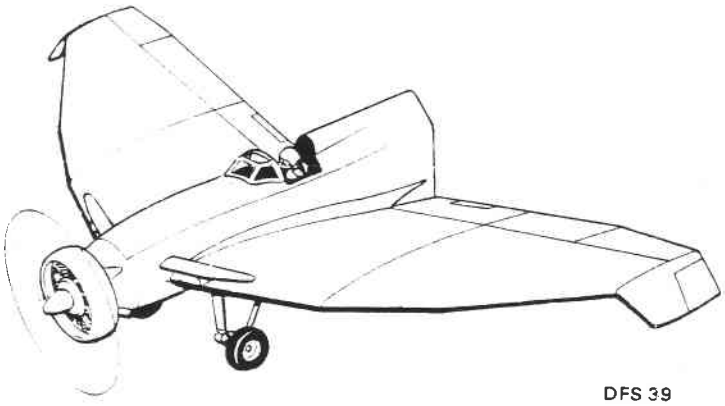
No. 127 JANUARY 1997

T.W.I.T.T. NEWSLETTER

German Research Institute for Gliding). After various setbacks his Delta IVb was given the official RLM designation DFS 39 in 1937.

Powered by a 100hp piston engine, the DFS 39 had a slightly gulled delta wing with pronounced wingtip anhedral. At this point the RLM was looking forward to a second version of the DFS 39 powered by an 88lb (40kg) thrust Walter rocket, representing the beginning of *Projekt* X. The RLM stipulated a speed of 217mph for the DFS 39 under rocket power, but Lippisch had already started design work on the DFS 40 and what was to be the DFS 194. These designs he considered more suitable for rocket power because they had central rudders, so avoiding the possibility of a recurrence of the flutter suffered by the wingtip surfaces of the DFS 39. In the event the rocket-powered DFS 39 did not actually fly, being dropped before completion in favour of the DFS 40.

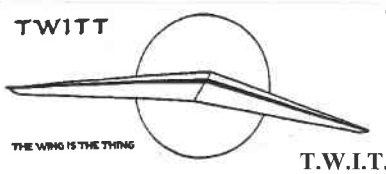


DFS 39

T.W.I.T.T.
The Wing Is The Thing
P.O. Box 20430
El Cajon, CA 92021

The number to the right of your name indicates the last issue of your current subscription, e.g., **9701** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, January 18, 1997, beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - East side of Gillespie).



THE WING IS THE THING (T.W.I.T.T.)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines.

T.W.I.T.T. Officers:

President: Andy Kecskes (619) 589-1898
Vice Pres: Bob Chase (818) 336-5485
Secretary: Phillip Burgers (619) 563-5465
Treasurer: Bob Fronius (619) 224-1497
Editor: Andy Kecskes

The T.W.I.T.T. office is located at:
Hanger A-4, Gillespie Field, El Cajon, California.
Mailing address: P.O. Box 20430
El Cajon, CA 92021

(619) 596-2518 (10am-5:30pm, PST)
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E-Mail: NBKP63A@prodigy.com

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Wt/#Issues	FRG	AUSTRALIA	AFRICA
1oz/1	1.00	1.00	1.00
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36oz/36	14.00	19.50	14.00
48oz/48	16.75	23.00	16.75
60oz/60	21.75	30.25	21.75

Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive, east side of Gillespie).

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PRESIDENT'S CORNER

I hope everyone had a good holiday season with lots of aviation oriented gifts and the spirit to carry on through the long winter months ahead (for some of you anyway).

The new year will get off to a good start with the January meeting by having Gene Larrabee talking to us about low speed aerodynamic problems and perhaps some solutions. We are seeing progress it getting TWITT wider exposure on the world wide web, along with having newsletters now available at the EAA museum/library as well as the Library of Congress.

The participation by our foreign members continues to grow as can be seen in this and the past few newsletters. This is most welcomed since there seems to be a lot of activity especially in Europe with regards to flying wings. The PUL-10 continues to intrigue more people and perhaps we will eventually see a US dealership spring up for this aircraft.

We continue to expand our association with other aviation organizations which gives us an opportunity to reach more homebuilders who may not have considered a flying wing project in the past. Hopefully, once they see the advantages of the design we might be able to win them over and see even more growth in filling the skies with tailless planes and gliders.

I know there have got be some of you out there who are diligently working on some fantastic project, be it full size or scale model, that you would love to share with the rest of us. Don't hesitate to drop a few pictures in the mail along with a short narrative of what you're doing. If you are at a stumbling block and need some answers, drop us a line with your question(s) so someone who may have already been through it can give you some help. None of us want to re-invent the wheel (or spoiler rigging, or canopy forming, or, or, or). Don't forget there is no dumb question and if you don't ask it before getting to far along it could cost you big bucks to rectify the situation after the fact.

For those of you on the west coast, we will be hitting the pages of The Pacific Flyer in February with an article by Chuck Stewart telling everyone about a bunch of TWITTs and their desire to keep the idea of flying wings alive and in the air. Look for it at your nearest airport.

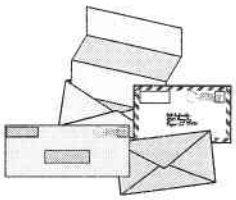
Andy

JANUARY 18, 1997 PROGRAM

This month's program will feature **Gene Larrabee** talking about **low speed aerodynamics**, a subject he seemed quite interested in when we talked at a past meeting. Bruce Carmichael commented that Gene is a walking history of aeronautical engineering and a most delightful fellow. With those kind of credentials, we can hardly go wrong having him talk to us about aerodynamics.

Gene worked for Curtis Wright on the aerodynamics of the C-46 cargo plane and several advanced versions of the P-40. He then moved on to become a teacher and professor at MIT. As a model airplane builder he became interested in sailplanes and low powered aircraft (man-powered). He brought together a group of students who created a series of man powered aircraft and Gene worked out a propeller design theory which produced a loading of minimum induced drag.

After retirement from MIT, Gene and his wife moved to California where he worked for the late Dr. Julian Wolkovitch on joined wing aircraft. He also taught aerodynamics at the Northrop Institute. He has just completed a book on stability and control in partnership with Malcomb Abzug.



LETTERS TO THE EDITOR

Dec 16, 1996

TWITT:

Thank you for your answer in the Nov '96 newsletter. My booklet is in Italian, but if someone is interested in publishing it in the US or elsewhere, I could translate it into English or French with a little help. The booklet will appear in '98 in German edition.

Now it is winter days in Italy and doing flight is a next-spring dream. But experiments are possible indoors. Enclosed you will find a still, I hope, flyable Zanonia model. Actually it's not so simple to fly such a wing right well. That's good exercise for observation and understanding.

For example: at very low speed and dimensions and low aspect ratio, it seems very important to have inherent directional stability with pure geometry of wing (also see the autobiography of Igo Etrich); it seems to be very important the relation between degrees of roll and directional oscillations; and for Dutch roll a maximal caution of the natural wing (seed) by concentrating the most mass in the CG.

Note the influence of:

Geometry of washout
Camber of profile
Very low or absence of sweptback in center
Contour most at trailing edge on wing tips

Some Zanonia wings of mine, like the natural prototype, still fly after 2 years surprising well, and in some cases they have an L/D remarkable or near 10 for span of 16.5 cm.

It is good to collect different shapes of that wing seed, build, compare models and extract principles.

Here are some things from books (see page of seed drawings Curzio included with this letter).

Maybe Zanonia is still interesting for flying wings with low A/R and dimensions? Hang gliders or floating wings (see Alain Mirouze).

Eventually send me please info-package on Zanonia wings of the past like Etrich, Berblinger, Weisse, Geest, Alula, Adaridi, Tjumin, etc. or designs of sailmodels of German type sweptback from Wasserkuppe Rhon (not Horten, Lippisch models).

Do you find the report on flying wings of February 1932 on magazine LUFTWACHT?

Regards,

Curzio Vivarelli
via Aspremonte 6
37126 VERONA ITALIA
Tel 045 8345331
Fax 0444 927555

*(ed. - Thank you for the material on the Zanonia seed and the model aircraft. I will publish the full page of seed shapes **(page 4)** and your annotations, along with the picture from your booklet in this issue. I will also try to carefully dissect your flying model so that its pre-folded shape can be reproduced as a template for others to try it. Bob and I have tested it and it flies very well considering it's made of regular 20 pound paper stock. In the past we have had better luck with light cardboard stock.*

*I am also going to include another version of a Zanonia seed glider **(page 5)** that someone sent us a long time ago that is made of foam like that found on food cartons. It was published in Model Aviation, February 1983, however, the article that accompanied it was incomplete so the only instructions on building and flying this model are on the plans sheet.*

I don't believe we have much more in the library covering adaptations of the Zanonia seed into actual types of flying wings. Bob will look, but we haven't received anything like that in the past few years.

As for your question on the 1932 magazine, I am not sure just what you are referring too. I seem to recall someone asking about the pictures of Bernie Gross that we included several months ago, but we don't have the magazine since Bernie provided the pictures from his own collection. Please let me know what I missed in answering your question on this part.)

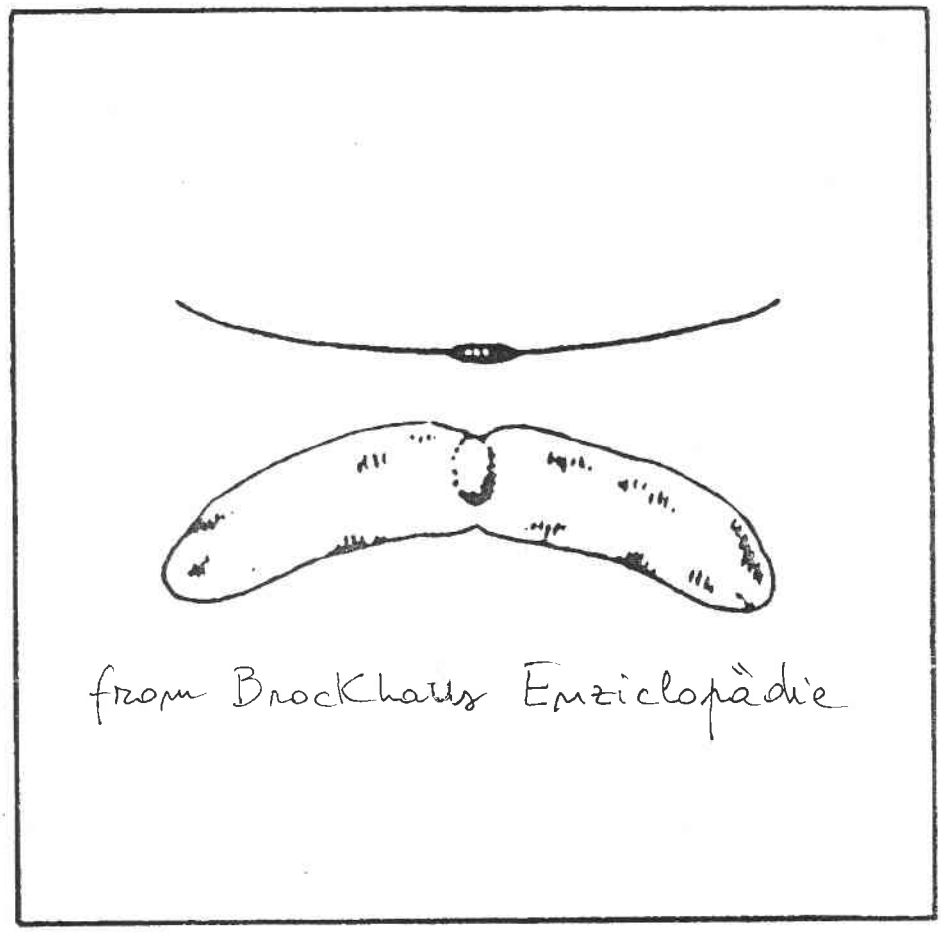
Thanks,

Scott A. Bridges
54362 Armstrong Road
Scappoose, OR 97056
(503) 543-7076

(ed. - Well, this is about the best we can do to get the word out that you are looking for information. I have included your address and phone number in case there is anyone out there that can help with some of your questions. We do have a few members that are familiar with the Mitchell wings, so perhaps one of them can tell you about the CG and flying characteristics. We haven't heard much in the past about putting retracts in a U-2, although it is obviously possible.

We had a member some years ago by the name of Klaus Saviar who had a U-2 that he had extensively modified, although not with retracts. I can't find an address for him right now, but he has been a key participant in the CAFE races over the years, so if you know of anyone associated with that organization you might ask them about Klaus.

We hope you get some response from our members on your questions, and welcome you as a new member of TWITT. If you have any construction pictures (seeing that you haven't covered it yet) you could spare, we would appreciate you sending us a few so we can show the membership your project.)



seme di Zanonia

ABOVE: Planform and frontal view of a Zanonia seed as shown in Curzio Vivarelli's booklet. Note the concentration of weight towards the leading edge and the natural curvature of the dihedral (looks like some high performance, glass sailplane wings).

12/19/96

TWITT:

Thanks for helping me with the phone numbers. If you could write up something in your newsletter I would appreciate it.

I need help with information on some items for the Mitchell U-2 I am about to finish. I'm looking for stuff on retracts, finding the CG, and any critical updates before final covering. I would also like to know about the flight characteristics, pro or con, to be looking for.

Retracts or not the aircraft should be flying this summer.

1997 NSM Designers/Builders Exhibit

Last month we published part of a letter from Paul Schweizer talking about the upcoming exhibit that will feature tailless sailplane designs and builders. What I neglected to do along with Paul's letter was provide you with some of what Al Backstrom had written to him that generated the letter to TWITT. So here is Al's letter.

November 6, 1996

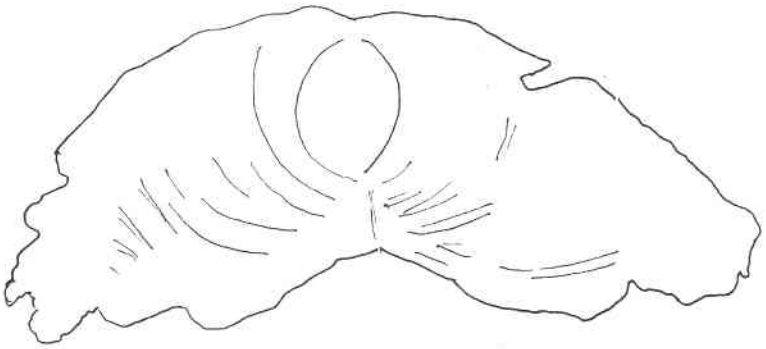
To: Paul Schweizer, Jim Swinnich, etc.

"This is to provide further information and thoughts on the exhibit.

"I have contacted TWITT and purchased a tape of Don Mitchell's address at the SHA meeting in 1991 in

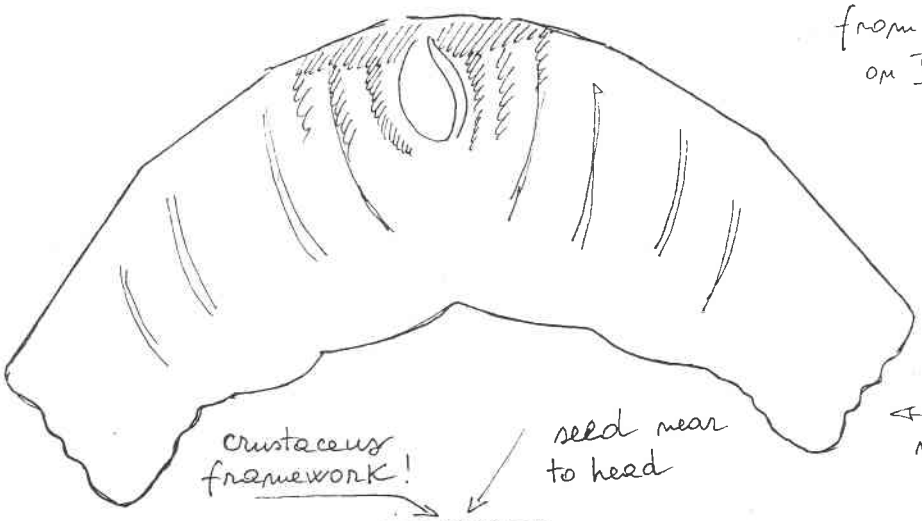
(continued on page 6)

from pg 23 prof Nickels' Book Tailless aircraft.



I 80% scale

from a very old Foto on IGO ETRICH'S Autobiograf



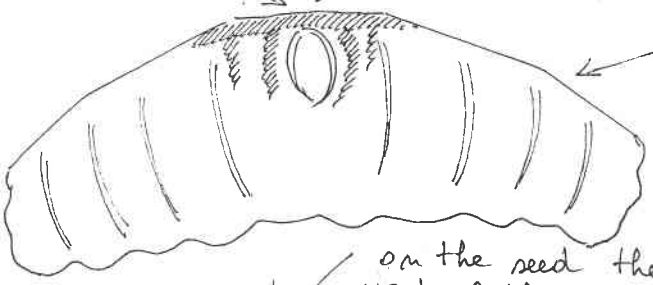
II

sinuate contour most at wing tips

Crustaceus framework!

seed near to head

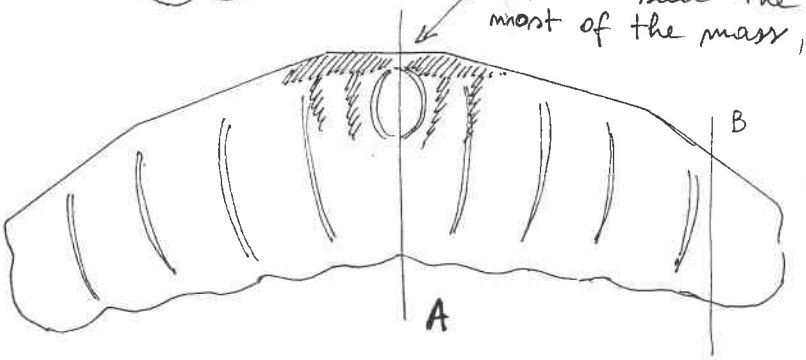
wing : very thin!



III

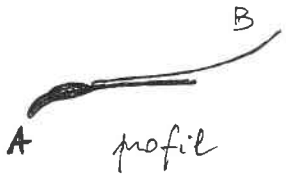
in flyght it appears dikedral.

on the seed the most of the mass,



IV

From Brockhaus Enziclopädie, Germany

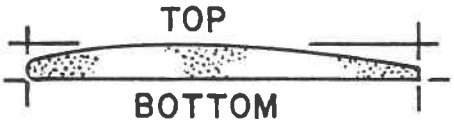


profil

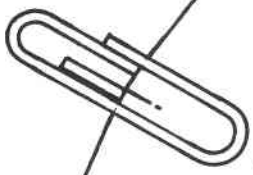
II, III, IV I did build models with good results. The dimensions are like natural prototyp which is from Botanic: Seed laterally broadened membranous, wing like margin 3, 3½ cm long. Wing usually falcate ± 5 by 14 - 16 cm.

1. TRACE WING OUTLINE, BALANCE POINT, AND OTHER MARKINGS ON THE BOTTOM OF A 5/32 THICK FOAM TRAY. CUT AND SANDPAPER TO OUTLINE SHAPE.

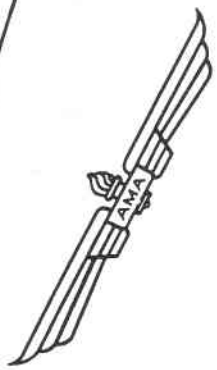
2. SANDPAPER ENTIRE WING TO AIRFOIL SHAPE ABOUT LIKE THIS:



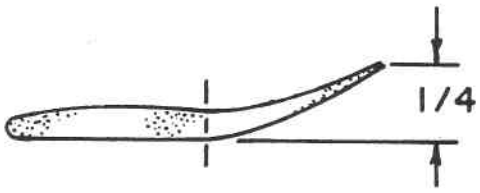
3. GLUE A PAPER CLIP SECURELY IN PLACE.



BALANCE POINT

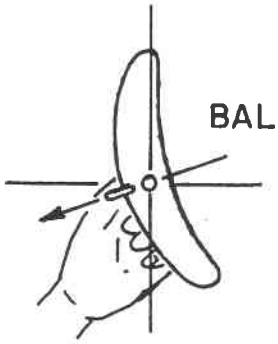


4. CAREFULLY BEND UP SHADED PART OF THE TIPS LIKE THIS:



5. ADD NOSE WEIGHT IF NECESSARY UNTIL GLIDER HANGS LEVEL OR SLIGHTLY NOSE DOWN WHEN BALANCED AT BALANCE POINT.

6. READ ADJUSTMENT TIPS IN TEXT.



BALANCING

LAUNCHING

ZANONIA SEED

A SIMPLE FOAM GLIDER
FOR INDOOR OR OUTDOOR FLYING

Tehachapi. This gives a good overview of Don's early work as well as his later work with the very light machines. I also obtained, on loan, two boxes of slides that Don had given TWITT. This is a group of at least 200 slides that contains much more than the tailless sailplanes. I have only started to review them but I have found many slides that should be of interest to the NSM. These include shots of Lindberg when he was flying sailplanes with Hawley Bowlus and shots in color of pre-WWII meets on the west coast in addition to good photos of the flying wing he and Bowlus built from the proof of concept glider for the large Bowlus troop glider. When I have found the slides that are of interest for the exhibit I will have copies made and forward them to the NSM along with the tape. I will also contact Bob Fronius and June Wiberg to see if the historical slides can be sent to the NSM for reproduction.

"The Plank at the EAA museum is the first and maybe only one built with a central fin. It was built by Al Cleave and was very well done. Al wrote an article on his experience with it for SOARING several years ago. The last word I had on it was from a friend who was at the EAA museum a couple of years ago and brought back some pictures. From the pictures it appeared to be in good condition.

"I feel that the exhibit should include information on the very light tailless sailplanes such as the SWIFT and if European machines include the "Flair". Jim Marske's Monarch was one of the first sailplanes of the type. This category of sailplane is one of the best applications for the tailless configuration."

(ed. - We are proud to be a part of this historic event even in the minor role we are playing. Our thanks go to Al Backstrom for putting together the material for presentation.)

Contribution to the EAA Aviation Foundation

We are pleased to announce that through the coordination efforts and financial contribution of Bob Chase, TWITT Vice President, we were able to send a complete set (120 issues) of TWITT Newsletters to the EAA Aviation Foundation in Oshkosh.

These newsletters will be available for viewing by homebuilders and other aviation enthusiasts who pass through the Foundation Museum and library. Since this is a central focal point for builders of all types of aircraft and those looking for new ideas it is a perfect place for our newsletters and the organization to get much needed exposure.

I would personally like to thank Bob for his generous contribution in both time and funds for this project. The plan is to send a yearly update each June to keep them current and hopefully we will see some new members who didn't know we existed.

This provides a great complement to our newsletters in the Library of Congress that have been coordinated by Bill Foshag.

ARUP Plans

Larry Nicholson sent us a sheet of plans for building a rubber powered model of the ARUP. This has a span of 27 7/8" and was designed by Gordon Englehart and apparently was published in the September 1936 issue of Model Airplane News.

The plans are on an 18" x 24" sheet of paper that could be used as the plan layout. It includes all ribs and bulkheads along with construction of light landing gear and propeller blade.

If you are interested in having a copy of this, send $2.50 for copying and postage and we will get one off to you as soon as possible. This looks like a fun, quick little building project that would be good for the remaining winter months.

AVAILABLE PLANS & REFERENCE MATERIAL

Coming Soon: Tailless Aircraft Bibliography
5th Edition

Well over 4300 annotated tailless aircraft and related listings: reports, papers, books, articles, patents, etc., of 1867-1996 listed chronologically and cross-referenced by designer and topic. Historical perspective. Core material. Information on sources, location and acquisition of material. Alphabetical listing of over 290 designers including dates and configurations of their aircraft. 250-300 pages.

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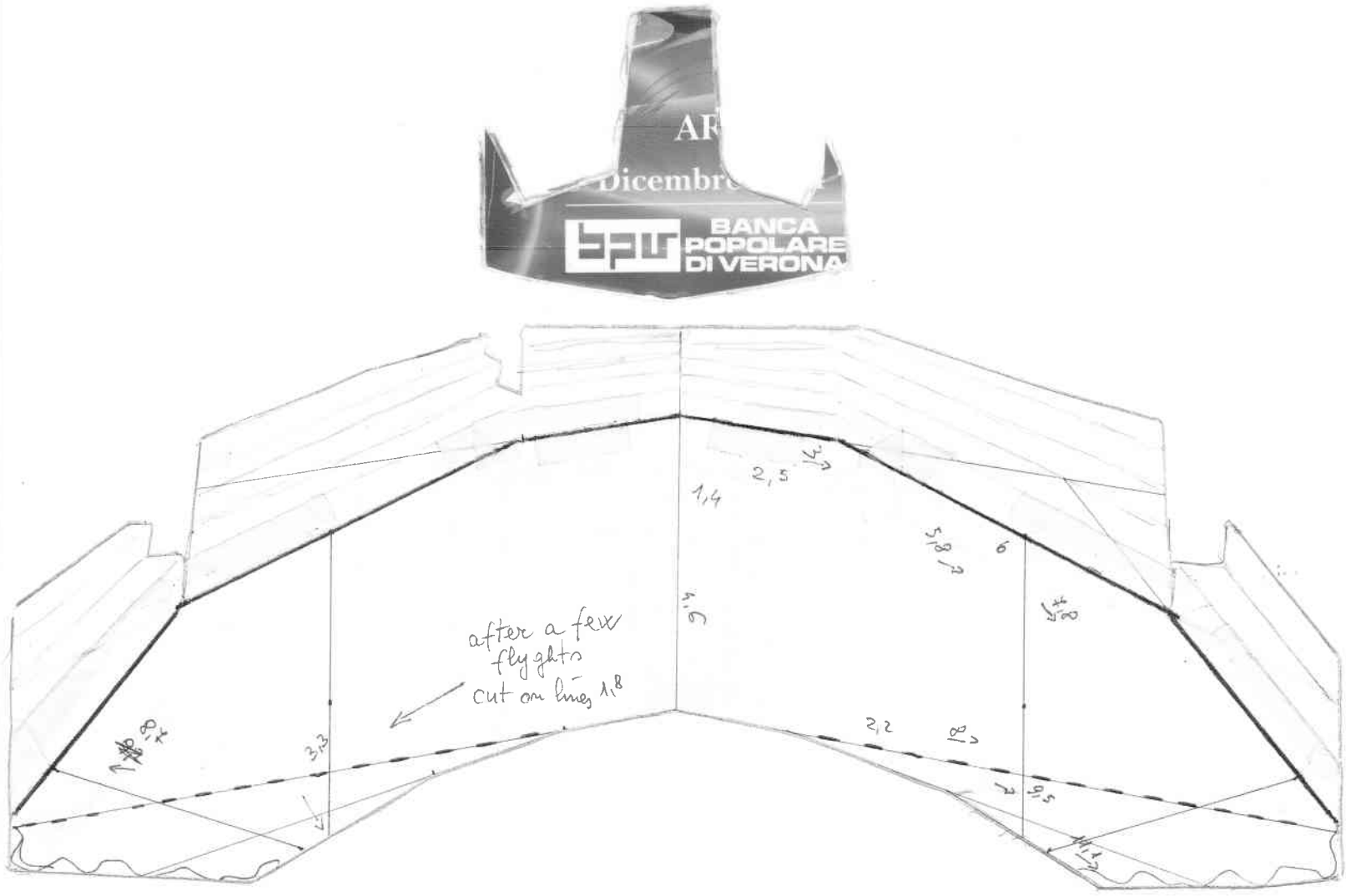
Tailless Tale, by Dr. Ing. Ferdinando Gale'

Consists of 268 pages filled with line drawings, tables and a corresponding English text. It is directed towards modelers, but contains information suitable for amateur full

BELOW: This is the unfolded version of Curzio's paper zanonia seed model. The heavy solid line represents the leading edge to which the paper in front is folded back in small increments (you may be able to see the faint lines from the folds). This gives the leading edge its ridgity and prevents the wing from flapping. The odd shaped piece at the front acts sort of like a spine and is made of light card stock. It is taped into place on the bottom after the folds have been made helping ot maintain the wing's shape around the center section.

The dotted lines at the trailing edge form the elevons sort of like the shaded area on foam version of the seed. This area can be adjusted upward and diferentially to tweak the performance. The CG was adjusted using a small metal paper clip taped to the light card stock spine piece on the bottom of the wing.

This looks like an interesting project if you are into Orgami paper folding. You might want to try the foam version first to get a feel for the flight characteristics and then try folding your way into flight.



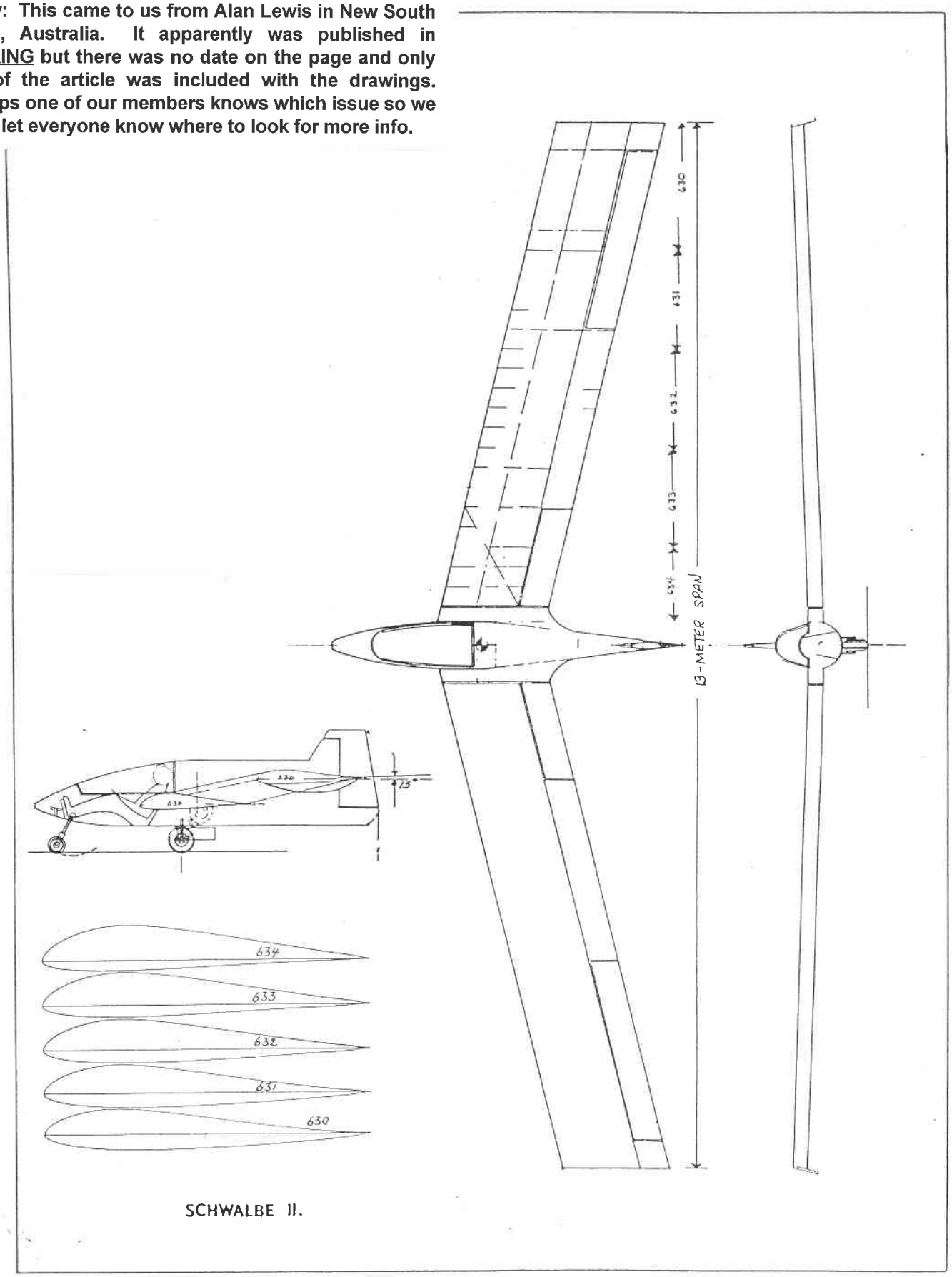
Paper "A Synopsis of Flying Wing Development, 1908-1953", by Richard P. Hallion, History Office, Air Force Flight Test Center, Edwards AFB, CA 93523, January 9, 1986. This paper has been prepared to funish readers with a quick overview of flying wing development from the Dunne aircraft of pre-WWI vintage through the Northrop flying wings of the immediate post-WWII years.

Cost:	$6.50 postage paid
Add:	$3.00 for foreign postage

FLYING WING SALES

The A-10/T-10 Mitchell Wing motor gliders are well-proven designs, ready to fly, with an aluminum clad wing giving aerodynamic cleanliness. These are fully trailerable, with flight instruction provided in a T-10 by a C.F.I. Major components are available for the homebuilder.
Information pack for $10.

Below: This came to us from Alan Lewis in New South Wales, Australia. It apparently was published in SOARING but there was no date on the page and only part of the article was included with the drawings. Perhaps one of our members knows which issue so we could let everyone know where to look for more info.



SCHWALBE II.

RIGHT: If it comes out, here is a picture of a jet powered Mitchell B-10 built and flown by Jim Gordon of Noblesville, IN. The engine is a Garrett JFS100-13 which was originally the starter for the TF-41 engine in the A-7 Corsair. It weighs 53 # and produced 80 # of thrust. Jim's company, Mirco Aviation, phone # (317) 776-2285, stocks the engines which also can be converte to a turbo-prop. The photo was taken by Karen Gordon and Brian Story and the article was apparently from the December 1996 issue of SPORT AVIATION, page 27.

KEN LICHTENBERG

BELOW: The Northrop N9-M on the tarmac at Gillespie Field during the static display of vintage aircraft in 1996. Note the extreme foward position of the nose gear and the small rear wheel that prevented the propeller tips from hitting the ground in the event of overrotation on takeoff. You can also see the location of the engine air intake nestled in the leading edge. This aircraft was restored by the Planes of Fame museum at Chino Airport in California.