

Hullbusters

JUNE 19377

The official newsletter of R/C Model Warship Combat

Supplies were extensive including extra pumps, 14 sets of 3-Xcells, Clippard fittings, Freon, propellers, "Cessna Gray" paint, gun parts, battery chargers, tool boxes, the Tirpitz ship box, and numerous other items.

On Saturday February 28, 1987 the repair of battle damage to the Scheer was completed. All systems had been left in the ship. It had a pump with turn on system, two functional guns, motors, and throttle. The radio control unit had been retained by Martin (We have some ray of hope that he will be back). On Tuesday evening 3/3/87 Stan's new Futaba Conquest was installed in the watertight box. The ship was then launched for tub testing (flying the American flag) at 8:57 PM. All systems worked well.

If You Can't Beatem, Buyem!

By Stan Watkins 3/3/87

After several serious rounds of negotiations between the Amarillo Axis and Allies, a significant agreement was reached. War damages and reparations in the sum of \$85.00 were to be paid by the active Amarillo American Fleet to the Schneider Werks. In exchange for said reparations the Schneider Ship Werks would turn over all warships and supplies.

On February Wednesday February 25, 1987 the payment for the war material was made and all material minus control units was transported to 7700 Lamount.

Martin Schneider had campaigned very successfully for 6 years. He had won the "Von Fluegel" Traveling trophy twice with two different ships. In 1981 his Lutzow won and in 1982 the mighty Tirpitz had almost single handedly blown away the entire Allied Fleet. Martin is buying a large older house which he and his wife have always wanted. He believes the preparation of this home will require a large time investment. The ships would be a temptation to divert time from that project. He also wants to do more machining work. He stated that he was not getting out because of being upset with anyone or the "rules". I informed him that I might sell some of the ships to get other Amarillo hobbyists into the hobby more easily. I also said I would probably keep the Diullio in the attic for several years (in case he should want to get back into the hobby). This ship could be reclaimed if he wanted to come back.

The ships transferred are: 1.) the 1981 champion Lutzow (still equipped with Mk IX GCH miniguns), 2.) Admiral Scheer (the one that Brian used when the Tirpitz was working), 3.) The Duillio (Schneider clone of the Andrea Doria), and 4.) the Tirpitz (2nd Schneider built Tirpitz, with the very latest in combat armament, pumps, and throttle).

The weather was improving fast and so on Wednesday March 4, 1987 the USS Scheer was launched flying the American flag. A new acquaintance from work (Ronnie Pierce) had come to see one of these strange beasts in action. Martin you will not be surprised to learn that the guns both worked well the very first time. No tweaking at all with the old "Geek" breach. Ronnie drove the Scheer around and was impressed with its responsiveness. He was also impressed with the power of the guns. Ronnie has flown R/C planes for years so he had no problems at all getting used to conning the Scheer.

On Saturday a bottle of Fokker red was bought to complete the dressing up of the war damage. Saturday night 3/7/87 the painting was completed and the too long gun barrels were cut to scale length for better scale accuracy. Stick on "port hole windows" were also added to the bridge. It's amazing how much that helped the looks of the Scheer. What next? Well the tape waterline still needs to be added and a few more windows in the tower. She'll never make best of scale but she can be made presentable, I think.

A suggestion

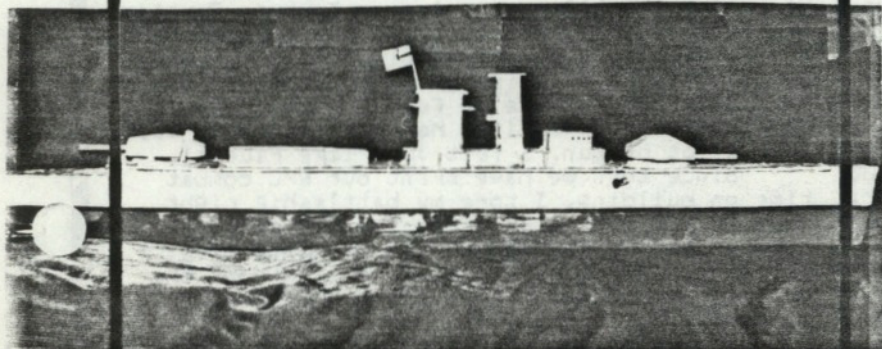
Marty Hayes

Most of us have formed opinions on the subject of the plastic pellets and most of us have said "no pellets" because they require too much retooling, are too expensive, aren't powerful enough, or require too much cleanup afterward, etc. Perhaps the way to test them out is to let a single ship (Foster) use them for one battle or some battles at nationals (if he will agree). This would require a special waiver from the club and the people he would battle with, but I think that could be set up. A single warship would not be such as to offset the tide of battle either direction but would still give us a reasonable test vehicle.

Ten Years Under the Gun!

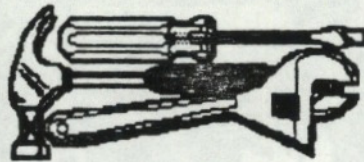
By Stan Watkins 3/28/87

The 10th Anniversary of the first firing of an R/C mini BB gun from a ship by radio control is approaching. This will be commemorated here in Amarillo on Friday October 23, 1987. The same ship and gun will be used and perhaps even the same radio control unit. The ship was the USS Ardmore. The gun was the Mk I (similar to the geek breach, except with thinner tubing). It featured a home made o' ring spool valve that was servo operated and a pressure tank made of 2 inch cast iron pipe fittings. The radio was a "World Engines Blue Max". Anyone who wishes to attend is cordially invited to do so.



1. USS Scheer "Impressed" into service with Stan's fleet. As She appeared on 3/28/87.

HOW TO BUILD: The Mansfield Mount



By Curly Barrett

K.L.S.S.

I was looking through old Hullbusters with Army, and she was interested in the "How To..." articles. She said, "Why haven't you written one yet? You must know something by now." I was, of course, smitten by her verbal attack. I looked at her brother Chris and asked, "Well, what does the newest Allied builder want to know?" He inquired, "How do you fill the gas tanks up for the propulsion motors?"

We had to straighten out a few of the basics before Army asked, "Have you given any thought to how you are going to mount your motors?" Chris was quick to reply that his best friend was a taxidermist, and that he could get his motors mounted for free.

I couldn't find any information on how to mount a motor, so I wrote this article. The following information is not an attempt to produce a state-of-the-art motor mount that will stun the veteran battlers; rather, it is a good basic motor mount

for rookies. Last year at Nats I used a very crude but effective motor mount consisting of a strip of aluminum stock which was perforated to accommodate two 6V. 380 motors. It took several hours and many attempts before the holes all lined up. The problem was - if I wanted to change to a different 380 motor it took about 20 minutes. Worse yet was the thought of trying a different size or brand of motor; none of the holes matched up. I set

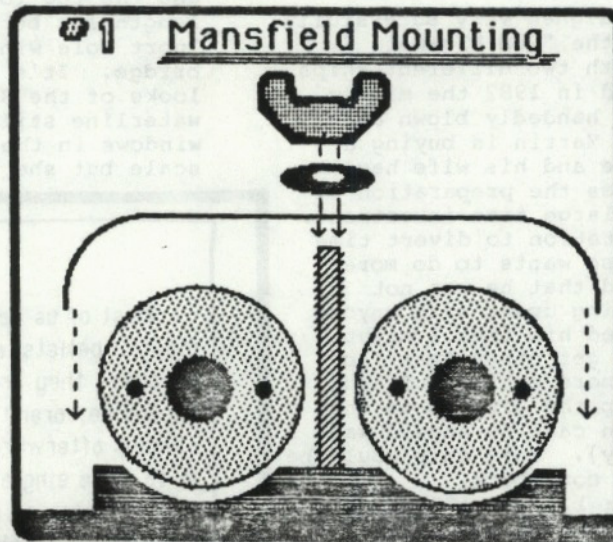
out to try to find other ways to mount a motor. The following is a short list of methods tried: Epoxy the motors down, wire the motors down, sandbag them in place, chewing gum, magnets, prayers, and even Dentu-Grip. The results were all poor.

I have, therefore, built a simple mount:
The Mansfield Mount

CONSTRUCTION:

The mount is easy to build and can be completed in around 20 minutes (or less, if you don't have to put on

band-aids as frequently as I do). The base for the mount is a piece of 1/4th inch ply-wood. The dimensions are not critical. I layed two motors down next to each other and used that for a size template of sorts. (Remember: This is for Rookies, and they shouldn't have to be precise to be reliable. We leave that to the veterans.) The next step is to countersink a bolt up through the bottom of the wood in the center of the piece. Place your motors on the mount to see where the center of their trough will be. Mark the center and start eating away the wood with a dremel, a surform, or whatever your favorite implement of destruction is. These rounded grooves will hold the motors in position, but they don't need to be carved to the exact arc of the motor. "Close Counts in Motor Mounts." once the motors line up parallel, you need to cut out a top piece. This could actually be another piece of wood, but I used a shorter bolt which required the use of a thir upper piece. I happened to have a piece of the aluminum sheet (1/16th of an inch) which I cut to size. Then, I drilled a hole in the middle of the top piece. I chose to bend the edges over to help hold the motors a little better and shield the motors from gunfire. ↗



News from Way Out (North)West by DAN DEES.

Since last Nats Terry Darby and I have had two battles, both last fall.

In early September I made the 5 hour drive to Cave Junction, Oregon, where Terry is head caveman at the Oregon Caves National Monument. We spent a lot of time roving around southern Oregon searching for a place to battle, since the lake we used in the spring was mossed up worse than Sequoia at the '83 Nats. About 50 miles later we found the perfect spot - about 100 yards as the crow flies from Terry's front door. That's about 1 mile by road for those of us who don't fly.

There is a nice pool in the Illinois River (Jass - we found it - but how did it get in Oregon?) about 18-24" deep. After launching we can walk up a path about 30' to where there is a kind of double ledge about ten feet above the water. The effect is like sitting on a comfortable bench looking down on the battle.

We had a good afternoon of battling - especially Terry, since he sank my battleship.

A couple of weeks later Terry came up to the northern end of the state and we battled here. The throttle mechanism on Terry's Portland was cooperative enough to turn his cruiser into a sitting target for my battleship. I was able to pound it at my leisure. Sinking the Portland so easily almost made me feel guilty, but pumping bb after bb into her helpless hull was sure a lot of fun. I felt just like Fluegel.

Since then we have spent our R/C combat time on building. I tore my battleship right down to the framework. Then I added some new ribs and modified most of the existing ribs. I still have a lot to do, but when I'm done the Colorado will have become the U.S.S. West Virginia.

I have nearly completed a Liberty ship for campaign battle. It has already undergone sea trials and only needs a superstructure and a paint job before joining the war effort. →

→ Actually, I was too lazy to cut it to size, and that's just the way it is!

INSTALLATION:

I found out where the motors would go (usually near the stern) and glued the mount down. The motors are layed in place and universal joints are hooked up. Then the top piece is put on, and a wing nut and washer complete the installation.

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CONSUMER REPORT:

The cost is little to nothing and the time involved is small. The biggest benefit is the ease with which you can change motors, even to smaller or larger ones (within reason). I tested the time it took to change a "Burned-out" 380 motor, and replace it with a new one. Can anyone beat 8 seconds ???

■ ■ ■
The two drawbacks are

the possibility of the wingnut coming loose and the mount coming unglued, but those can be minimized with good glue and a lock washer. I also wrapped the top piece with electrical tape so there would be less radio interference from metal on metal parts in the ship.

Again, this is just one way to do it. It works well in a two screwed ship. I would be interested to hear of other ways to mount a

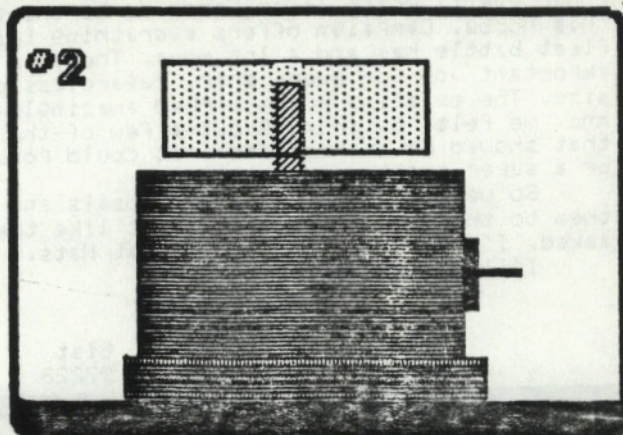
motor, but I think most rookies could live with a Mansfield Mount. (The name was tagged on after the original drawing of the motors looked like part of the anatomy!) Good luck and Happy Hobby.

"Our feet are stained."
Curly Barrett

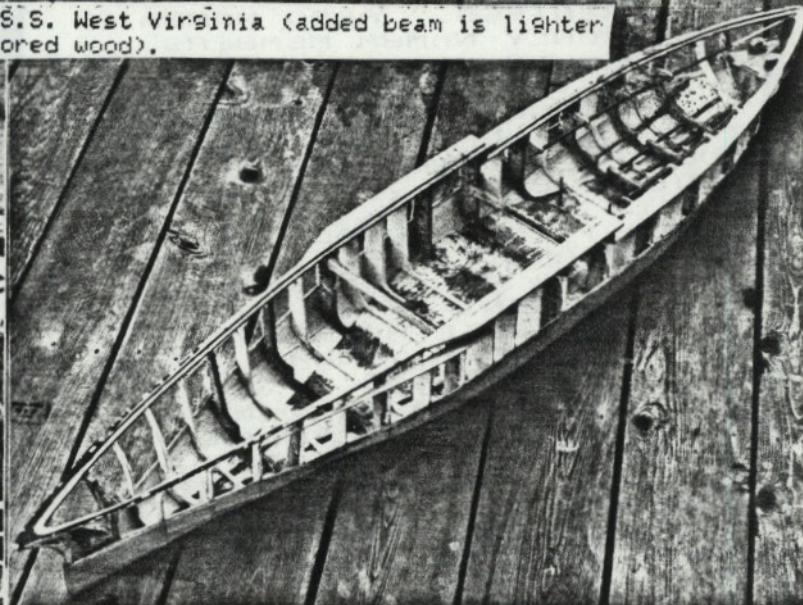
2170 Draper Ave
Roseville, Minnesota

55113

Smallitude



U.S.S. West Virginia (added beam is lighter colored wood).



→ I have started a small ship but won't have the time to finish it this year. The hull is framed and motors and Props are installed.

Terry is building another Astoria, not the New Orleans class ship but the Cleveland class, Cl 90. The hull is beautiful. I hope he's working on it now because Nats is less than two months away.

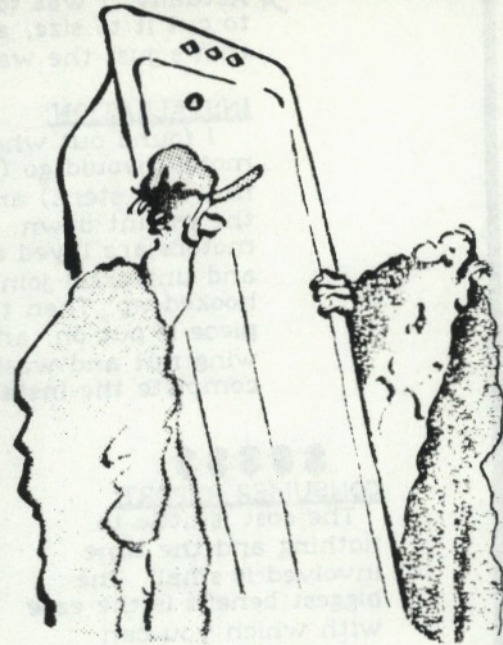
Terry stayed at my Place one weekend a couple of months ago and we spent several hours discussing modifications to the Campaign rules. We had talked about this on the way home from Springfield last summer.

We were both excited about the campaign battle at Nats. We feel it comes closer to realistic naval warfare simulation than any

other event, which is supposed to be the goal of this hobby. Campaign offers everything that fleet battle has and a lot more. There is an important job for every ship, regardless of size. The existing rules worked amazingly well and, we felt, by ironing out a few of the bugs that showed up in practice, it could possibly be a super event.

So we made up a set of proposals and sent them to the executive board. Just like they asked. I'm sure we'll hear more at Nats. I'll see you folks in July.

Dan Dees
11084 S.W. 81st
Tigard, OR 97223



"A BECK AND A LITTLE
SUPERSTRUCTURE AND
'WIALA' THE SHARPHORST."

JUNE '87. NATS TO YOU..

by JEFF POINDEXTER

THIS 'NATS TO YOU' WILL BE DEVOTED TO INFORMING YOU ABOUT CERTAIN RULES THAT WE NEED TO FOLLOW THAT I HAD NOTHING TO DO WITH. FIRST: THE SPRINGFIELD CLUB HAS STATED THAT THEY WILL REQUIRE THAT YOU SHOW THEM YOUR NAMBA 87 MEMBERSHIP CARD. (IF YOU DO NOT HAVE YOUR CARD AT THE NATS YOU WILL NOT BE ABLE TO COMPETE.) SECOND:

NAMBA HAS PLACED ON THE MEMBERSHIP CARD THAT: "NO ALCOHOL CONSUMPTION IS ALLOWED AT ANY TIME YOU ARE OPERATING A MODEL AIRPLANE, CAR OR BOAT. NO ALCOHOLIC BEVERAGES OR OTHER INTOXICATING MATERIALS ARE PERMITTED ON THE PREMISES." ALSO NAMBA WANTS ONLY NAMBA MEMBERS ALLOWED IN THE PIT AREA. THIRD: THE SPRINGFIELD CLUB NEEDS MONEY FOR CHEMICALS TO TREAT THE LAKE. SO SEND IN YOUR NATS ENTRY FEES.

INDIVIDUAL.....\$30.00
FAMILY

FIRST INDIVIDUAL.....\$30.00

EACH ADDITIONAL.....\$12.00

ADD \$3.00 PER PERSON FOR ENTRIES SENT AFTER JUNE 15, 87
SEND TO: JEFF POINDEXTER
RRT 9, BOX 251, AMARILLO, TX
79108

NOW FOR OTHER ITEMS. MAIL YOUR CLUB DUES TO DAN HAMILTON, RT3 BOX 558, DECATUR, ALABAMA, 35603. THIS FEE IS \$4.00. (IT USE TO BE \$8.00.) \$10.00 IF YOU WANT 'HULL BUSTERS'. DO NOT SENT NAMBA DUES TO ANYBODY EXCEPT MYRTLE B. COOD, 6073 SUHRISE DR. LOWER LAKE, CA. 95457. SEND HER \$30.00 IF YOU ARE THE ONLY PERSON IN YOUR STATE JOINING. (NAMBA'S INSURANCE COMPANY NO LONGER COVERS PEOPLE THROUGH THE SAME CLUB IF THE PEOPLE ARE FROM DIFFERENT STATES.) IT'S ONLY \$25.00 IF JOIN THROUGH A NAMBA CLUB IN YOU STATE.

AS BEFORE, FLEET AND CAMPAIGN BATTLES WILL BE SCHEDULED DAILY. ~~SEE SCHEDULE~~ INDIVIDUAL SHIP TO SHIP CHALLENGES SHOULD BE ARRANGED BY THE CAPTAINS INVOLVED.

ALL PERSPECTIVE COMBATANTS SHOULD HAVE ALREADY RECEIVED THIS INFO THROUGH THE MAIL.

ALSO THINK ABOUT HAVING THE 10TH. NATIONALS IN AMARILLO NEXT YEAR IN 1988. (I MADE A MISTAKE EARLIER.) THE LAKE WE'LL USE IS ABOUT 1 1/2 TIMES LARGER THEN THE ONE IN SPRINGFIELD, 4 FT. DEEP AND OUR DRYDICK AREA WILL BE ABOUT 20 FOOT FROM THE LAKE. GOD BLESS YOU ALL.

TURBO PUMP: PART 2

by James C. Foster

As with all things there is always room for improvement. This is just as true for the Turbo pump design I discussed in Hull Busters some time back as for anything else. This article deals with the slight improvements that have been made to the basic Turbo Pump design to improve reliability and ease of construction.

THE IMPELLOR: This of course is the heart of the pump. Care of construction and application is essential to a pump which works when you need it to. Figure 1 shows an impellor in it's final form, so just refer to this drawing as you read this section. Materials you will need are brass sheet for the impellor top and bottom and also to fabricate the special "tool" to assist construction. This sheet can be any thickness you wish, but I suggest using one of the medium thicknesses (K&S) for strength and ease of machining. The blades are still manufactured out of sections of brass tube, I recommend the brass tube which is 21/32" in diameter. You will also need 1/8" lock collars.

The first step is to mark on the brass sheet two 1 1/8" diameter circles on the brass sheet, accurately locating the center of these circles at the same time. Then within these 1 1/8" circles center 5/8" diameter circles, taking care to get everything concentric. On one of these circles draw cross hairs to divide the circle into equal quadrants. These line will be your guide to accurately solder the blades in place. Next lay out a 7/8" diameter circle again locating the center accurately. Once all three circles have been marked out on the brass sheet, the next step is to drill the center out to 1/8". It is CRITICAL that this hole be located as close to the center of the circles as possible, so take some time to do a good job. After drilling, the next thing to do is to cut out the circles. The best way to do

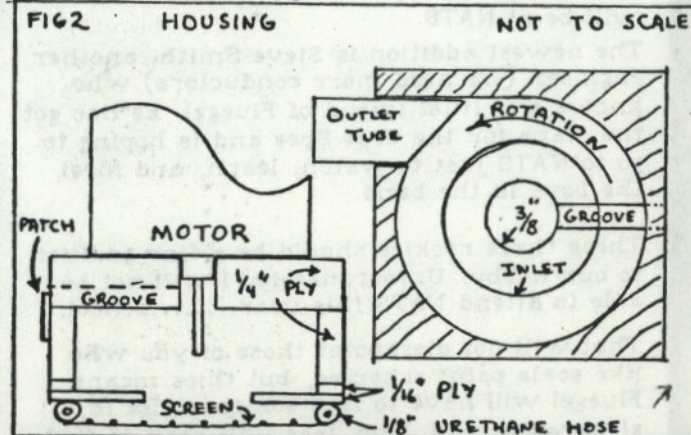
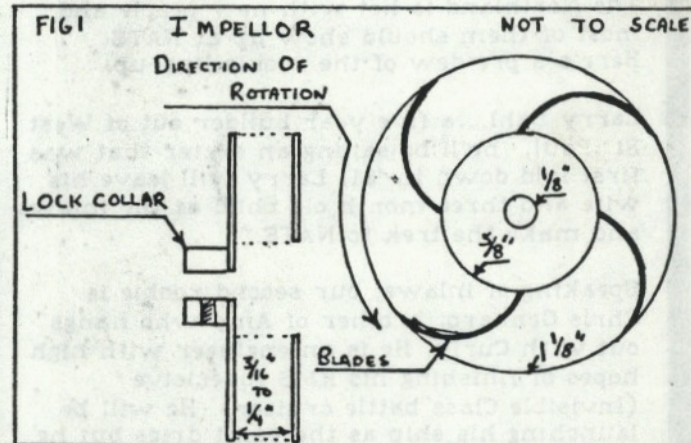
this is to cut the circles out of the brass with a good amount of extra brass around the outside and gradually by taking small straight cuts remove the excess brass down to the 1 1/8" diameter line you drew. You may want to leave a small amount of brass outside the line, depending on how well you can cut. One important point to remember in this cutting process is DO NOT distort the disc of brass. You want this disc to remain as flat as possible. I recommend using sharp, strong scissors rather than tin snips as the snips always distort the brass to some degree.

With the three discs cut out of the brass, you can now solder the 1/8" lock collars in place. You will need two of the collars prepared for soldering by removing the chrome plating, I say CHROME plating with sand paper. Only one face of the collar needs be cleaned in this manner, ignore the sides and other face, they can stay plated. To insure everything stays aligned during soldering use a short piece of 1/8" music wire, or a drill bit (the chuck end) with another 1/8" lock collar securely attached to the wire. Slip the disc with the cross hairs onto the wire with the lines DOWN, or in other words solder the prepared collar on the unmarked side of the disc. Slip the prepared collar onto the wire with the unplated side next to the disc and clamping the disc firmly between the two collars tighten the set screw onto the wire. Eyeball the disc to insure that it is being held in a flat attitude exactly perpendicular to the wire. Adjust the two lock collars as necessary to insure alignment. When you are convinced everything is square, go ahead and solder the collar to the disc. When cool remove this assembly and perform the same procedure with a prepared collar and the 7/8" diameter disc. This will be a clamping tool which will greatly assist blade placement and assembly. Prepare the other unused 1 1/8" diameter disc by enlarging the center hole to the full 5/8" diameter. There is no easy way to do this by hand that I have found except to use very sharp milling burrs in your Dremel or other similar tool and just gradually enlarging the hole until it is 5/8" in diameter. Try and avoid any distortion during this process, keep the disc FLAT!

Make the blades for the impellor by cutting sections of the 21/32" brass tube. Make these sections (you need two) 3/16" to 1/4" high. The main thing you want here is identical height of the sections and square cuts of the tube. I recommend using the K&S tubing cutter as it has a very fine blade and with care will cut straight and square. Just go slow and don't force things. Take these two tube sections and cut them each into two equal semicircles with a Dremel cut off wheel. These four semicircles will actually be to long, but they will be cut to proper length later. Find your 1 1/8" disc assembly, the one with the soldered collar, and place it back on the music wire with the cross lines facing UP this time. Again be sure to clamp the disc between two collars, the one soldered onto the disc and another on the wire. Take one of the blade pieces and place on the disc with one end touching the intersection of a cross line and the 5/8" circle inscribed on the disc and the other end near the outer rim. you want to place the blade so the inner end is NOT pointing directly at the center of the disc, but rather makes an angle. See Figure 1 to see what I mean. Play around with the blades and see which particular angle give you the most blade area available. Once you have discovered the best arrangement for the blades, mark one at the point where the blade contacts the outer rim of the disc while the inner end is still on

the cross line and 5/8" circle intersection. Cut the blade off at the marked point and use as a pattern to cut the remaining three blades to the same length. The important thing is to get the blades all the same length, and secondary to get them exactly on the inner and outer rims. With blades all cut to length place them on the disc in their approximate positions and slip the 7/8" diameter tool onto the wire until it rests on top of the blades. Screw onto the wire to act as a clamp to hold the blades in place while soldering. With the clamp positioned, move the blades into their exact positions, the inner ends at the cross lines and 5/8" circle, and the outer end on the outer rim of the disc. Solder all four blades once they are properly positioned, placing the solder along the INSIDE or CONCAVE surface of the blades. Avoid overheating the whole assembly as problems will arise with too much heat. With the assembly cooled down, remove the clamping tool and place the 1 1/8" diameter disc with the 5/8" hole onto the top of the blades. Reinstall the clamping tool to hold this disc in place so the outer rim is aligned with the outer rim of main disc and blades. You may want to turn the whole assembly upside down WITHOUT removing from the music wire support for ease of soldering. Once this second disc is well aligned and clamped securely in place solder onto the blades, again being very careful not to overheat the assembly or knocking the blades out of position. When the assembly has cooled, clamp the music wire into a drill without having removed the impellor from the wire, and with the drill running hold the outer rim of the impellor against a flat abrasive surface such as a sanding block or a cut off wheel. Grind down, or is that GRIND down the rim until you have an outer diameter concentric with the hole in the middle. The impellor is done after this is done. Not easy but you do get a good impellor!

It is always a good idea to check the



balance of the impellor by inserting a short piece of music wire into the mounting hole and balancing it between two razor blades. Add solder carefully to the inside of select blades or remove solder to achieve an acceptable balance.

THE HOUSING: The housing is really where the major change has been made in the turbo pump design, the other change being in the dimensions of the impellor itself. The new housing is NOT made in the old spiral shape, but rather has a circular impellor chamber and a square outer shape. Assembly of the housing is also simplified by the use of stacked layers of plywood. The plywood you will need is 1/4" thick and 1/16" thick aircraft or marine birch plywood. Plastic could also be used if you have access to such supplies. First step is to lay out on the plywood squares which are 1 1/2" on the sides. you will need two squares from each of the thicknesses of plywood for a total of four squares. locate the centers of the squares as accurately as possible. Drill the center of one of the 1/4" thick squares to 5/16", or whatever diameter of hole is necessary to clear the end bearing on your motor. Layout on the other 1/4" thick square and one of the 1/16" thick squares a circle 1 1/4" in diameter, centered within the square. Next draw a line tangent to this circle and parallel to a side of the square. Draw another line parallel to the first and 5/16" away. See figure 2 for a drawing of the housing to make more sense of this. On the final square of 1/16" ply, layout a 5/8" diameter hole in the center. Cut the four squares out, being as careful as possible to cut the squares out accurately. Also cut out the sections of the

two squares which will be your impellor chamber, starting in along the tangent line, cutting along the 1 1/4" diameter circle, and ending along the line 5/16" from the tangent. Glue these two squares together after cutting, lining up the inside surfaces and the outlet slot to make an assembly 5/16" thick. Use a Dremel tool or similar to rout out the 5/8" diameter hole in the remaining 1/16" thick ply square. This will be the bottom or inlet of the pump. On the remaining 1/4" thick ply square, cut or rout a groove from the center of the 5/6" hole to the outside of the square. Make this groove about 1/4" wide and about 1/8" to 3/16" deep. This will be your access to the set screw on the impellor during assembly and disassembly of the pump. Glue your motor onto this grooved piece of ply with the groove down or away from the motor. Center the motor as precisely as possible before glueing in place. Also make sure that the motor is not tilted or skewed in any fashion. I use super glue for this and have so far not had a motor come loose in operation. Next glue the 5/16" thick assembly of the impellor chamber onto the motor/plywood assembly from the previous step. Align the pieces so the outlet slot is on the opposite side of the housing from the set screw access hole. Rummage in your scrap box and get a piece of 5/16" diameter brass tubing about 1" long. Cut one end to a 45 degree angle. Insert this tube section into the outlet slot in the housing so the 45 degree angle matches the curve of the impellor chamber (you may want to slip the impellor on the motor shaft to check for proper clearance of the tube). Glue this tube in place being sure the outlet is NO SHORTER than 3/8" past

News from Port Polar Bear:

The Northland is hot with new people and most of them should show up at NATS. Here's a preview of the rookie line-up:

Larry Dahl... a five year builder out of West St. Paul, he'll be sailing an exeter that was first laid down in '81. Larry will leave his wife and three month old child at the inlaws and make the trek to NATS.

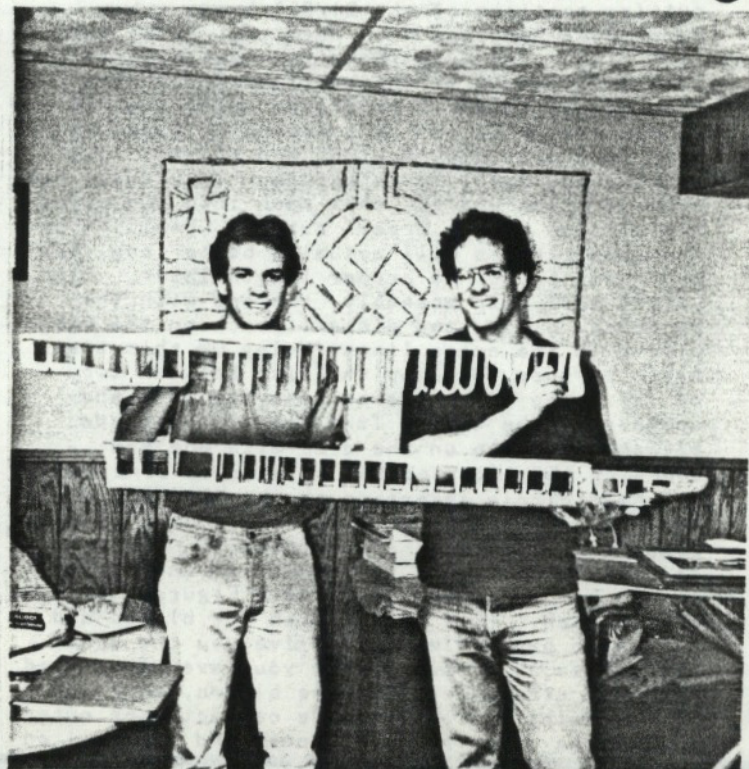
Speaking of inlaws, our second rookie is Chris Gennaro, brother of Amy who hangs out with Curly. He is an engineer with high hopes of finishing his HMS Indecisive (Invisible Class battle cruiser). He will be launching his ship as the paint dries but he will be at NATS.

The newest addition is Steve Smith, another engineer (we need more conductors) who knows a mutual friend of Fluegel. He has got the plans for the Graf Spee and is hoping to go to NATS just to watch, learn, and meet the boys in the band.

These three rookies should be a fine addition to our hobby. Unfortunately, I will not be able to attend NATS this year.....school!

That will not dissappoint those of you who like scale paint schemes, but this means Fluegel will have to find someone else to sleep with, and John Jass will have to find

someone else to stay up late at night with, laughing so his father can't get any sleep. The good news is that we are hoping to have a fall regionals in the Chicago area. This will be a great chance to get one last use out of your ship before winter. Among the expected battlers are the three Big Guns - Millholland, Foster and Barrett. (Just kidding) OK, Two Big Guns. It should be great. Contact Tom J. for more info. Happy Hobby

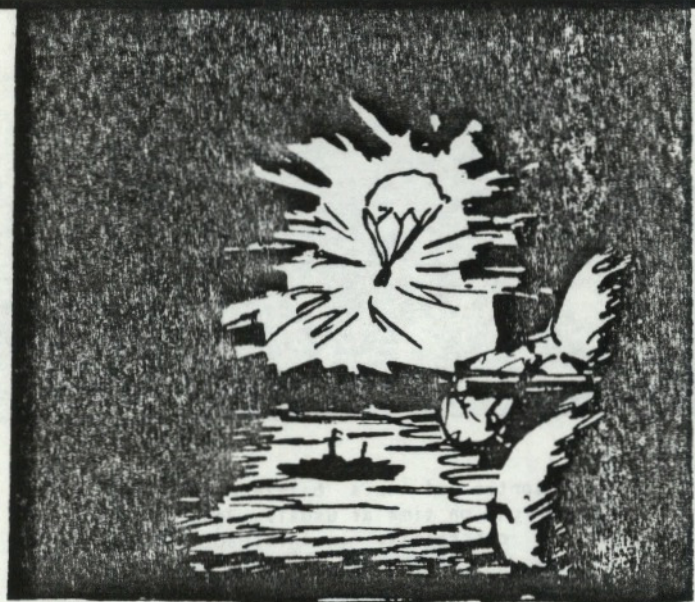


the housing. Use a sufficient amount of glue to insure the tube is well anchored and that any gaps are sealed. Try not to get any glue inside the impellor chamber itself. Next you must waterproof the whole housing assembly, either with polyester resin or some other durable sealant. After the water proofing is dry, assemble the pump by slipping the impellor onto the motor shaft (NOTE: if the shaft of the motor is smaller in diameter than 1/8", make an adapter out of 1/8" diameter brass tube to fit inside the lock collar and having a hole cut in the side for the set screw to pass through) and adjusting so with the play removed from the motor shaft by pressing on the top end of the shaft, there is about 1/64" gap between the bottom of the impellor and the inlet plate of the pump. Also check to make sure the top of the impellor does not rub on the top plate of the pump housing. Tighten the impellor in this position. Before glueing the bottom plate in place on the housing, connect the motor to voltage and run the pump while holding the inlet in place and see if there is any rubbing with the pump held in many different orientations. Correct any rubbing problems found by shimming the impellor or readjusting it's mounting location on the motor shaft. Glue the bottom plate in place after this test. Next, glue a small piece of thin (1/64") ply over the set screw access hole, and this is VERY important, leave a small gap at the top of this cover piece. This gap (about 1/32") is to allow air in the impellor chamber to escape easily and the small amount of water which escapes this hole in no way affects the pumping capacity of the pump. If you do not leave a

sufficient gap or no gap at all, the pump will tend to cavitate and take several minute to reach full pumping capacity. The last step to finish the pump is to install a filter screen. I like to put a ring of the Clippard low pressure tubing (same as used on the guns) around the outside of the housing and put ordinary aluminum window screening over this tubing. I just glue everything securely in place with good old super glue.

Well, I hope this article will help with you pump builders out there in never never land, that is if you can figure out what in the world I am talking about in my instructions. I deliberately made them confusing so some rookie won't beat up on me in some future battle. Lets face it, us old men need SOME advantage over the young whipper-snappers! All seriousness aside, the pump should serve you well, with my pumps built to this design and using Dumas 4.8v motors had a capacity of 1 1/4 gallons per minute at 10v input. Cavitation was non-existent with instant pumping action in the three major test modes of starting dry with pump housing submerged, removing from water while pumping and re-submerging, and starting wet and gradually submerging into the WATER

James E. Tate



Don't there something in the rules against star shells in night battle?

RULE PROPOSALS

- Pumps shall have a 3/32 outlet. Dan Hamilton, D.W.Fluegel
- Pump motors shall be no larger than the Dumas 4.8 volt motor. Dan Hamilton, Eric Noble
- Battleships and Battlecruisers 40,000 tons standard and over shall be able to cover all four quadrants and be able to rotate one gun per main turrent. Dan Hamilton, Tom Jass
- Lightcruisers below 5,000tons standard shall have one full unit. Dan Hamilton, Eric Noble

1987 SOUTHEASTERN REGIONALS

Tom Jass

The trees were filling out with leaves, the lilacs in Lombard (our only claim to fame) were in full bud -- spring was here and in spring an old man's fancy turns to battling at the Southeast Regionals in Decatur, Alabama. Since John and I missed the 1986 fall Southeast Regionals, we were both excited about going back on the campaign trail again against the hated Axis. On Thursday, April 30, I drove to Valpariso, Indiana to pick John up. The wagon was loaded with the SWIFTSURE and the ARETHUSA and all the support gear, but it was much less crowded than usual without the shape of the beloved RODNEY. For the first time we were going off to battle without a BB. We left for Decatur at 1900 hours (7 PM for the Axis nerds), and sped through Indianapolis, Louisville, Bowling Green and Nashville at 70 MPH with our radar detector lit off.

During the long night I thought of the upcoming battle and the efforts we had made to be ready and effective. Throughout the winter (as work on my airplanes permitted) the SWIFTSURE was modified as follows: her superstructure aft of the deck step was rebuilt from scratch to more closely resemble the SWIFTSURE's unique configuration rather than the more general generic Colony class configuration she had when I built her; she was gunned with two forward guns and one stern gun (at John's insistence as a former battleship captain); I installed two small Radio Shack motors and the necessary electric circuitry for turning; the forward 3/4 of the hull was reskinned to remove the silicone caulking on the interior. The ARETHUSA was only patched up from the 1986 Nats damage (minimal) and remotored with two Radio Shack motors (no turning system was installed as she has always been a quick turner) in an attempt to conserve battery capacity. I was able to keep her within the weight limit and still use X-cells. The ARETHUSA was using a 4.8V motor on her pump

which only provided minimum dewatering capability, but conserved battery capacity. The ships were repainted in their usual colorful scheme; they at least looked snappy!

During the drive no troopers (Axis or state) were sighted and the English cruiser squadron arrived in Decatur at 0600 on May 1. After checking our eyelids for light leaks for two hours, we headed for Dan and Mary's home for a spot of tea and English hospitality.

We all went to the lake and set up the pit area for tomorrow's battling. Dan and John pounded metal fence stakes into the Decatur red dirt around the pit area. Plastic tarps would be suspended from the stakes to surround the pit area and provide spectator safety. If this method were used at Nats it would increase safety by 100%. Dan said the 6'X6' tarps are available at Sears for about \$6 each. They can be folded and reused and are a good investment.

We then ran speed tests on the SWIFTSURE and the ARETHUSA to determine their legality. As contest director Dan was not going to issue any blanket challenges on ship construction, but we were all tested for speed. The SWIFTSURE ran through the 100' course in 24.9 seconds with no resistors in the propulsion circuit. I was satisfied with that speed and stood pat. The ARETHUSA tested at 27 seconds with the Radio Shack motors so out they came, and Dumas 4.8V motors were installed. With this change she ran the course in 24.3 seconds and was ready to go. John and I tested the pumps in the ships to determine if there was a difference in pumping capacity with opposite battery/pump polarities.

ORDER OF BATTLE

From Dan's entry forms, the probable fleet composition looked as follows: VALIANT, SWIFTSURE and ARETHUSA against HAURNA, SUZUYA and PRINZ EUGEN. The English fleet had 10 units against the Axis' 10 units -- even. The English fleet was composed of all veteran ships while the Axis fleet was all new ships. Given the usual problems that new ships experience, a slight advantage should lay with the Allies. Handicapping the experience of the captains, another minimal advantage should go to the English as Dan and John had more experience than David and Gerald (although this was John's first experience with fighting a heavy cruiser rather than a BB). All in all, (on paper at least) the fight looked to be fairly even with a slight theoretical edge going to the English. (I'm sure the Axis captains had gone through a similar evaluation in their heads and had probably come to the opposite conclusion -- especially remembering the glorious Axis successes in 1986.)

Gerald Roberts' new Japanese battlecruiser HAURNA, complete with pagoda bridge, was all decked out in a green paint job. Naturally she was quickly dubbed the "Green Hornet" and Gerald was known throughout the weekend as Cato. The HAURNA is a four unit ship with twin rudders, fitted out with one pump and four guns. Gerald usually used two broadsides and a forward gun during the weekend. She's an effective battler and Gerald has done himself proud with her construction. The PRINZ EUGEN is a German very heavy cruiser built by Eric Noble (who now resides in Decatur, Alabama). Her white-gray paint job rendered her easily identifiable on the water. She was gunned fore and aft and had one pump. Her superstructure was not entirely complete, but Eric had constructed her 01 and 02 superstructure levels of solid balsa -- a good technique on a heavy German cruiser hull. She got better throughout the weekend as Eric worked out the butterflies in his system as he increased his experience. The SUZUYA is David Haynes' new Japanese CH. David didn't have time over the winter to complete her superstructure, but her hull and hull systems were finished in David's

usual immaculate way. He has developed a vacuum forming method for duplicating her main turrets that should be written up for MULLBUSTERS. All six of the battling ships were 24 second speed class ships except for the VALIANT (26 seconds). The evenness in speed and unit numbers between the two fleets promised exciting and even battling.

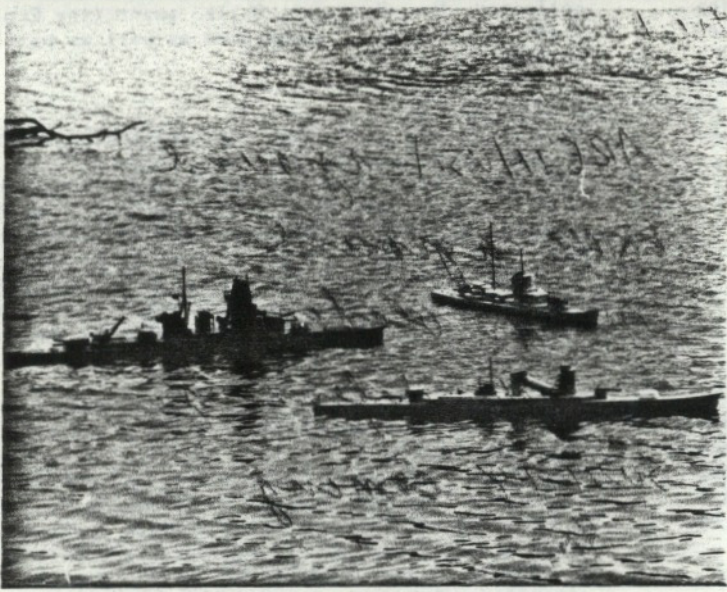
SATURDAY BATTLING

The schedule was set up for us to begin battling at 1000 hours so John and I arrived at the lake at 0900 and unloaded our gear. Dan and Mary appeared a short time later but Gerald and David were late. The weather was sunny and partly cloudy with a gentle breeze coming onshore toward the pits. The weather forecast was predicting a 90 degree plus day so we all liberally applied a coating of sun screen. After arrival and setup, David experienced severe X-cell problems as he was unable to bring his two strings of 4 cells each to a voltage much higher than 5 volts. When he made his speed test the SUZUYA was so slow that something drastic had to be tried. David attempted to fast charge the X-cell strings using an automobile 12V battery (Eric's Chevette); the charge went up, but no one knew if his batteries were going to last a full battle.



FLEET BATTLE 1

The initial sortie of this battle commenced at about 1230 (right on time as usual). John and Dan were going to concentrate on the SUZUYA while I was to occupy and harrass the PRINZ EUGEN. Early on the ARETHUSA ran hard aground in the channel and the situation looked bleak for the English. However, Eric ran the PRINZ EUGEN aground in the same channel as he attempted to blast the ARETHUSA. (A shrewd strategy on my part? No, just poor piloting.) With the SUZUYA experiencing battery trouble already, the VALIANT and the SWIFTSURE proceeded to work over the PRINZ EUGEN. The HAURNA was thickly in the fight which was occurring in the channel about 3 feet in front of the five captains, but two veteran English ships are more than a match for one Axis battlecruiser. VALIANT kept the HAURNA busy while the SWIFTSURE with two forward guns was riddling the hull of the PRINZ EUGEN. The PRINZ EUGEN sunk in the channel with 1380 points of damage. HAURNA was blasted for 100 damage points while SUZUYA escaped with only 40. The English had suffered much less in Sortie 1 -- VALIANT 120 points; SWIFTSURE 120 points; ARETHUSA 40 points (lucky for being aground during 95% of the fight). With Eric sunk we had to score the Sortie 1 points before reloading and continuing the battle. SUZUYA was in serious



trouble with batteries but the HAURNA was in no real trouble. The Allied ships were not hurting at all and they could smell Axis blood.

During the second sortie SWIFTSURE was punished with 150 points of hull damage (not very serious), but sank when her pump failed to pump effectively. HAURNA and VALIANT mauled each other throughout the sortie, but their pumps kept them afloat. VALIANT suffered 630 points, but HAURNA was damaged for 840. SUZUYA escaped with a further 80 points and ARETHUSA was pounded for 180 hull points.

The first battle ended with one Axis CH sunk and one Allied CH sunk, but the Allies were victorious 2390 to 1840. But a more important fact became obvious -- the SUZUYA was experiencing serious battery problems which were to plague her the entire weekend. Without an effective David Haynes the Axis chances were considerably dimmed. We were not going to see a repeat of the 1986 regionals!!

FLEET BATTLE 2

After patching and switching batteries and pumps the ships were put into the water for Battle 2. No sinks occurred in the first sortie, and with the increasing cloudiness and impending showers we agreed not to score the fight until after the second sortie. PRINZ EUGEN was again sunk in the second sortie with a total battle damage of 1380 points (lightning had struck twice in the same afternoon). She suffered 5 below the waterline hits and 14 hull hits. HAURNA was blasted by the English for 860 damage points while the SUZUYA absorbed 300 points. The Axis shooting was not very potent as the Allied damage was as follows: VALIANT, 260 points; SWIFTSURE, 240 points; ARETHUSA, 40 points. The outcome was even more lopsided: Allies 2540 points; Axis 540 points.

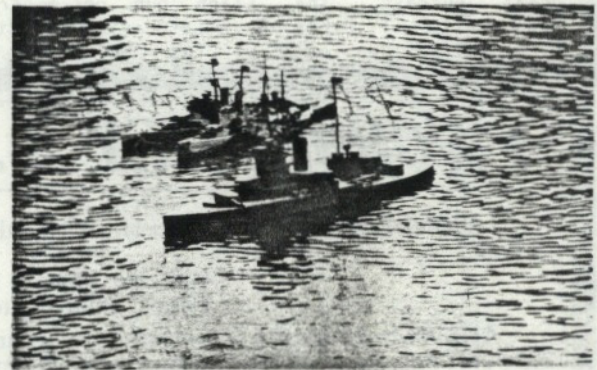
Vague memories of action in Battle two are: SWIFTSURE breaking her main drive u-joints and cruising drunkenly around on her turning motors activated by full rudder commands; ARETHUSA ineffective in Sortie 2 due to a blown freon tank to poppet valve hose; HAURNA and VALIANT trading numerous broadsides -- with VALIANT once again coming out on top. Saturday was a complete sweep for the English, with a lion's share of the credit belonging to the VALIANT.

On Saturday evening we all went to the Hamilton home to review the videos of the day's battles and repair ships. John built new u-joints for the SWIFTSURE, David was trying to revive the batteries of the SUZUYA while Gerald, Eric and I patched hull damage and repainted.

FLEET BATTLE 3

On Sunday the weather was sunny and windy -- much more like the Atlantic than the Pacific we had experienced on Saturday. We all loaded up on sun screen and tanning lotion for the hot day ahead.

After the first sortie it appeared that the worm had turned for the Axis. The SWIFTSURE was sunk (890 points) and so was the ARETHUSA. However, the Allies had managed to sink the HAURNA near the launching pier in shallow water. In fact, John went into the water after the SWIFTSURE had sunk to feel under the HAURNA's keel to determine that she was on the bottom. The sinking of the ARETHUSA was wierd -- I was bringing her back to port while she was on 5 minutes (she had a slight but not dangerous list) when she was caught broadside to the stiff wind and turned turtle and sank in less than 10 seconds. (Shades of Jim Lisher's CH at a previous SE Regionals.) The Axis fortunes were reduced when we determined that the ARETHUSA had no hull damage (one bb dimple on the solid bow area) and was declared an unseaworthy sink, not a combat sink. Once again the windy conditions at Decatur, her low freeboard and poor deck seal had done her in; she had sunk similarly in the 1984 SE Regionals. After Sortie 1 the Axis finally had a lead -- 1260 to 1030.



During the second sortie the VALIANT was alone as she battled the two remaining Axis cruisers. She more than held her own as she defeated them by a score of 860 to 100 (760 damage to the SUZUYA and 100 to the PRINZ EUGEN). The SUZUYA was left riddled with her bow aground on the shore and her stern almost awash; she came off 5 minutes just before her stern would have gone under. So, valiantly the VALIANT engaged two cruisers and turned the tide for another Allied victory, as the English made it three for three by a score of 2120 to 1130. Total Axis damage for the two sorties was: HAURNA, 1110; SUZUYA, 890; PRINZ EUGEN, 120. Allied total damage was: VALIANT, 240; SWIFTSURE, 890; ARETHUSA, 50 (unseaworthy).

FLEET BATTLE 4

We all agreed to limit the fourth battle to a one sortie affair since David and Gerald wanted to begin the trip back to Texas in the daylight. All six ships were readied and into the water they went for the last time. Could the Axis pull one



out and avoid a shutout? The state of the batteries of the SUZUYA didn't make the situation look good. Sure enough, the English made it a clean sweep for the weekend as they won this battle by a score of 1300 to 480. Damage was as follows: HAURNA, 920; SUZUYA, 380; PRINZ EUGEN, 0; VALIANT, 240; SWIFTSURE, 120; ARETHUSA, 120.

For the weekend the individual ship totals were:

VALIANT	4137
SWIFTSURE	2341
ARETHUSA	1823
HAURNA	1699
SUZUYA	1521
PRINZ EUGEN	782

The British had swept the seas clean of the Axis fleet and revenged the 1986 SE Regionals outcome. The worm always turns in this hobby. Who knows what this portends at 1987 Nats? SUZUYA will have good batteries and the game outcome may well be reversed.

AWARDS

So, the battling was done -- the English had in some small measure avenged the Allied defeat at the 1986 Southeast Regionals (where I dimly remember the Axis had won all the battles), and the awards were parceled out. The VALIANT was awarded the overall trophy while the SWIFTSURE was recognized as the champion cruiser. Throughout the weekend the VALIANT was undoubtedly the most effective ship on the water. Not only had she gathered the lion's share of the Allied points, she had also scored the lion's share of the bb hits on the hated Axis. Gerald's HAURNA was honored as the outstanding BB -- a well deserved award as she was effective all weekend. She aggressively traded bb's with any and all English ships, was reliable in each sortie and often went broadside to broadside with the VALIANT for extended sessions. Well done, Gerald!! Once the SWIFTSURE's pump was changed and the new u-joints installed she was very effective, although I don't think that John's experiment with 2 bow guns was a great success. The stern gun on a cruiser (especially if Dirty Dave is driving) is still a very effective weapon. The SWIFTSURE also

collected the Best of Scale award (the English fleet was sharp in appearance as well as battling ability).

LESSONS LEARNED

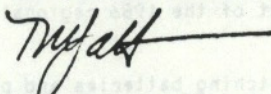
No really new and startling lessons seemed to emerge from these battles. Some of the old knowledge was reemphasized: new ships have teething problems which only show up in battle; running aground or becoming dead in the water is hazardous (usually fatal) to your ship; most pump failures are failures to begin pumping rather than lack of pump capacity; we tend to battle extremely close to the area that we are piloting the ships from.

David's problems with his 2 year old X-cells should worry all of us who have these cells in the same age category. I had one cell in a 3 cell string go bad on me this winter also. Check your X-cells in the water with a 45-60 minute test run; do not assume that a correct voltage reading on a meter in the workshop gives you an adequate test. I think David compounded his problems by attempting to fast charge his cells using an automobile battery, but I would have done the same thing after a 12 hour drive to battle. The alternative was to sit out the fray -- not a Navy good deal.

Our thanks to Mary and Dan for another well run regionals! The atmosphere was relaxed and cordial and all captains were cooperative and helpful. Some sort of record was established as there were no damaging rams recorded all weekend even though there was much fighting at close quarters. Well done, captains. After this past winter and all the flaps and argument it's good to see that the people in our hobby can still have fun and enjoy each other.

1986 was revenged!!

See you all at Nats.


Tom Jass

I WONDER WHY...

I WONDER WHY a pilot's cabin is called a cockpit?

— Gilberto Davis,
Ponce, Puerto Rico

ANSWER: In British Navy warships around 300 years ago, an auxiliary steering compartment was located deep in the ship near the rudder. Wounded sailors were taken there during battle — and seamen began calling this blood-spattered compartment the "cockpit" because it resembled the bloody pits where cockfights were held.

Soon sailors also began to describe the steering area on the main deck as the cockpit.

When the aviation age arrived, pilots adopted cockpit to refer to the part of the plane where they sat and steered.

What To Bring To Nationals By Chris Pearce

Those who are going to Nats for the first time, or who still wonder about these kind of things might have asked this question before. Unfortunately, the answer is not quite so simple. However, there are some

general ideas that could be followed to help insure preparedness.

The first and most obvious things to bring to Nats are yourself, and your ships. Another useful item is a car. This can be avoided, however by carpooling, or taking a plane. Of course, money would also be useful for those constant trips to Radio Shack and the local hobby shops. For the economy plan, one might want to bring a cooler with supplies for lots of sandwiches...

With the basics out of the way, one might also want to bring spare parts. In this area, it is best to bring replacements for each system on a ship. The hobby shops might be able to help with a burned out motor, but they can't provide things like ballbearing guns, or pumps for that matter. The best way to think of it is that if it can go wrong, it will and then it will have to be fixed or replaced.

This brings up the idea of tools. In this area, it is better to be overequipped than to end up borrowing tools every time something goes wrong. A general rule could be to bring everything that was used to build the ship. In the case of people who are carpooling, they might want to each bring some different tools so that there is enough room for everything. The best idea would be to consider everything that could be damaged, or broken, and bring whatever would be needed to repair that.

→ On a less serious side, a camera is a fun item to have at lakeside. It also helps to have a wife, girlfriend, mother type to act as photographer... Most importantly, bring a good share of friendliness and conversation, because the amount of time on the water is far less than the time on shore and in the dockyards, and even if a few battles are missed, the company is worth it. So, good luck people, and hopefully we will get to put some holes in each other at Nats.

God bless y'all

OBSERVATIONS OF THE FOUNDING FATHER
By Stan Watkins

Greetings Combatants!

We have a new Combatant as of Saturday April 11, 1987. After 10 years of patiently watching, my wife, Sherry finally went to war against me. The family that battles together, loves together. The old DKM Scheer (ex-Schneider navy ship) was used by Scherry uh, Sherry. I used my old Oregon City. The following is the way it happened:

Sherry and The Scheer
By Stan Watkins

On Saturday April 11 it was a beautiful warm windless day. After the occurrence of numerous blizzards and gales of recent days, I knew we couldn't waste this incredible opportunity. Sherry had previously agreed to battle me if I would furnish her with a battle ready ship. The USS Scheer had been refitted and declared ready for several weeks and the Oregon City had been fully converted to Mk 27 Safety breach guns. So we were ready.

The newly developed "Watkins Top Gun" training program would be followed. This is a 3 part introduction to: 1). Ship Handling 2). Gunnery operation and targeting. 3). Battle.

The first part deals with the learning of familiarity with the radio control unit and conning a ship with another ship present. One of the things that was not anticipated was the need to explain which was the front of the ship and which was the stern. During this phase of training the trainer should expect to receive numerous rams by the trainee. Sherry showed that she was a "natural" by only ramming the Oregon City once. After about 10 minutes at the helm Sherry seemed ready for phase 2. For this phase the trainee gets full magazines and the trainer gets Zero BBs. The trainer tries to avoid getting shot while he instructs the trainee in some basic gunnery tactics. Since it is not very natural, much attention is given to explaining the use of the stern gun. Sherry once again proved that she was a natural by putting 2 holes in the Oregon City. After the trainee has expended the magazines it is time for the real thing. The trainer should not

TIME	SUNDAY 07/12	MONDAY 07/13	TUESDAY 07/14	WEDNESDAY 07/15	THURSDAY 07/16	FRIDAY 07/17
09:00	TESTING DAY FOR	FLEET "A"	FLEET "A"	SMALLSHIP (FLUEGEL) FLEET "A" (SLEEP) (HOUR)	-- --	-- --
10:00	ALL SHIPS	FLEET "B"	FLEET "B"	SMALLSHIP FLEET "B"	-- --	A M
11:00	TESTING DAY FOR	FLEET "A"	FLEET "A"	SMALLSHIP FLEET "A"	A M	A I
NOON	ALL SHIPS	FLEET "B"	FLEET "B"	SMALLSHIP FLEET "B"	A I	R THREE
13:00	TESTING DAY FOR	SHIP-SHIP MIX "	FLEET "A"	SHIP TO SHIP	R ONE	-- -- END OF "NATS"
14:00	ALL SHIPS	CRUISER MIX FLEET "A"	FLEET "B"	CHALLENGE SHIP C	-- --	
15:00	TESTING DAY FOR	CRUISER MIX FLEET "B"	FLEET "A"	TO SHIP CHALLENGE	A M P	
16:00 (4pm)	ALL SHIPS	CRUISER MIX FLEET "A"	FLEET "B"	SHIP TO G	A I	
17:00	TESTING DAY FOR	CRUISER FLEET "B"	SHIP TO SHIP	SHIP CHALLENGE	M TWO	
18:00 (6pm)	ALL SHIPS	SHIP TO SHIP	CHALLENGE TO SHIP-SHIP	SHIP TO SHIP	-- --	
19:00			CHALLENGE CHALLENGE CHALLENGE			BANQUET
20:00 (8pm)	PARK CLOSED	PARK CLOSED	PARK CLOSED	PARK CLOSED	PARK CLOSED	
21:00				NIGHT BATTLE 10:00 pm		RALE PROPOSALS MEETING
22:00 (10pm)						8 ELECTIONS

repair the damage recieved in phase 2. Phase three began in earnest with the Scheer hitting the Oregon City and then, in turn being hit by the Oregon City. The two ships exchanged volley after volley. At one point Sherry exclaimed, "Oh, You may have created a monster". She was having fun shooting the Oregon City. Then the Scheer pump was heard to fire up briefly and

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shut off. No problem, she had taken on a little water. The Oregon City was out of ammunition so Stan declared 5 minute rule. Sherry wanted more distraction so she kept trying to bring the stern gun to bear. The Scheer had a list and seemed to be down some by the bow but not to worry, she had an 05 Schneider pump.

Soon Sherry announced that control problems were making it hard to handle the ship. The radio batteries were freshly charged. What could the problem be. Stan took over the control. She was getting lower by the head. The pump was not running. She had only very erratic control. She was too far out to make it home. Finally she started to head toward shore. But suddenly her bow went under and the Scheer was gone. Wow, the mighty Scheer, gone.

Rule number one for a good trainer is that he should always recover the trainee's ship. The water was still pretty cool from all of those snow storms, but she was successfully recovered. It had been fun and Sherry definitely was not outclassed. The sink only occurred because the pump failed. The damage was as follows:
Hits on Scheer-21 hull= 420 points.

Hits on Oregon City 5 above and 1 on the waterline=150 points.
Fluegel the sink does count so add 600 points for a Heavy Cruiser sink for a total credited to the Oregon City of 1020 points. Hey, this is a fun hobby. Sherry has said that she might like to battle in a mixed doubles against Jeff and Kay Poindexter at the Amarillo Regionals on June 5, 6 or 7.

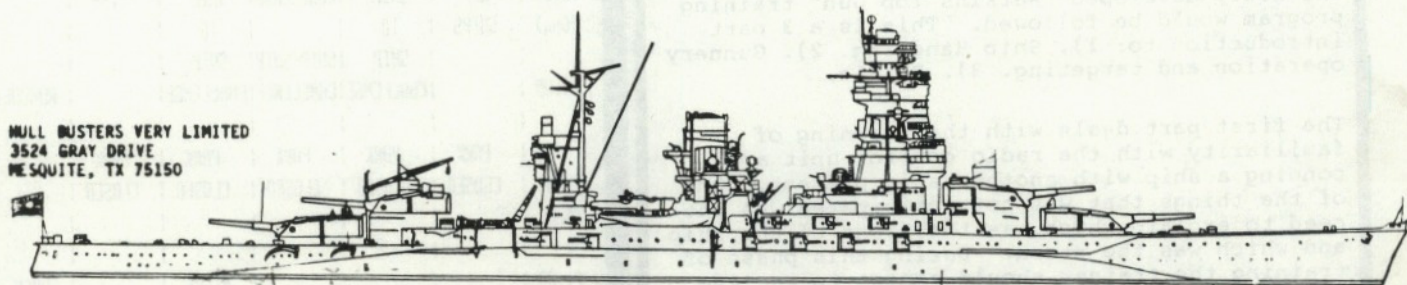
Technical Note: Subsequent investigations by the American Technical Evaluations Team reveals that the Germans had used a strange type of termination on the Scheer's pump wiring. The main power wires were twisted together. No solder was used. During the battle this connection system developed a high resistance which caused the pump to shut down. This type of termination is only used in the American Navy as a very temporary type termination. It seems strange that the Germans would use it for a permanent termination.

If you are walking around in a 7-11 convenience store you might look in the June 1987 issue of the new "Tabloid" MODEL SHOPPER. It has a story on R/C Warship Combat. See you at the Nationals.

CONCLUSION

A big Axes Thank you to all the unselfish contributing authors! Without them, Hull Busters could not exist. The "First Fleet" CLUB may sponsor a special issue of Hull Busters that will arrive in your mailbox just before NATS. Good luck to them in this goal. In case they don't let me list a few helpful pre-NATS information. The phone number for the Battlefield Inn is (417) 883-1340 (Cheap sleep). The Inn is located just North of the "cemetery" on a street called "Glenrose" (That name may be wrong). Sequiota Park is on "Lone Pine". Refer to page 365 in Hull Busters for map.
P.S. War is declared July 13, 1987 - 9 A.M.
Love Fluegel

HULL BUSTERS VERY LIMITED
3524 GRAY DRIVE
MESQUITE, TX 75150



船体は全面(暗い灰色)

船体下方は(暗い赤)

