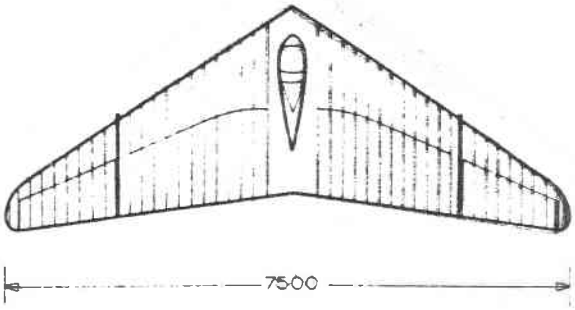
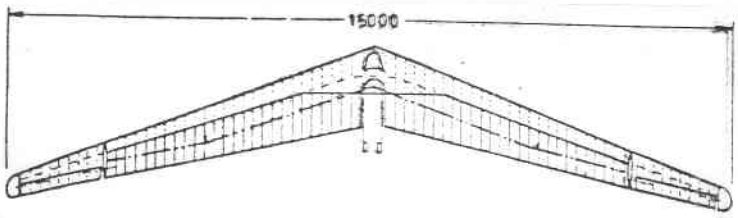
No. 54 DECEMBER 1990

TWITT NEWSLETTER

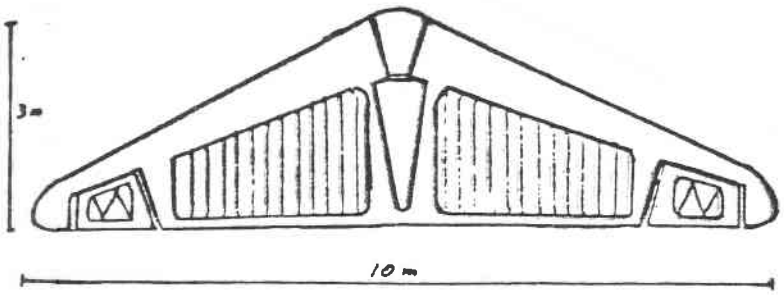


PIERNIFERO 1

Designs of Dr. Reimer Horten - See meeting minutes for more information on these and other Horten designs.



PIERNIFERO 3



PIERNIFERO 2

TWITT
(The Wing Is The Thing)
P. O. Box 20430
El Cajon, CA 92021

Best Wishes For the Holidays and for Health and Happiness Throughout the Year

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The number to the right of your name indicates the last issue of your current subscription, e.g., 9012 means this is your last issue unless renewed.

Subscription rates are $15 per year for U.S. mailings and $19 per year for foreign mailings due to higher postage rates.

Next TWITT meeting: Saturday, **JANUARY 19, 1991** beginning at 1030 hrs at hanger A-4, Gillespie Field, El Cajon, Calif. (First hanger row on Joe Crosson Dr.)

PRESIDENT'S CORNER

If you weren't there for the November meeting you missed an interesting set of presentations on composite parts fabrication, and a historical overview of Dr. R. Horten's designs. DON'T FORGET THERE IS NO DECEMBER MEETING.

I would like to personally thank Dr. Don Hunsaker for his efforts in obtaining a daisy wheel printer to go with the computer. He also donated a 21" television and I understand there maybe a VCR to follow shortly. This will give us a continuous capability to show your videos during meetings without having to round up the needed equipment.

This brings up the possibility of starting a video library to supplement the information and data files we have now. Harald Buettner has been doing a little editing for us so we have several different types of flying wing activities on one video cassette. You modelers out there might be interested in some of this for your monthly meeting, especially if you have a group heavy into slope soaring. Let us know if this would be a desirable service and we will see what it would take to set it up and the cost of mailing tapes.

Bob and Doug Fronius have been most gracious with their hanger space to accommodate all this "stuff" TWITT has been able to acquire over the years. However, this is starting to become a problem, since they always have one or two major construction projects going on within the hangers. We almost had a small bit of office space a few hanger rows down, but it got leased out from under us. If anyone in the local area knows of some vacant space the landlord would be willing to donate, which would hold a desk, the computer equipment, file cabinets, etc., please let us know. Preferably, it should be in the El Cajon/ Santee/Lakeside area for easy of access by Bob, June and others who might be able to do work on the library listing.

As of publishing time I still haven't seen any comments on what people think about not having meetings during the summer months. I really would like your input on this, since we are here to serve you, the members, in the best and most economical ways possible. Let me know what you think when you send in your annual renewal.

Speaking of economies, I found an office supply store, Office Club, in our local area that will print the newsletter for about $18 less than the current cost. This will help our cash flow, and if the print job is as good as the sample (quality equal to the last newsletter) it will help us keep prices down.

As you can see from this newsletter, we are trying to improve its looks with each new one. I now have enough computing power and software at home to put it together with a desktop publisher and I will experiment with various layouts over the next several months. If you see one particular style or layout that is particularly appealing, let me know. Our goal is to keep the readability easy (big enough type for everyone), while getting as much information into the allotted space as possible. Don't hesitate to voice your opinion, after all, it's YOUR NEWSLETTER.

Well, I guess that is quite enough for one month. I covered a little more than usual, but it all was kind of necessary to keep things running smoothly. Have a wonderful Christmas and a Happy New Year. We'll be looking forward to seeing all of you local fans after the holidays.

Andy

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THERE WILL BE NO DECEMBER MEETING THE NEXT MEETING WILL BE JAN 19, '90

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MINUTES OF THE

NOVEMBER 17, 1900 MEETING

The meeting was opened by Andy with an apology to Jerry Blumenthal for the editorial error on the cover of the newsletter. Jerry also pointed out that the penciled in changes to the tail-end of his design were not his. Somehow the photocopies that ended up being used to produce the cover had been in some unknown hands and had been slightly doctored. We are sorry this happened and will strive to prevent such occurrences in the future.

Mark Motely donated a video tape of the Klingberg Wing scale model testing, load testing, and full scale foot launch activity. We have asked Harald Buettner to edit it down to a usable length for a future meeting and perhaps add some other flying wing video material we have been able to collect. This should be part of the January meeting.

Andy reminded everyone there would be no meeting in December due to the holiday schedule we all get wrapped up in. He also noted we still have TWITT hats for sale for $8.00. Andy then announced that Dr. Don Hunsaker thought he had located a printer for us and we would know more later. Bob has setup an area in the hanger to place the computer and associated equipment. This will be used primarily for putting together a bibliography of the library.

Budd Love asked if a roster of the members could be published in the newsletter. There was one several years ago, and the January newsletter looks like a good place for it since there will be no December minutes. Budd also asked about getting name tags for everyone that can be used for meetings, since we don't always know everyone

attending the meetings. We will check into this and see what the cost might be to have a tag with some type of logo on it.

Andy then introduced Dave Inkel, of DA Graphite Products in Spring Valley. Our member, Bob Peck of Peck Polymers, recommended Dave come down and tell us a little bit about his products and the capabilities his shop has for producing composite components. Dave started by explaining how he has gotten into the model field by making parts for radio control cars which take a lot of abuse.

He uses high pressure laminates in a press that will give a piece of high quality material 30" by 30" in production. He can also produce parts up to 48" in length. The materials are cured at 250 degrees using commercial grade material instead of higher cost mil spec types, although he has access to both types. The application of the product will determine the material used. He uses unidirectional materials, but he can do shaped items, as well. He has also been experimenting with core materials to come up with combinations that will meet different applications.

Dave's company can offer you solid, unidirectional, carbon fiber laminates to your designs and specs with the limitation to size noted above. There are other companies that can meet the larger needs, but costs go up due to the complexity of machinery.

The materials he uses have a 100% memory and are five times lighter than steel and a little more than half the weight of aluminum. The bumpers he makes for the RC cars can take much more impact, without damage, than their aluminum counterparts. It won't hold a set until the fibers actually fail, which can be at the catastrophic point. They have tensile strength of about 500,000 lbs which gives it good characteristic without being brittle.

There was a lengthy discussion between Dave, Harald Buettner, and Ralph Wilcox on various types of materials, resins, core sizes and composure, etc., that became somewhat technical. Dave was going to get together with Harald after the meeting to discuss the techie stuff and what each might do to help the other in their business ventures.

Dave is interested in reaching more of the modeling or homebuilder market, since that is where his product size best fits. If you want more information about what he might be able to do for you in building small, high strength components, he can be reached at (619) 562-6123, 1235 Portola Avenue, Spring Valley, CA 92077. He probably can put together things like bell cranks, spar caps, webs, etc., so give him a call or send him your specs and see what it will cost to have the parts fabricated. We will provide more information in the newsletter as it becomes available.

Andy then introduced Phillip Burgers to talk with us about Dr. Horten and his history with flying wings. Phillip began with an overview presentation showing how the flying wing concept got started in WWII in Germany. Since we cannot reproduce all the slides in the newsletter, Phillip agreed to select several of the best ones and reproduce them for us.

Early flying wings were designed to bury everything inside the wing structure, as was tried by Junkers in the early 1900s. There was then the Lippisch design that put the pilot inside the vertical fin of a delta shaped wing with a coal burning engine. An American, Marion Baker, took some of these ideas and put together a homebuilt flying wing that obviously had little success. Another flying wing was the Messerschimdt 163 "Komet". Komet was an appropriate name since if it landed with any fuel on board it usually ended up in a ball of fire. This aircraft had an unusual rocket firing mechanism for shooting down B-17s. The shadow of a B-17 passing over solar cells would automatically fire the rockets upwards into the bomber.

Phillip then showed a slide of the 163 with "Whitcomb" winglets and noted that Lippisch also used winglets during the war. He then progressed onto the Horten flying wings beginning with the Horten I built in 1933. This plane won at the glider competition on the Wasserkuppe for best original design. Dr. Horten didn't like the way the airplane flew to the point of destroying it so no one else could fly it. From the lessons of the Horten I he went on to build the Horten II where he started using his bell shape lift distribution theories.

The Horten IVB had less sweep then the IV and was Horten's first experience with laminar airfoils. He used wind tunnel testing of the P-51's laminar airfoil (obtained from a captured P-51) to work out the airfoils for the IVB. However, it didn't fly as well as planned due to low Reynolds numbers and laminar separation at the tips.

The Horten VI still fascinates Dr. Horten in that he wonders what types of L/D we could get today with modern building materials. He eliminated the laminar airfoils from the design feeling they were too dangerous.

Phillip showed tuft testing done by Mississippi State University on a Horten IV which showed an L/D of below 30, compared to the 41 professed by Dr. Horten. Some of this was due to the need to rebuild part of the IV's center section since it was damaged by an allied soldier when it was found during the war.

Dr. Horten had orders from the Luftwaffe to use the Horten V for training new pilots. Part of this was due to the excellent single engine performance of the airplane being able to turn in either direction with a dead engine.

He showed us Horten's concept for a six engine flying wing with a big fuselage with a large hole in the middle. This was to be used for doing in-flight wind tunnel type testing, but there were no available funds to begin construction so it only remained as an idea.

Phillip showed us a concept drawing of what could well be a German version of the stealth aircraft from the WWII

era. It had flown on a demonstration flight to show single engine capabilities. The test pilot shut down the wrong engine, couldn't get it started again, and since it ran the hydraulic pump couldn't get the gear down. Needless to say, there was a crash landing causing damage and embarrassment.

Dr. Horten began designing a new series of aircraft from his new home in Argentina in about 1946. The first of these was the IA-34M (single passenger) and a two place version. The IA-41 was a side-by-side flying wing which had a glide ratio of about 24. The airframe has been stored for many years in an old garage, and Phillip was able to find it during a trip to Argentina.

Another of Dr. Hortens ideas for maintaining a good CG for loads being carried inside a wing involved using a triangular shaped cargo bay. Since the CG would always remain within the first one third of a triangle, with a point facing aft, the aircraft CG could be predicted and maintained as long as a homogeneous material(s) were loaded.

Dr. Horten then designed his Piernifero series of hang gliders type flying wings. The Piernifo I was a 7 meter span design that you sort of "put on" and flew relatively well with a glide ratio of 20. He designed a 30:1 glider along the same lines, but it was never built or flown.

Phillip then showed us a plan view of a flying wing design he had begun as a university project that he was never able to complete, even in model form. He concluded this part of his talk with a picture of the ultra flying wing, a specially designed BIRD which incorporated all the factors needed for successful flight.

With some prompting from the group, Phillip went on to talk a little about the Horten brothers, Reimar and Walter. Walter was the politician of the two and worked at getting permission from the German government to perform research and use what were considered to be essential war materials. Reimar was the designer and builder who became interested in flying wings during the 1920s. Unfortunately, he has given up on further design work since he has had so many bad experiences with trying to fight government red tape, etc., in putting his ideas to work for either Germany or Argentina.

The other unfortunate thing about this is that he has become very hard to reach, and apparently does not want to leave his home to share his knowledge with interested groups or governments. Phillip has also found that trying to get Dr. Horten entered into the Aeronautical Hall of Fame would be a major undertaking, even though Dr. Horten obviously contributed much to the technology of flying wings, as is being currently used in the B-2 bomber. Part of this may be due to the competition which was prevalent between Horten and Lippisch, with Lippisch having worked on the high speed aspects of flying wings.

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LETTERS TO THE EDITOR

Nov 7, 1990

TWITT

I am behind on my dues, but we sold our house in Nevada about one year ago and have been traveling. Enclosed is my check, and please note my new address on my envelope and below.

On the 11th we will depart for our new home in Arizona. Among our things will be our (Marybelle & me) Mitchell B-10M (modified) project. Don has given me his guidance, and if I do my work well it should turn out well.

Best regards,

Gil Metcalf

2648 Canyon View Drive

Sierra Vista, AZ 85635

NOTE: I can't find what the dues are, and can't remember. Let's try $15 - let me know if not enough.

(Ed. Note: We hope your new home in Arizona will be enjoyable and that the good weather will enable you to finish your project. You were right about the dues, and we will start including a small advertisement in each newsletter to help other people "remember" the amount and be able to pass it along to others who are interested in flying-wings/tailless aircraft.)

Nov 9, 1990

TWITT

How I wish I could help - but I'm just an old model builder - fascinated by flying wings - out to pick your collective brains. I hope that's all right.

I want to thank you for the "About The Size Of It" article in the information package. I've been looking for that information for years. How does one "access" your library?

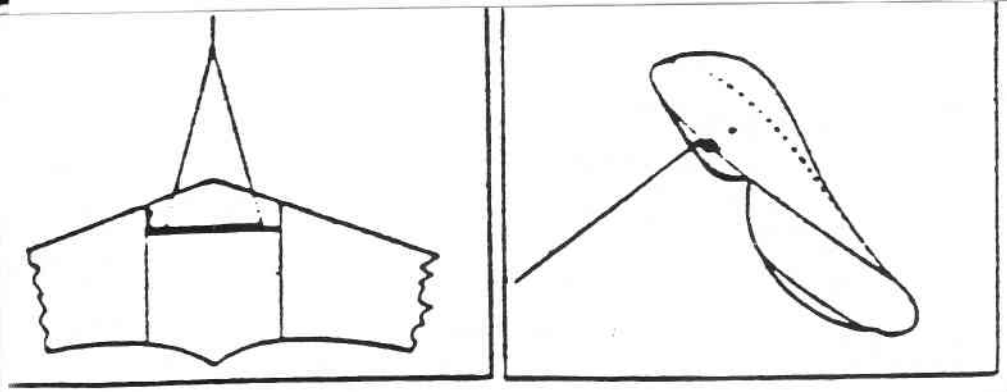
Sincerely,

Claude De Bogban

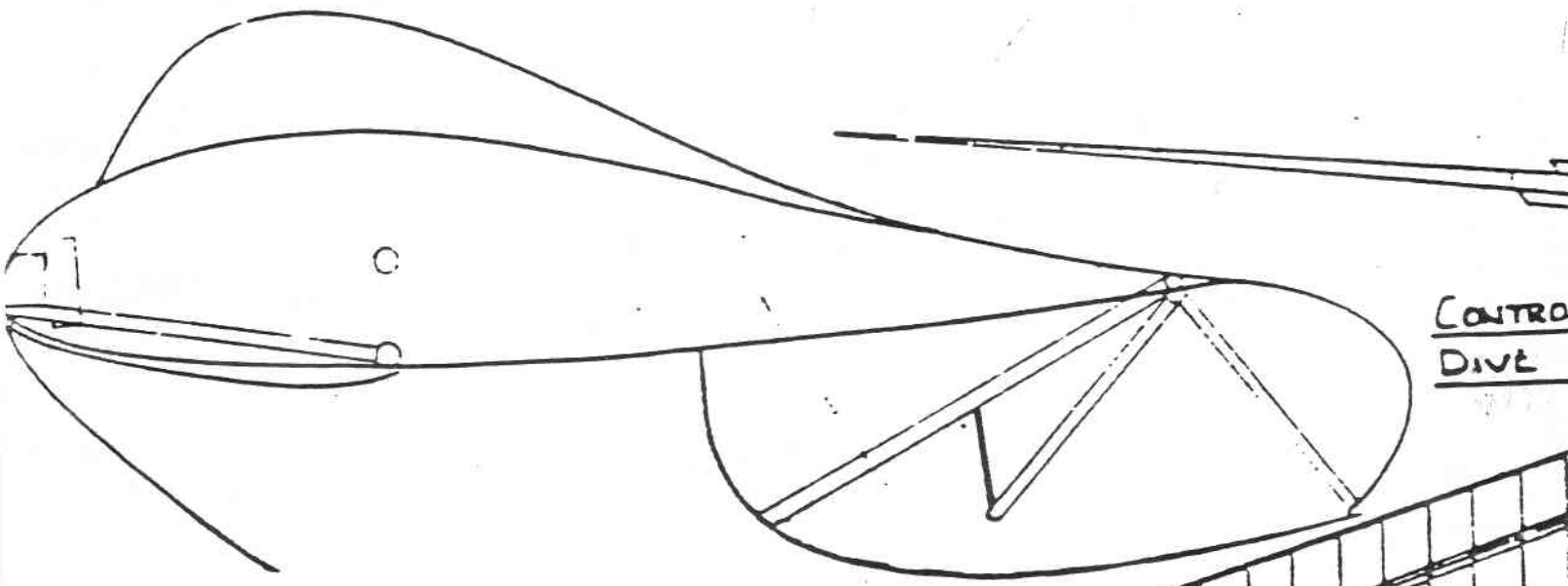
RT 66 HC Box 264 c7 3

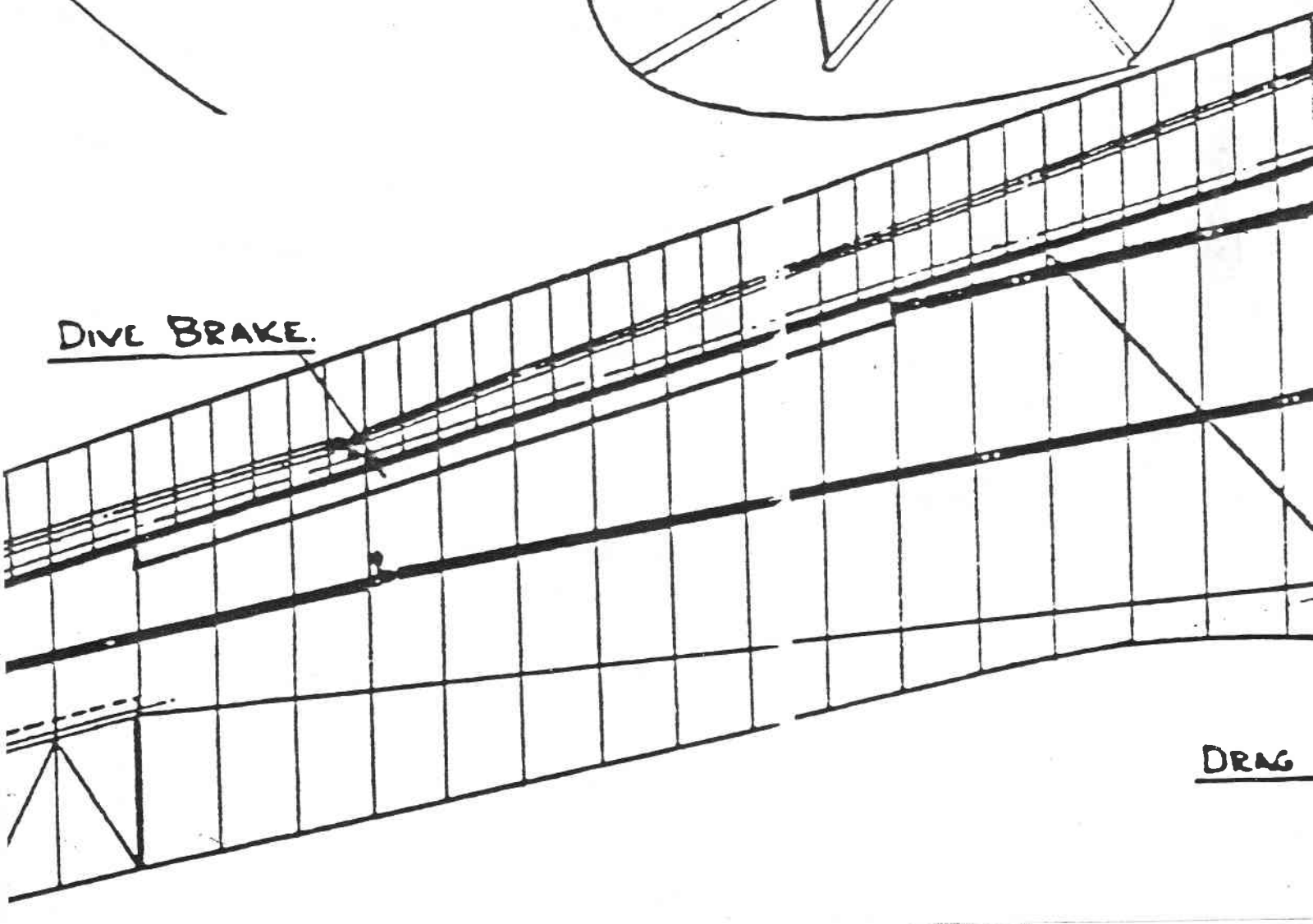
Yellville, AR 72687

(Ed. Note: Claude, everyone can help in one way or another. If you have any ideas about new designs or have had success with some particular flying wing kit, let us know so we can pass it on to the other modelers out there. We have a lot of them in TWITT looking for the same things you are, so this newsletter becomes a way of getting in touch with each other. As for the library, we do not have a list of what is in it at this time. That is one of our near term projects once the computer is set up and people are taught how to use it to start cataloging the



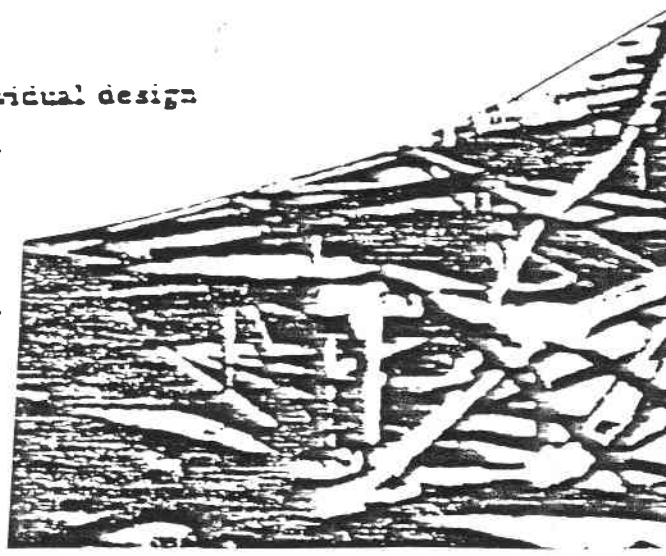
Double harness for C. G. cable attachment, a post war experiment.





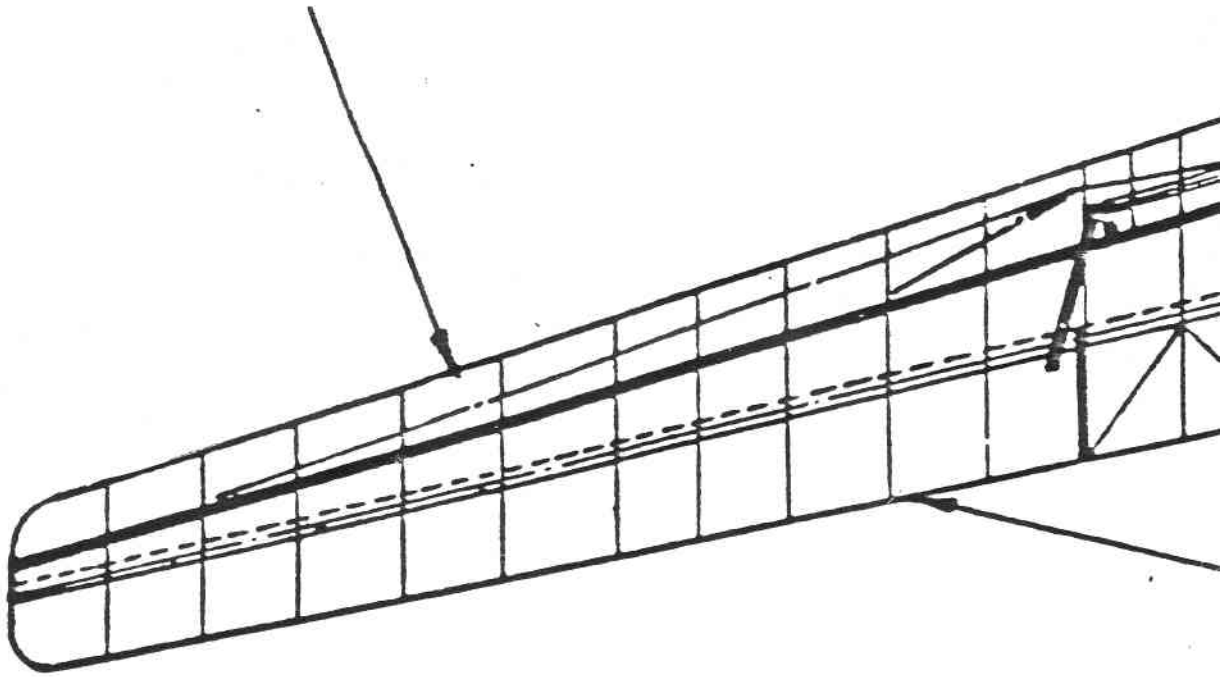
MAIN DIMENSIONS OF THE HORTEN IV a

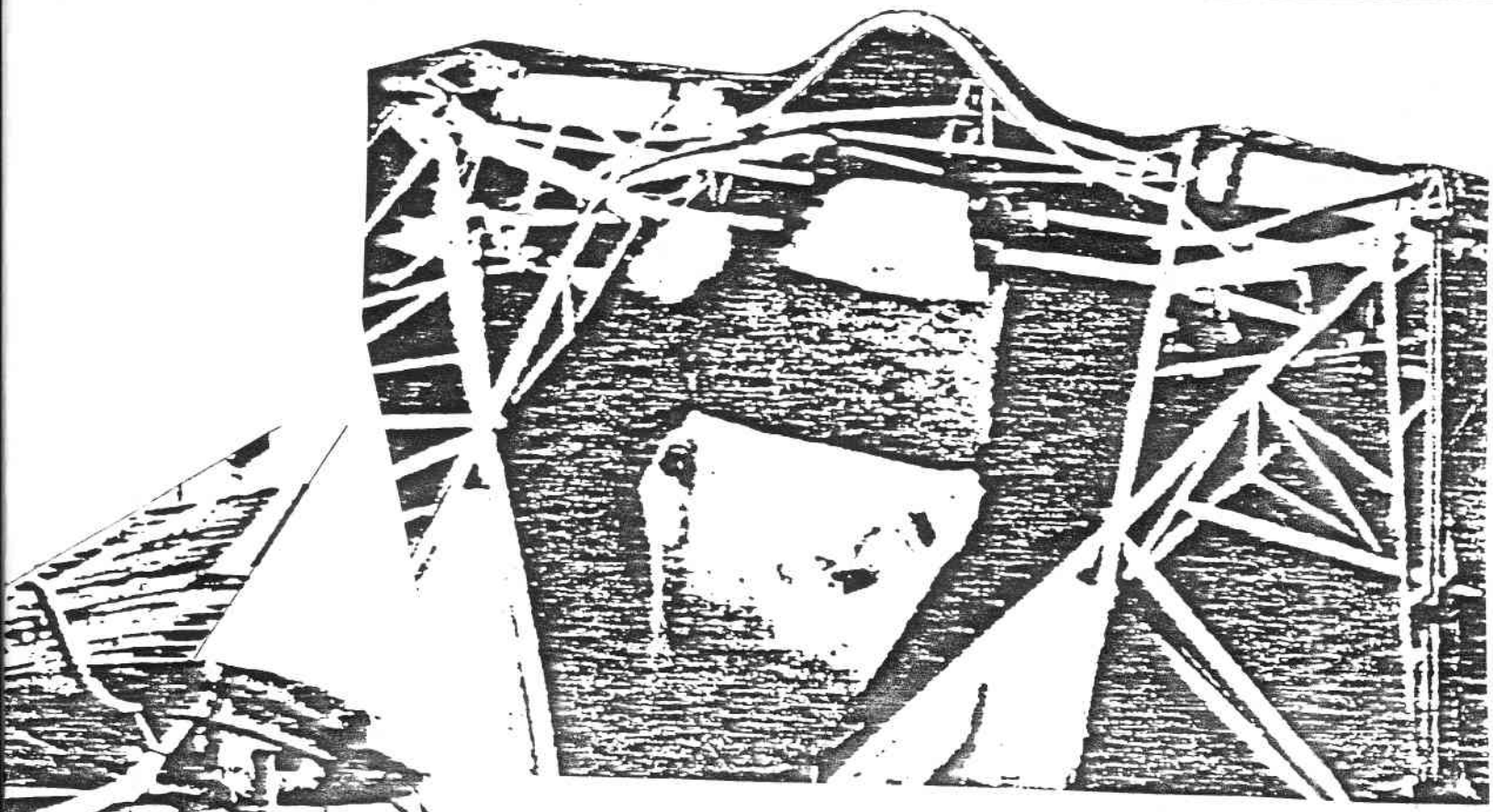
Span	20	m
Wing area	18.8	m^2
Aspect ratio	21.3	
Dihedral	5	degrees
Sweep-back (1/4 chord line)	17	degrees
Twist	7.1	degrees
Wing root chord	1.55	m
Wing tip chord	0.28	m
Taper ratio	5.55	
Airfoil sections	Reflexed, individual design	
Total area of elevon surfaces	3.16	m^2
Ratio of the elevon surfaces to the total wing area	16.8	%
Total wetted area	41	m^2
Ratio of the wetted area to the total wing area	2.18	
Empty weight (present condition)	266	kg
Gross weight (recent flight tests)	366	kg
Wing loading " " "	19.5	kg/m^2



The uncovered wing and ce

DRAG RUDDER.





Pilot cushion in the H IV.

er section of the H IV.

CONTROL SURFACES.

material. If you have a specific thing you are looking for, drop us a line with what information you have and we will try to match it to something in the library. Since we will have to copy and mail it, any donation you would like to make towards what you anticipate the costs to be, would be greatly appreciated. We hope to be hearing from you again.)

November 19, 1990

Dear TWITT

Sorry - could not find your name associted with No. 52 - which I got from Jim Gray (Jerry Slates). I'm a model builder and archivist. I collect plans, books, pictures or full scale plans, and make make models and kits for model builders. My love is "The Wing." I'm presently flying a "Plank" (Backstrom) type model now. I also have a 1/5 scale Monarch (Marske). I've included $15 for a subscription and would like back issues - how much? I've always liked your articles and hope you have many more to share.

Thanks,

Jim Ealy

Hightstown, NJ 08520

November 26, 1990

Dear TWITT

During a recent visit to Australia and in particular a fellow homebuilder, Reg Todhunter, I saw your newsletter T.W.I.T.T.

I am a glider engineer, instructor and an avid self-launching sailplane fan (currently own an SF 27M) with a strong leaning towards flying wings. In fact, I have written to Don Mitchell twice in the last year to try and find out when I can get my hands on the plans/kit for this Victory Wing.

I would very much like to subscribe to TWITT and also get from you copies of this years (1990) newsletters. I understand that the annual dues are $19. Would you please confirm this and let me know the cost of the 1990 back issues and I will forward a cheque straight away.

Thanking you in anticipation.

Kindest regards,

Nevilie R. Swan

90 Luckens Road

West Harbor

Auck 8

New Zealand

P.S. If you have any recent information concerning Don Mitchell I would appreciate hearing it. I know he is no longer a young man and has health problems.

(Ed. Note: It is nice to have another member from Down Under. To save on postage we are sending you this month's newsletter to start your subscription and answer your questions concerning the cost of back issues. You are right about the foreign subscription rate of $19 (US). Back issues are $1.58 (US) each and will be bulk mailed to you upon receipt of your cheque ($17.38 for the 11 issues). Don Michell is a member of TWITT, so hopefully he will be able to answer you directly after reading this newsletter. Welcome to TWITT, and let us know is we can be of further assistance with flying wing material.)

November 20, 1990

Dear Bob and June:

If you haven't already seen it, I thought you would like to have a copy of the enclosed article written by my friend Professor Jan Roskum. I thought that you and the TWITT group would like to review it.

Although I don't plan to use it, I find that TWITT can also stand for Tilt Wing is The Thing. I enclose a recent article on tilt wing aircraft.

Hope you had, or will have, a good Thanksgiving.

Warm Regards,

W. F. Chana

(Ed. Note: Room constraints prevent us from publishing either of the articles Bill has sent along. However, we will try to get them into the newsletter just as soon as possible, perhaps January. The Roskum article is from Professional Pilot, October 1990, and is titled "Flying Wings - Advantages and Disadvantages of 3 of Tailless Airfoil Systems. They're Not For Everybody." The tilt wing article is by Bill Chana from Airliners, Fall 1990, and is titled "High Speed V/STOL - The Answer To Congestion?" We would like to thank Bill for these contributions to the library.)

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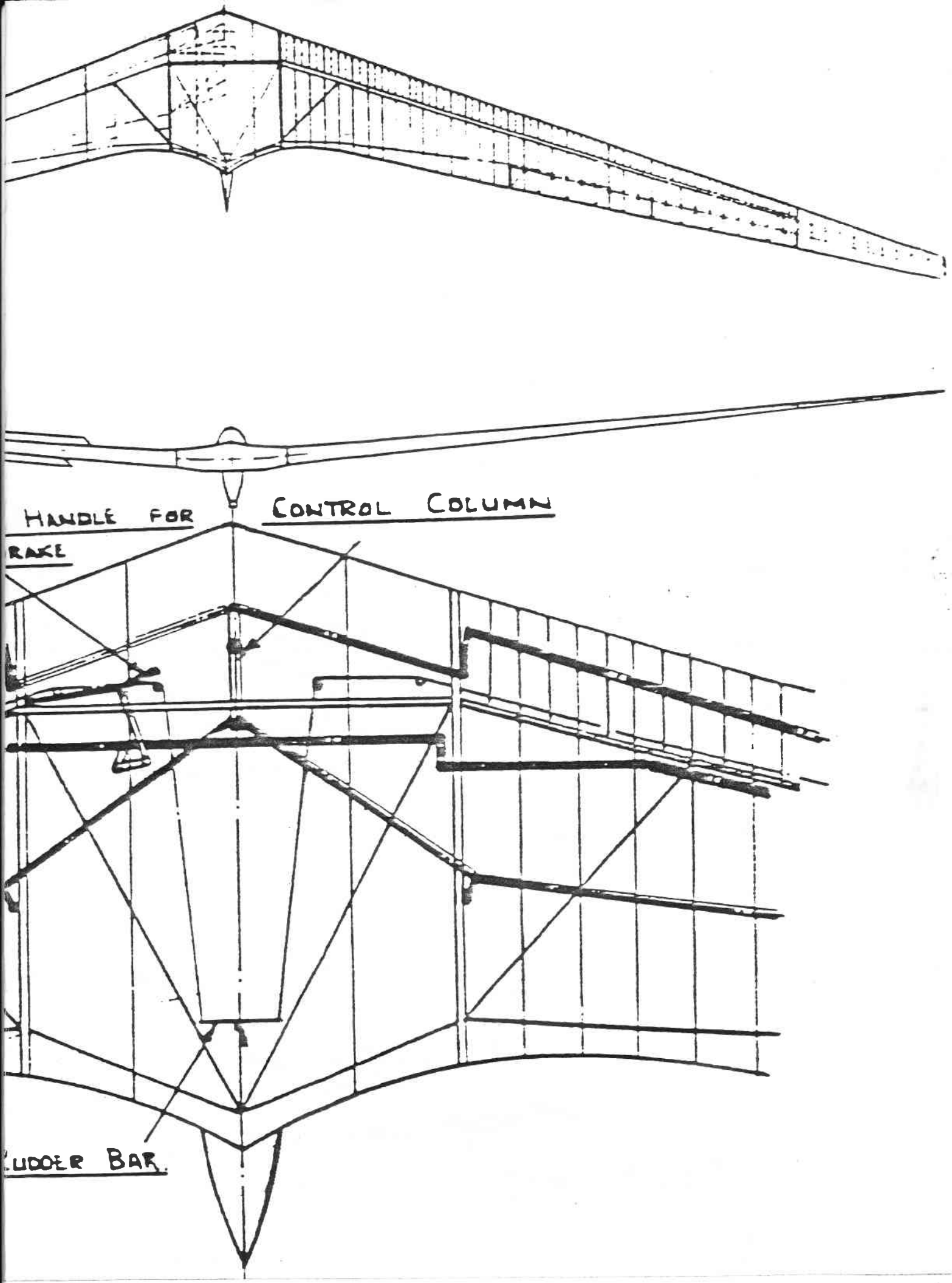
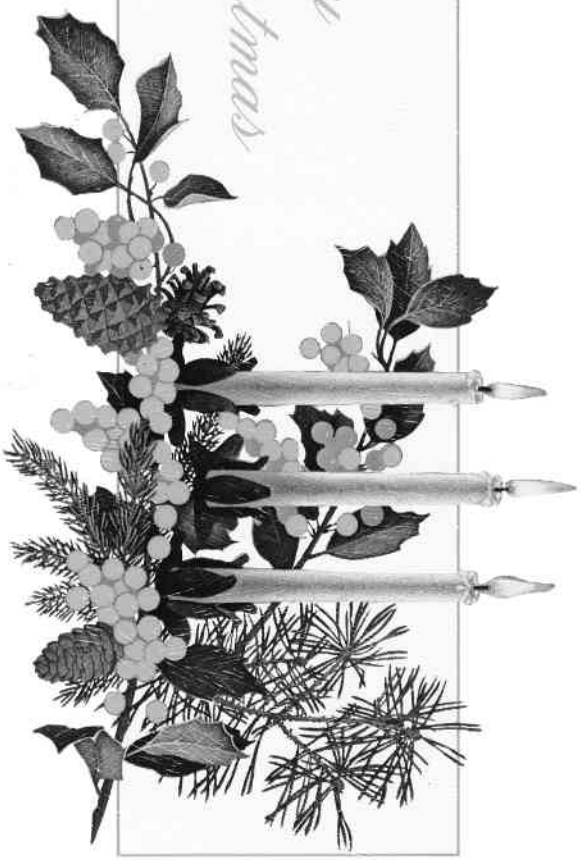
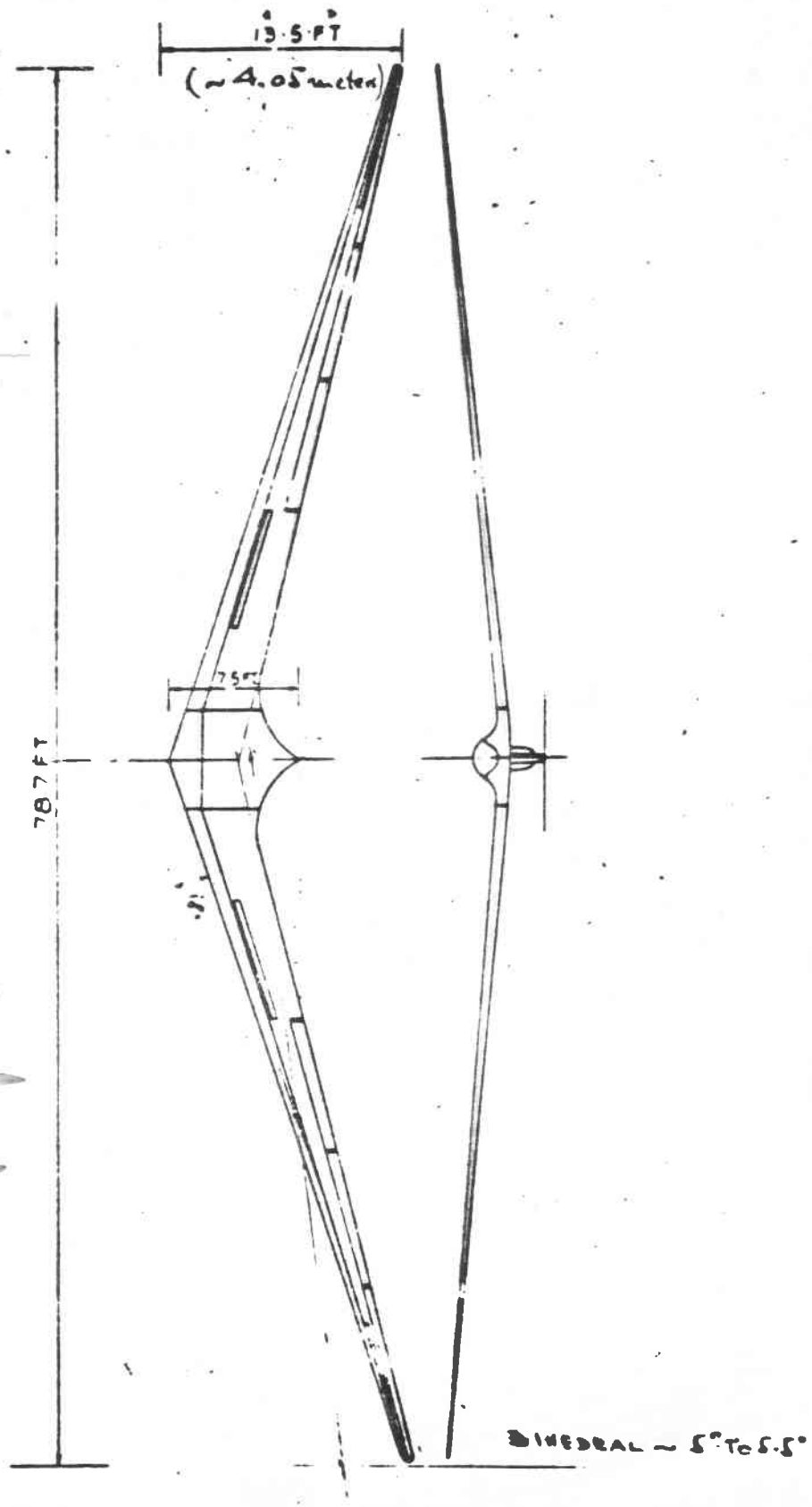
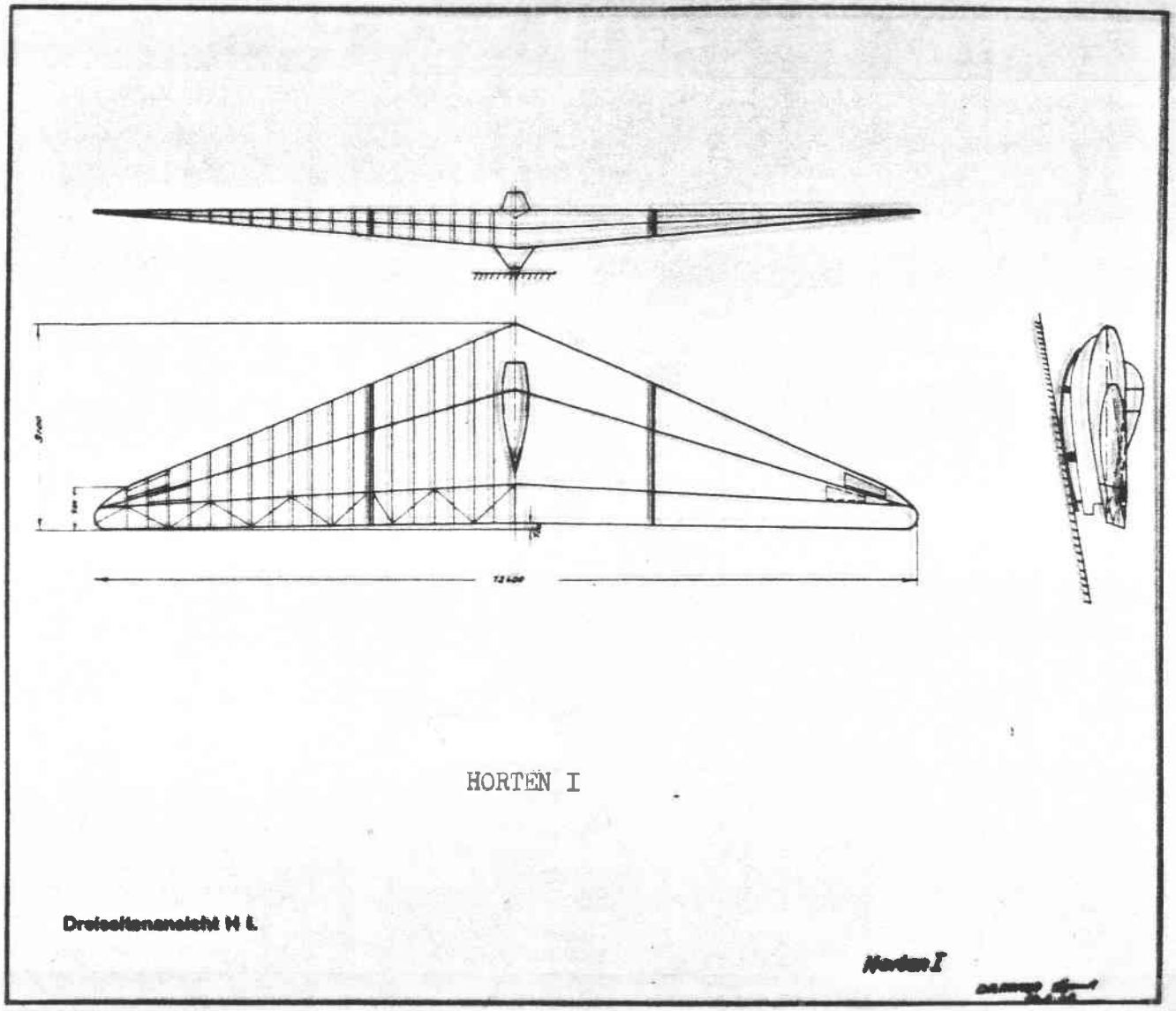
IN CASE YOU HAD NOT NOTICED, THIS ISSUE HAS TWO "CENTERFOLDS" THAT CAN BE TAPED TOGETHER AND GIVE YOU A GOOD VIEW OF THE HORTEN IV,


HANDLE FOR
RAKE
CONTROL COLUMN
RUDDER BAR.

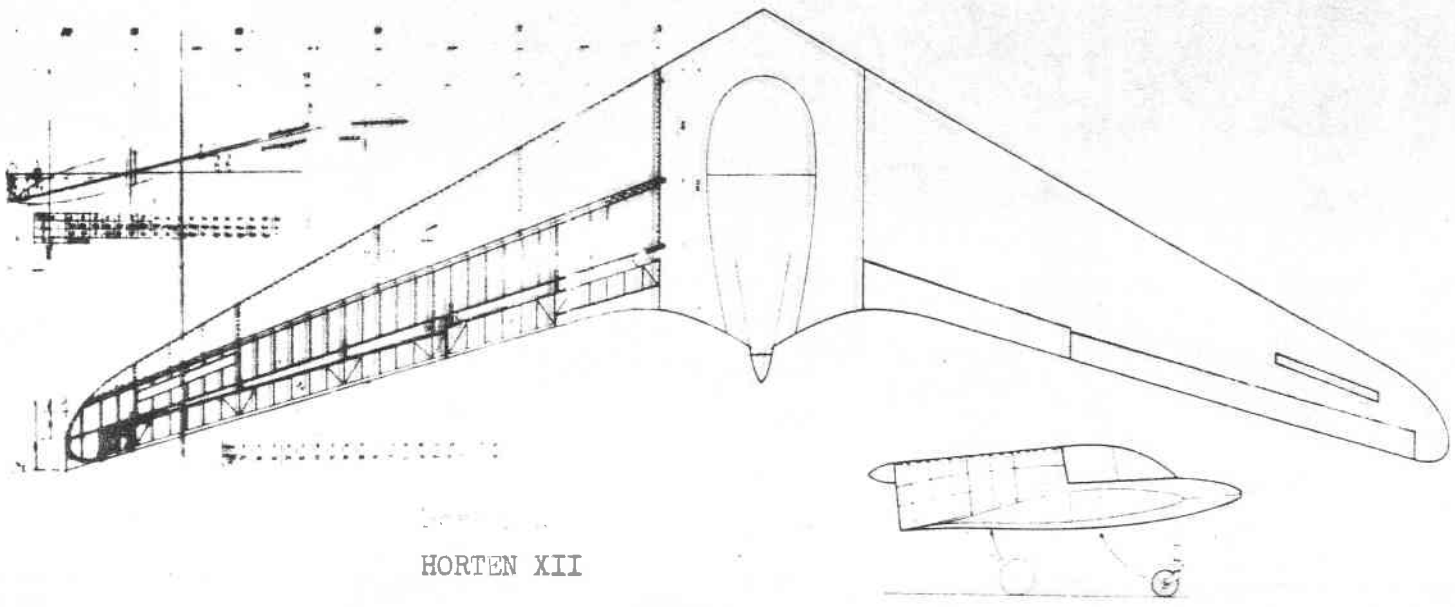




SCALE



HORTEN I



HORTEN XII

Table 1.

Data sheet for Hortor Aircraft.

Type		I	II	III	IV	IVb	V	VI	VII	VIII	IX	XII	XIII	XIV	Para-bola
Span	ft.	40.7	54.1	65.6	65.6	66.3	52.5	78.7	52.5	131	52.5	52.5	40(app)	49.2	39.4
Wing area	ft^2	226	344	403	203	205	451	191	473	1680	566	343		150	355
Aspect ratio		7.27	8.48	10.66	21.3	21.5	6.1	32.4	5.8	10.2	4.9	8	4	16.2	437
Taper ratio		5.7	8.7	7	5.5	5.5	4.6	6	6.6	4.1					
¼ chord sweepback	deg.	9.5	26	23	17	18	32	15	34	27	28	30(L.E.)	60(L.E.)	20(L.E)	
Total washout	deg.	7	8		7.1	5.6	5	6.2	5	7	1.8	3½		8.6	
Dihedral	deg.	3	3	3	5	5	3	5	2½	3	1.5				
Thickness ratio at centre section	(%)	20	20	20	27	27			17	18	16				
Wing root thickness		20	20	20	16	15.5	17	16	15	16	13			17	
Wing tip thickness		10	10	10	8	10	8	8	8	8	8			10	
Weight empty	lb.	264	606	550	440		2310	550						265 -	198
loaded		440	827	770	660		2760	770	7050	33000	18700	1550 (Glider,		485	375
Wing loading	lb/ft^2	1.9	2.4	1.9	3.3		6.1	4.0	15	19.5	33	4.5		3.24	1.01
Performance															
Best gliding ratio		1/21	1/24	1/28	1/37		-	1/43	-	-	-	-		1/30	1/19
Minimum sinking speed	ft/sec	2.8	2.6	2.13	1.77		-	1.58	-	-	-	-		2.03	2.13
Power units		-	-	-	-		2xHM60R	-	2xAS10c	6xAS10c	2xJumo 004	-	-	-	-
B.H.P.							2x80	-	2x240	6x240		-	-	-	-
Maximum speed m.p.h.		-	-	-	-		134	-	212		590	-	-	-	-
Cruising speed "		-	-	-	-			-	190			-	-	-	-
Landing speed "		-	-	-	-		47	-	62			-	-	-	-