is obtained by dividing the propellor pitch in inches by 6.28 (=2 $\overline{11}$). The values plotted on the horizontal co-ordinate must be expressed in the same units (i.e. inches in this case) and correspond with the position of the stations on the carving table. An important point to note is that the scales used on both co-ordinates must be the same.



GRAPHICAL DETERMINATION OF PITCH ANGLE.

FIG. 3.



MEASUREMENT OF PITCH ANGLE OF POSTERIER SURFACE.

FIG. 4.

The angles formed between the horizontal co-ordinate and the lines joining the value on the vertical co-ordinate with the values on the horizontal co-ordinate are the angles which apply to the posterior surface at that station. See Figure 4. These angles can be read off directly from the graph.

One more point to consider is the direction of slope of the back face. This is related to the direction of rotation of the engine. Standard VW conversions when viewed from the front, swing the propellor in a clockwise direction. Refer to the accompanying photograph to ensure correct direction of slope.

The next practical step is to mark out on the blank the portion which must be removed from the posterior surface. The bulk of this is easily and rapidly removed with vertical saw cuts and chiseling before going on to use a spokeshave or similar tool. The carving should start at the tip and move in towards the hub. When dealing with the portion of propellor adjacent to the hub (approximately 8 inches) it should be borne in mind that this portion has less importance as regards the development of thrust and a principal task is the transmission of the thrust load from the blade proper to the hub. Therefore the shape of this portion of the propellor should be developed so as to fair smoothly into the hub area in a fashion which ensures that an amount of material adequate to bear the thrust load remains. This is of more importance in this area than an accurate following of pitch angle.

Now with the back face done, let us turn our attention to the front face. The goal of our carving is to create a blade with an aerofoil section and the aerofoil used widely in propellor carving is the Clark-Y section. This is a very convenient section as it has a predominantly flat undersurface which is represented on our propellor by the flat back face. The key at this stage is to make up a set of suitable size templates and this can be done with reference to Figure 5 which has the co-ordinates for the Clark-Y section.

Co-ordinates for Clark-Y Aerofoil

Chord (datum) line along flat portion of lower surface
Leading edge radius = 1,50% chord.

Percent of chord	Upper surface	Lower surface
0	3,50	3,50
1,5	5,45	1,93
2,5	6,50	1,47
5	7,90	0,93
7,5	8,85	0,63
10	9,60	0,42
15	10,69	0,15
20	11,36	0,03
30	11,70	0,00
40	11,40	0,00
50	10,52	0,00
60	9,15	0,00
70	7,35	0,00
80	5,22	0,00
90	2,80	0,00
95	1,49	0,00
100	0,12	0,00

Fig. 5

With the templates ready and the prepared back face as a guide it is just a matter of some patient carving to produce two completed symmetrical blades.

Drilling the Propellor hub

Drilling the hub is the next step and this must be done with due care as a perfectly carved propellor can be ruined by holes placed asymmetrically.

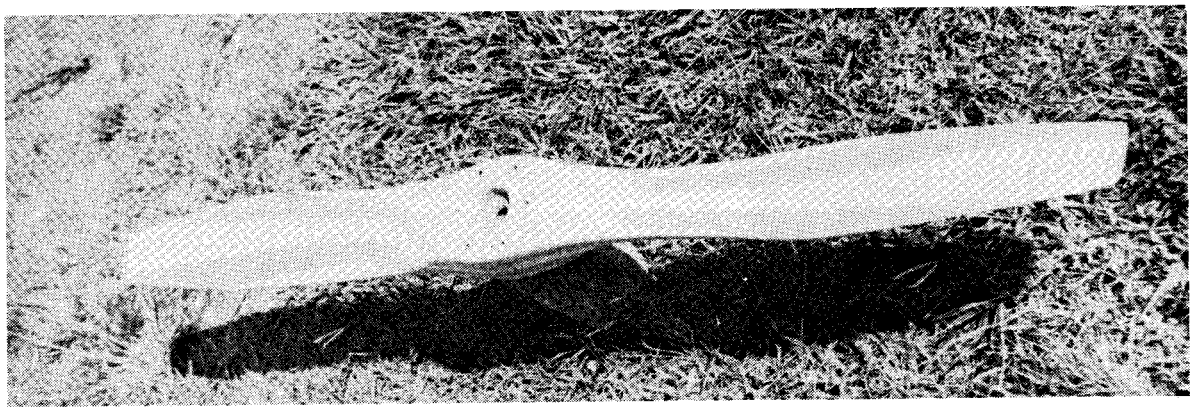
The holes must be drilled to mate with the propellor hub to be used. In general the bolt holes are six in number placed symmetrically on a 4" diameter circle in such a fashion that two bolt holes are situated along the longitudinal centre line of the propellor. The centre ¾" hole is enlarged to 2" diameter and recessed to the depth required.

After the drilling has been completed a static balance check should be performed.

Finishing

There are several techniques here which can be used. In some instances only the propellor tips are fibreglassed (this should include at least 4") and the remainder covered with a durable varnish such as polyurethane. In other instances it is preferred to completely cover the propellor with fibreglass.

When the finishing has been done the propellor is checked again for balance. Then it is ready for business — hey who wants to give me a swing?

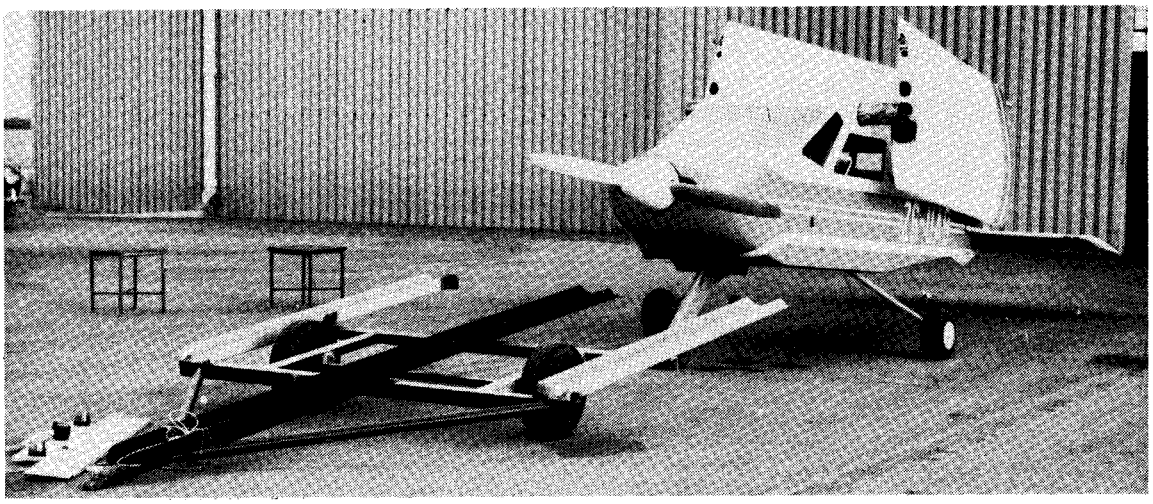


SATISFIED BD-4 OWNER

by Dr. A. L. Bergamasco

In the September issue of Homebuilt, I gave a brief outline of the flying characteristics of our recently completed BD—4, then barely two months old. A further six months have passed, and our flight experiences amply confirm our first impressions of the pleasant and docile characteristics of the BD-4.

Wings folded and trailer waiting

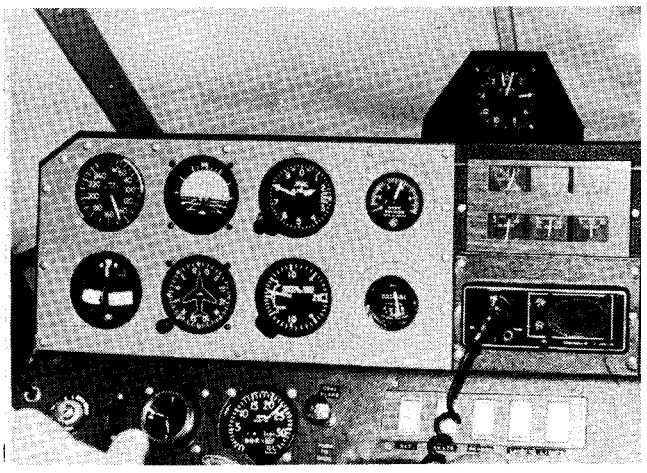


To begin at the beginning, one might consider the transportability of the BD-4. I incorporated the wing folding option on our aircraft. This consists of two sections of steel tubing, one attached to the fuselage centre spar and the other to the wing spar: the two sections have a hinge joint. Removal of two bolts allows the wing to slide off the centre section. It is now supported by the steel tube and this being hinged, allows the wing to be simply rotated vertically and then folded backwards to be supported on a rack straddling the fuselage. Ditto with the other wing. As the fuel lines, electric wires, and pitot tubing are flexible, none require to be disconnected. Furthermore, the aileron and flap controls simply re-engage when the wing is pushed back onto the main centre spar; and so preparing the aircraft for trailering is as simple as it could be. One snag; the tanks should be reasonably empty as the weight of fuel would make the wings heavy to handle.

To make full use of the ease of transportation, a trailer was constructed consisting of a sturdy steel frame on wheels, and having three channels at suitable spacing to accommodate the tricycle undercarriage. A simple tackle attached to the nosewheel pulls the plane onto the trailer, and after securing the wheels to the channels with metal strips bent over like mudguards, the unit is now attached to the car and is ready to be driven home to "hangar" or to attend to any jobs that may have to be done. The photograph shows the BD-4 with wings folded ready to be pulled onto the trailer. We took advantage of this capability when we took the plane home to change the eight inch nosewheel for a ten inch one. The smaller wheel we found has a tendency to sink into soft areas of taxyway or runway, and I feel that any BD-4's being built in this country should be constructed with the larger wheel; the touring capability of this homebuilt encourages it to be flown far and wide, and all sorts of indifferent strips are likely to be encountered.

Early flight testing concentrated on stall behaviour, an aspect of the flight envelope which I considered most important to be familiar with. Briefly, we found the stall behaviour to be comparable to that experienced in the very safe store bought article, and this even though the BD-4 has a "fast" wing, and there is also no twist. Two flight situations illustrating docility and safety can be mentioned. Put the aircraft into a steep turn at moderate speed and throttle setting; steepen the turn more and more; some planes will suddenly then exhibit (I am told) a spiteful flick and spin in the opposite direction. Trying this with the BD-4, I found that it drops the lower wing and kicks up the tail in an incipient spin. However, a touch of opposite rudder and nudge forward of the stick found her

The recording needle of the accelerometer showing 4.G.



stable and flying again. Another pleasant trait observed is as follows: with 20° or 30° flap, ease into a full stall (about 63 m.p.h.). Just before the nose drops and keeping the stick well back, give full throttle. Notice that though the airspeed is kept on 60 m.p.h. (i.e. below the stall), the plane responds by climbing at 400'-500'/min. This suggests that the plane can be safely hauled out of awkward situations or out of a short runway that suddenly has become too short.

The next item on the testing agenda was windy situations. Taxying in a stiff wind with a castoring nosewheel takes more effort than in a plane with a steerable nosewheel. The effect of the wind on the fin will try to whisk the plane around. Keep the situation in hand with firm foot application on one or other toe-brake. There seems little danger that even severe gusty conditions will tip the plane over; the high aspect ratio wings and the slight negative dihedral while the plane is on the ground obviate this worry. Cross-wind landings – well if I don't bring them off so well I don't blame the plane. Actually, on one practice occasion, an instructor who came along for the ride commented that she behaved more ladylike than some stable low wing trainers.

Final requirements of the D.C.A. are speed and strength substantiation tests. The former is simple – nose down and don't let the engine over-rev. Two hundred m.p.h. is soon on the clock, and that seems enough. The next requirement is not so pleasant. This requires a G-meter which I fixed to the top of the panel where it can be clearly photographed. A very courageous cameraman strapped himself into the back seat. Actually, the camera operator found that above 2 G's he could not hold the camera up, and had to wait until after the manoeuvre to snap the result on the G meter. The requirement for this plane is 3.8 G. The idea is to attain moderate G's at first, gradually increasing till the required stress factor is attained. Here goes: nose down pick up speed and pull back on the stick: 2.5 G's appeared on the meter; then 3, then 3.6. Not quite enough. Here goes for another try: nose down; speed is 160 m.p.h.; haul back on the stick; the world gyrates past the windows in a blur; one listens anxiously for any untoward sound; ease off on the stick to avoid going right over into a loop. What does the G meter say? Cheers, 4G. Quite enough. A photograph taken as proof and off we go for home and some resuscitation – the crew I mean, not the plane thank goodness which was in fine shape.

Our BD-4 now has 85 hours on the clock, quite trouble free, and seems set to fulfil our primary aim – and that of all homebuilders – happy flying.

SOME HINTS ON TEST FLYING A HOMEBUILT AIRCRAFT

by Johan van Garderen

First and foremost: NO CHEAP HEROICS. That means: Take it easy, don't press it, think what you are doing. Are you sure the C of G is within the design limits? None of this "We'll-sort-it-out-afterwards" business.

Do you have full control deflection, as designed, and CAN YOU GET IT AT ALL TIMES? If you have fulfilled these requirements, you can do the taxi tests. These tests must be 100% satisfactory before you go on. Be sure that there are NO VICES i.e. swinging with power-application, or sudden changes of direction for no appreciable reason. Pay special attention to the brakes, they must be good. Once you are happy about this, establish the tail-liftoff or nosewheel liftoff speed, as the case may be, and test the rudder effectivity, that is, if you have enough runway. If this test is satisfactory, and you have enough runway, lift the aircraft just off the ground, put it down and brake like hell. Check the take-off speed against that given by the designer. If you are still smiling, take off with a few extra knots in hand and climb straight out to a safe altitude. Set up a comfortable cruising speed and do some GENTLE manoeuvres, not more than 30° bank and gently feel out the controls. The controls must not come near the stops during these gentle manoeuvres, watch out for this, it is extremely important throughout. If this is okay, sneak the speed down on reduced power, at no more than ONE mile per hour retardation per second, to your **highest** acceptable approach speed. Keep feeling out the ailerons, a sudden decrease in effectivity shows that a portion of the wing has stalled. If you have tufts of wool on the wings, you will pick this up easily. Once again, be sure that the controls stay far away from the stops.

Assuming all goes well, reduce the speed by, say, 3 mph increments to the predicted stalling speed. Be sure that the control effectiveness stays good. Reduce the speed until you get a stall warning. This speed multiplied by 1,3 gives you your MINIMUM approach speed. Take the aircraft back to the airfield and do a fullstop landing. Wipe off the sweat and the grin, write down all your observations and analyse them. If all is well, go on to investigating the stalling characteristics. Before doing so practice a few incipient spins in the CLUB AIRCRAFT, so that you don't overcontrol in case your homebuilt drops a wing. Be very careful of any bad design like pitch-up on stalling. Do not reduce speed faster than ONE mph per second, otherwise you may get a dynamic or G-stall. Again the controls must not reach the stops, except maybe full up elevator to accomplish the stall.

All still being well, you can begin with incipient spins. Again be careful and feel it out gently. If it recovers easily, do a half turn and recover. IF IT DOES NOT RECOVER VERY EASILY DO NOT GO ANY FURTHER. If, however, it recovers easily, take it to one turn, then two turns or even three turns if you have the guts, BUT MAKE SURE THE NOSE STAYS DOWN IN THE SPIN, lest you lose the aircraft. After this you get to dynamic stalls . . . G-stalls at cruising speed, to see if the aircraft flicks when it stalls. This is best done in a steep turn. I will be happy to lend my parachute to anybody who gets to this stage of testing.

Since you have to stay near the airfield for some hours you might as well spend them test flying; do these stability tests:

LONGITUDINAL STABILITY:

STATIC: If the aircraft requires constant forward pressure on the stick to remain level accelerating from low speed to high speed, then it is statically stable in the longitudinal plane.

DYNAMIC: Begin at low cruising speed. Trim for straight-and-level (if you have a trim) and apply a double impulse (stick forward, stick back, 1G accelerations i.e. OG and

+2G) and let go. The aircraft must return by itself to straight-and-level, preferably periodic, to be considered dynamically stable. Increase the speed until you have covered the entire speed range.

LATERAL AND DIRECTIONAL STABILITY:

STATIC: On approach speed and with plenty of power, gradually apply rudder till full deflection, keeping straight with aileron. Be careful of rudder-overbalance and fin and rudder stalling. If you have enough aileron to counteract full rudder, the aircraft is directionally stable.

DYNAMIC: If the aircraft does not Dutch roll like a V-tail Bonanza, it is dynamically stable.

SPIRAL STABILITY:

With ailerons ONLY, keeping the rudder centralised, roll to 30° bank and let go the stick. If the aircraft returns to straight-and-level, it is spirally stable in the rolling plane.

Repeat this using the rudder only, if it recovers it is spirally stable in the yawing plane.

(I have yet to fly an aircraft with any spiral stability at all) So, take it easy all the way, keep looking for any abnormality, and if you find any, land, think it over and go on only if it is safe to do so; otherwise stop right there and get some gen before going on. I hope this will prove of some use. The future of the homebuilding movement depends on you, so take it easy, we don't like losing members. Never let the number of take-offs exceed the number of landings.

FLY BABY AFTER 150 HOURS

by Tony Wills

Fly Baby ZS-UFI became airborne for the first time on September 26, 1972 after some four and a half years of graft; most of it pleasurable but including much blood sweat and tears. Now, some 150 flying hours later all this is forgotten. Only the joy of owning and flying the aeroplane remains.

One of the great sources of satisfaction is its cheapness (relative!) to fly. ZS-UFI has cost so far just under R5 per hour when properly costed out, i.e. hangarage, insurance etc. plus the cost of fuel and oil. If you're like me you will quietly forget the fixed costs, in which case about R3 per hour for running costs comes directly out of my pocket. Here is a very approximate break-down of the costs so far:-

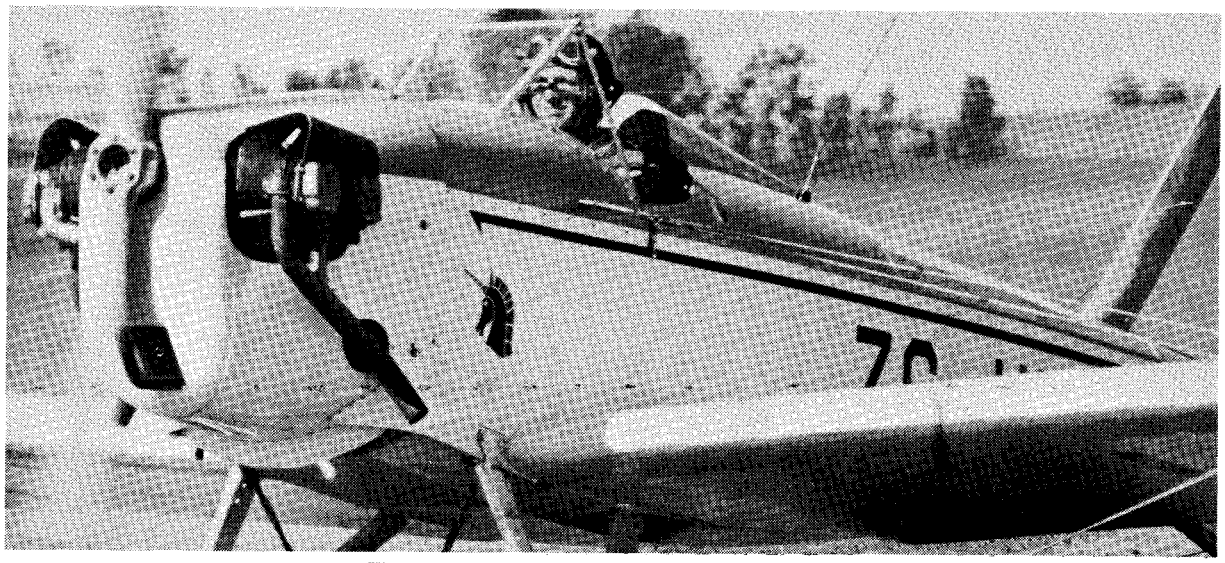
Hangarage @ R15 per month	R285
Insurance (pro rata)	75
Maintenance — Parts	100
Labour	—
Oil (oil change at 25 hr intervals)	25
Fuel (150 hrs @ 3½ gals/hr)	262
Total	R747
Cost per hour	R4.98

The aeroplane has proved to be remarkably free of maintenance snags. The R100 or so spent so far has been on small improvements, modifications and minor repairs. The Fly Baby is a wire-braced low wing monoplane and uses 1 x 19 stranded stainless steel flying and landing wires secured by Nicopress sleeves — very draggy, but effective. After some time I replaced the flying wires and used double Nicopress sleeves simply for peace of mind. The tailwheel and spring is a highly stressed area on any taildragger, and, after having a bolt failure accompanied by expensive noises, I have reinforced the rudder post and spring attachment area.

The aeroplane has been flown by several pilots and they all seem to have enjoyed it. I feel that I know the aeroplane quite well by now and am tolerant of its weaknesses (love is blind, so they say). It has a high rate of sink without power. It is rather slow — about 85 mph cruise to be honest — and it has a limited range. Its straight-through axle precludes the use of strips where the grass is longer than about six inches. However it more than makes up for these short-comings by being a pleasure to fly — light and sensitive on the controls — safe and sturdy. I have climbed up to 12500' and it was still going up — slowly. Its spin recovery is quick and conventional.

I know that my aeroplane is not everyone's idea of the perfect homebuilt — it has been unkindly called "a latter-day antique", but it gives me great pleasure. I am content.

Fly Baby with son Dave at the controls



FOR SALE

- Five and ten hundredweight turnbuckles. Very reasonable price to E.A.A. members, Contact Mr R. Stayt, 15 Friesland Rd., Sherwood, Durban.
- Fly Baby project, 60 per cent completed. Will sell with Rapide wings and 75 hp Lycoming for R1 000.
- Red Robin ready for test flying. R2 500
- Teenie Two project, 80 per cent complete. Will sell with two VW-1700 motors and propellor for R1 500.
- Fairchild ready to be covered. Motor 350 hours. Will sell with spare motor (500 hours) for R3 500.

  Contact Mr B. Harding, Box 222, Empangeni, Zululand.

SPORT AVIATION

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