

# The Arcane Bombardier

Summer, 2003 A.D.  
Volume 1 Number 2

## Spring Sproings the Bungeelistas And “Tennis Balls”, a Punctured

It's been a busy Spring with a series of challenges, new efforts, and old problems. Some of the challenges including the production of my own Trebuchet have had to “take a backseat” to old or discovered problems. The two biggest of these problems are Bungeelistas and EAD (Energy Absorption Device) Tennis balls on Ballista Bolts/Javelins.

I'll speak to the old one first. For those of you who haven't heard of it, a Bungeelista is a simply made, active stringed, small, mounted missile engine that is very cheap and easy to make and occasionally looks something like a real engine. They bloomed a few years ago in the Society and served up a healthy portion of mayhem. There has been a lot of discussion of the resurrection of the engine system if not the actual design.

The engine is the purest of simplicity. The whole concept is the same as the old Rubber band and Paper clip shooter you made back in Third Grade you made with your fingers. The use of an elastic “String” of relatively

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The departments within this periodical will be as follows:

Head line....(above).... The Lead Story

Intro/Editors Note.... First Column

The following will be in order of Priority  
(My Choice per Issue!):

Wall Busters.....Heavy Engine News

Puncture Proof.....Armor and Fortifications

Long Distance.....Archer's News and Info

Behind the Smoke.....Latest Powder Stuff

The Sharp End.....Close Weapons News

More from Less.....Light Engine News

In the Air.....Other Missile Weapons  
(Slings, Javelins, Atalatal, Etc.)

Nose Newts.....Local Events and Stuff

Beyond the Horizon.....Other Events

Comments.....Yours (Keep it, Short and  
Clean)

From Page 1

low power allows VERY rapid cocking, firing, and reloading without the need for Trigger or Winch with projectiles only slightly larger than a Combat Crossbows. The philosophy of this will be dealt with in a separate article in this release.

My major offense with here is with the Engine's safety itself. A standard Bow when it fails transfers its energy back into the Bow. The String is a tool to use the energy in the Bow not the provider. The Potential Energy is reduced to a rest state. If the Windings in a torsion Engine fail, the system returns the energy in the machine and the force is dissipated in the frame. This is what happens in a Enclosed Engine whether it has a single motor (Onager) or multiple (the true Ballista). Have the counterweight separate on a Treb and (to say the least, it's a bit more dramatic but,) the engine returns in the least energetic way, back to rest.

Before you run for the Stakes and Torches, a Treb can still have a disastrous failure if the Arm breaks on the projectile side of its fulcrum. In this case the energy is still being delivered to the failed section and things are truly out of control. We reinforce and secure together the Arm to limit the chance, or at least the degree, of the ensuing chaos.

This brings up the inherent problem with an Active String. Should a structural part (worst case) or the String part the energy remains available. Should the String part at the end, it whips like a Rubber band released at one end, except with hundreds of times the mass. If the end stays on it becomes a whip with a metal end and should it bring part of a broken structure with it becomes a vicious Flail. Oh, and if the

support for the String Holder (It's not a Bow.) quits, you may get to wear it.

The securing mechanism for the string is generally a notch with no other safety and requires that your hand be involved directly with the Active String a launch. This is about as Darwinian as leaning over a Treb Arm with a Hammer to know the Trigger loose!

A few still exist and were "Grandfathered" in the Regs but, they are fast becoming extinct and should stay that way.

Old News...

September 15, and December 15 will be the next expected release dates. Deadlines will be the first of that month.

Advertising will still be FREE but, keep it to 4 column Inches; B&W images are okay. Activity listing will ALWAYS be free but, be sure you include a contact person.

If there are no submissions to a department or I have no new info for that department in an issue it will still be given space but, will have a "Doesn't Anybody Care?" note in it and after 3 issues will no longer be carried.

How do you subscribe, do you ask? If you are reading this you are. If you don't want it drop me an Email and I will remove you. If you wish to forward this to a friend go ahead and if they want to subscribe just have them send me an Email asking to be included. They are welcome.

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submissions may also be sent to the following address. The address for this publication is:

Handgonnes Design Newsletter  
C/o Fred Miller III  
165 Hampden St.  
Indian Orchard, MA 01151-1503  
Or Email  
Graywolf@handgonnes.com

I am still willing to make this a Bi-Monthly or even a Monthly.  
On to the NEWS...

For this issue the order of departments will be as shown on Page 1, Column 2.

## Wall Busters

This is a light (not really) column this month. I'm still waiting for a set of plans for a rational size Treb. There are supposed to be a set coming "Snail Mail". I will release an EXTRA when I get and convert them. I had saved several pages and columns for this information.

However,...

I have received a nicely done Cad rendition of a rolling Block release for heavier Engines. Lord Brun's design is very solid and reliable. He has used it for years and under full working stress it releases easily and cleanly. He rates it at 400 plus pounds and the design could be "Beefed Up" readily for much more weight. The concept of the design is both simple and solid. Depending on the position and engine design you can readily add a "L Toggle" to place yourself at Right-Angles to the machine.

The drawings are in Wire Frame, but once you get used to seeing with Superman's X-ray Vision they are very clear and easy to work from. The originals are on a format called Voloview™. I am converting them to JPG's and including them as the last pages of this issue.

During "War of the Roses", *Thank you, Concordia*, I had a chance to work with Oskar's Wild Ass (ONAGER! Be nice, children.). This is a nice size large Engine. It disassembles for transport, is mobile (!), contains several technical innovations, and is overall a very handsome machine.

The design was still in the testing stages and had a few teething problems but, I saw nothing that will limit its future performance. He has an innovative torsion engine system that after testing on smaller models was installed on this beast. First runs were not at full twist but, showed that with some more skeins and a good torqueing it will reach out and Smack something.

Sling ended, it had the common Curse on the first real throws. We all tend to make this common mistake. ***The Sling Carrier Pin does not need to be tilted FORWARD!*** Due to inertia the sling rides behind the arm as it rises and should slip off part way through the stroke, between 40 and 55 degrees depending on engine, sling length, etc. Having the pin aligned at anything forward of 0 Degrees automatically locks the sling through the entire stroke and turns the Engine into a self-abusive Flail! We could go into vectors and inertial coefficients here but, basically the sling rides behind at a greater than 90 Degree angle for the most important part of the stroke. It can't catch up enough to slip off until it's too late with the pin

tilted forward. Also avoid wide sling straps. As the sling accelerates, Air Resistance can further the ability of the Sling to catch up increasing any complications from the Pin.

Once these minor modifications were made, even at low power, the engine threw beautifully. I am looking forward to this design coming to fruition.

I am still looking for more designs for Engines, Triggers, and the like to post to further the research in heavy Engines

Again, your comments are encouraged and I will be happy to print them. I need your Articles to make this section a success.

## Puncture Proof

I will not normally leave an article in for more than one Issue but, this is an exception. The Article on Armor making by Oskar is a nice primer for new folk. It will be retired to the Archives after this pass. I look forward to more techniques and suggestions here.

If anyone has some suggestions for shield making, improved Armor, "How to correctly fit a Helmet", better protection for Hands while keeping dexterity, etc., I will gladly print it here. Images are welcome.

There is some new stuff in the target section here, too.

Oskar's original article:

*SCA now requires ALL folk fielding for Combat wear at least minimum Armor*

*First, to those of us new to the "Wadda ya mean he's gonna hit me?" world and can't afford to blow a paycheck or 3 on fancy custom Metalwork, Oskar der Drachen auf Klaagenfurt, a fine Engineer and new Marshal has sent us some nice instructions.*

*It seems Oskar has been wearing light weight Plastic Armor for quite a while. He paints it to look like metal and even after some extended, abrasive combat it still looks good. You will still need a good Gorget, preferably of heavy leather. Plus, you'll need depending on Local Regs, Metal Knee and Elbow protection, etc. and, of course, a Combat Helm. The rest is simply made by his technique. The following is verbatim from his suggestions:*

*Materials: 1 expendable t-shirt, some sheets of cardboard and the barrels. Leather gloves or oven mitts. A sweatshirt and pants that can get wet, and another wet towel or two. Jigsaw, x-acto knife, heavy cord and a drill bit of the same diameter. A friend that does not enjoy causing you pain*

*Minimum standards. Helmet, Gorget (neck), shoulder, elbow and knee cops (do not have to be metal), Kidney protection, cup for jewels, gauntlets.*

*Optional. Chest, back and abdomen protection, shoulder and arm protection including vambraces (forearm). Thigh plates, greaves (shins and calves).*

*First, the expendable t-shirt for the torso armor. Draw the parts on the shirt that you want to cover and cut them out. Lay the forms on the cardboard and cut out the templates, attempting to get the best symmetrical*

*forms that you can for ease of duplication. Try to cut the parts bigger than you think they might have to be so you can cut them down later. Next work the cardboard forms so that they are somewhat flexible and will fit on the curve of the barrels.*

*Pierce the cardboard forms and lace them into the armor so that you can wear it. This is where most of the fitting adjustment takes place. If you can move in the cardboard suit, you should be able to in the plastic. Less is more here! A tip is try not to overlap the pieces, and if there is going to be a gap between plates, as opposed to being laced tightly together at the edges, make the gap at least 1/2 to 3/4 wide. If the gap is narrower than this, and you take a hit, you will get pinched!!*

*Another tip. Either cover you nipples completely, or leave them completely uncovered. Armor that might cover or uncover this portion depending on movement is bad, remind me to tell you the story of the Duke with three nipples....*

*The best place to put an opening in a coat of plates is under your left arm for a right-handed person. Put your laces or buckles here.*

*Lay the cardboard forms on the barrels and cut the armor shapes out of the barrels, attempting to fit the curve of the barrel to the way the armor will fit. Remember to mark the lacing holes!*

*An example would be the chest plate. You want the shape cut out of the plastic to mostly fit your belly and chest before you start shaping the final fitting. The plastic will resist being taken out of its natural curvature.*

*Trying to shape the plastic against its natural curvature is difficult. ( Apologies for the repetition, I've flubbed this part a couple of times ) The easiest way to do this is to lay the templates on the barrel in the way they are to be finally assembled.*

*Once you have your forms you are ready to start the heating process.*

*Oven to between 210 to 225 depending on how thick the plastic is. Time between 10 to 15 minutes for the same reason. The proper flex when the plastic is ready is much like thick leather. Use your gloves or oven mitts! Put the wet sweatshirt on and have a friend take the hot armor section and hold it to the place where it is going to fit. If you have more than one friend helping you, you can fit more than one section of armor at a time.*

*When you have the hot armor piece fitted to you, swab the outside of the section with the wet towel to cool it down faster. Please do not try to be brave here! I knew of a guy that heated all of the armor sections at the same time and directed his friends to tape the sections to him over the wet sweatshirt. This was a bad idea. When the water turned to steam in the sweatshirt he had to try to figure out how to remove the taped on armor sections at high speed... Hosing him down would not have helped, plastic is a good waterproof insulator.*

*Final tips. If you have knee or elbow cops fit them to the cardboard forms to make sure they fit you. Use them when you fit the hot plastic armor.*

*Leather is good for filling an awkward*

gap.

*Make sure you can move! Less is more.*

*Make sure you can get into and out of your armor by yourself.*

*This armor is being designed to be covered. Perforate the heck out of it so you have air circulation. Air circulation is a life saver in combat.*

*Work out what you want to use for padding as you are building your suit. I like two long sleeve t-shirts.*

*There you have it. You can get the Barrels from a local Recycling Center or dealer. They are not expensive and are very resilient. Blue should be your last choice. White is nice but like the Blue it requires Primer and Paint. Black is sweet and requires no paint and has virtually no upkeep to stay looking good. Just be sure to THOROUGHLY CLEAN the Barrels before attempting this operation.*

*I'm sure Oskar would be glad to answer any questions. You can reach him at [Oscar@sfrcs-sabis.net](mailto:Oscar@sfrcs-sabis.net) .*

Forts and Targets get the same column here, and there is much ado about Targets.

Tilters are back with a new twist.

First further testing has shown that the base can be mad with 2X4 rather than 4x4 with no notable difference in operation or survivability. Chip Board (cheaper but a little heavier can be used for targets 40 yards or over.

The newest model is a simple "ADD ON" to the original design. Use 2 of the standard targets. Make a couple of spacers and grab 4 washers

and a 6 foot piece of 1/2" bar instead of the 2 standard ones.

Get a piece of Plywood 2 feet by 5 feet like the standard bodies. Cut it into 3 approximately 8" wide pieces. You have a couple of spares this way. Round off the top if you wish. Do the center mount just like the standard tilters using 3 mounts. About 6 inches down from the top mount a 1-1/4" I.D. piece of plastic pipe with 2 bolts 2" to 2-1/4" long with the standard large washers both front and rear. Paint the body Brown and the pipe Black. Mount 2 pieces of 2X4 at the bottom rear. Then assemble one target using the long rod as the axle. Slide the a washer, spacer, then washer on the the new assembly.(Make sure the pipe is in front of the target body.) Add a washer , spacer and washer again then assemble the second target further down the axle. Space the center tilter about 2" away from each frame. Then drill and pin the axle. You can leave the extra length for handles. You need to add extra scrap to the front and rear of bottom of the center tilter to make it rest with the pipe about 1/2" in front of the side targets.

This target is a lot of fun at 60 yards. If you hit either side it tips alone but, if you hit the center all three go over. It is possible to miss between the segments. We score the target as a Triple or Critical. A 2' by 6' piece of ply can be braced a couple of feet in front to stop skip hits.

This as well as the other tilts have now been used in conests and practice extensively and have excellent survivability. They break donw for east transport and I can carry many easily with my engines. Public response has been great and it is nice to hear cheers for the hits. I will forward the pictures to anyone who asks for free. Contact me

at [Graywolf@handgonnes.com](mailto:Graywolf@handgonnes.com) . There are about 15 shots depicting all the assembly details and show them in action.

The Tilt Targets seem to have stirred interest in other active targets as well.

Guru Docmo, has come up with a really nice idea for a Wall Challenge. This is an easy light portable system with a nice scoring concept. You should try it.

Docmo's Idea:

Fortress Siege.

A stack of boxes will be used for the target.

The idea is to knock down or displace as many boxes as possible with a set number of shots.

The number of shots will equal the number of boxes, plus 2. With a 5 point bonus for clearing the field.

No time limit.

One machine at a time.

A box may only be hit once.

A bounce off a dead box that causes a live box to fall counts.

No ground bounces.

Best score is # of boxes down plus 5 (if the boxes end up not falling when hit, consistently, then a score will be given, javelins 1pt, rocks 2pts.)

I love it! I do have a couple of additional suggestions. None will change the character or goal of this challenge. If you overlap fold the top and bottom of the boxes you don't need to tape them and they will disassemble and be reusable. (read as: Cheaper and continued playtime.) Spray painting the boxes will make them more waterproof and visually exciting. You could even

randomly add a few Tennis balls to a few boxes and making them react as heavier blocks. I know that's low down, evil, wicked, bad, and nasty but, wadda you expect from an old Mercenary?

Here's a shameless plug to go with it. My Mundane Job is with Public Storage. We sell "Box Paks", that for around \$20, have 5 small (1.5Cuft.), 3 Medium (3.0Cuft.), and 2 Large (4.5Cuft.). This is a good way to go for new boxes. Yeah, other places sell similar stuff.

That should be enough to get you stimulated for now. I still need INPUT.

## Long Distance

Once again, Here, I could use some help. I know a lot of you are boosting your aggregate scores in real(?) Archery but, if you ignore the Combat side, you are still just punishable civilians. You are belittling Cer y, Agincourt, and many other Archer pivotal battles. History has marked you as a "Moving Force" in battle. How many are living up to it and how many are "Riding on your ancestor's shoulders?"

### Doesn't Anybody Care?

*I do wish to thank Angus the Crossbowman, who added to the quality, enjoyment, and mutual efforts at War of the Roses, by his valued participation!*

Still accepting submissions

Submissions from you “Pros” out there will make this section what it is designed to be.

That Combat Bow or  
Crossbow just not getting  
it done?  
**Go Bigger!**  
at [ballistaplans.com](http://ballistaplans.com)

## Behind the Smoke

### Doesn't Anybody Care?

Again you get ME...

The Good News is we will still have a Gonne/Gun Safety class at Pennsic. That's the good news.

The predominant argument I have found in the attempt to bring the stubborn Old Schoolers up to speed on Powder is that Fighters are purely Pavlovian. “Anytime we shoot a Gonne/Gun fighters grab their gear and think they missed a battle.” “If we did an opening display, it would be impossible to control the waiting fighters. They would try to fight after every shot. It would be impossible to manage the lines.” If someone said this about me, I would be RIPPED! I have heard this from more than one person!

Okay, I'm not a Heavy List Fighter but I know quite a few and NONE of them are that Primitive

Minded! The realistic adaptation to Powder and its rightful place is being Stonewalled by claiming your Stupid! Yeah, and all Football Players are just big, dumb, Head Bangers.

I admit that I do not field as a Fighter. Why, because I can't keep up with you highly trained and skilled Artisans. This old body won't keep up but, I won't ever say you are incapable of tactical decisions or general cognoscente. It insults me as a member of your community, even indirectly, that the major excuse for the resolve to not accept Powder is defined as YOUR STUPIDITY!

Again, I need to go back to the fact that those of us that use Powder have no wish to “Mow you down” on the field. The slow loading of even small Handgonnes tactically would have made us MEAT. Gones fought Gones. The “Rubber Band Cannons” were a great novelty and an engineering masterpiece, but would never have served in the capacity that they have been employed unless under great duress.

If nothing happens here, nothing will change but, the folks presuming that you are just “Dumb Meat” will still be those that decide your fate. Speak up, would you enjoy a show to salute the Fighting Man before the opening of a Major Battle or would you just salivate and run at the first sound?

Anyone with the Heart to repost this section is welcome to; just post all of it. I will even send an “EXTRA” weekly, just for this controversy.

This isn't to create a division in our activity. That's already happening. We need to reunite to keep as many folks within our social family as possible. We are all SCA.



## The Sharp End

### Doesn't Anybody Care?

Over the last year I have made friends with many of the Fencers and Rapier Artists. These are some of the more innovative people in the Society (Except us Siege People).

It would be nice to hear of some of the things done in their Field. Other simpler things like how to get started, what is needed, what to avoid, etc. would be a great help to our readers. We are now an international publication and the differing activities would make worthy News. Those of you who make Foils and Rapiers are welcome to shamelessly plug your product. (Just make sure you include why you think it's so good. Those "Artists of the Blade" feel free to revel us with your tails.

The reason I wish to include this section is pure respect. Many of the gentles involved in this activity also share the thrill of good Engines. Their courtesy is being returned by this inclusion.

**Your Foil,  
Foiled? Your  
Rapier, ...?  
Time for better  
Equipment?  
Better contact  
Therion Arms  
At  
Therionarms.com**

## More From Less

### Tennis Balls From Hell...

Before you Panic, nothing discussed in this section will change any Society rules in the near future, Pennsic Included, but this area is worthy of further research and discussion.

For openers, I will give you my abridged report to East Kingdom on a *PRECIEVED* problem with the EAD (Energy Absorption Device) most favored on the Siloflex™ bolts currently in use as Javelins/Bolts on many Siege Engines. Again, no real operational problem has surfaced here but, we are just considering making a Safe device Safer.

My Report:

**Research Report  
On My Latest Testing  
Of  
Tennis Ball EAD's\* for  
Ballista Javelins/Bolts**

By

Lord Graywolf the Gonner

Deputy Commander Siege  
General,  
East Kingdom

To  
Oohashi Katsutoshi  
His Majesty's  
Commander Siege General,  
East Kingdom,

And  
All Concerned

This report includes General information  
on actions and observations,  
Empirical Data, and quotes from  
the current SCA Siege Engine  
Handbook (revised 12/2002).

\* Energy Absorption Device

Since my acquisition of my first  
Combat Ballista/Arbalest and later  
building of six more, I have launched in  
excess of 7,000 Javelins/Bolts and  
observed many more. I favor the  
Siloflex™ 160 Type above all others for  
overall performance and longevity.  
Recently questions have arisen as to the  
EAD Tennis ball used commonly for  
impact absorption.

The SCA Siege Engine  
Handbook reads as follows relative to  
the design of Javelin/Bolt ammunition. I  
have highlighted certain points to  
indicate the bolts used in this testing.

(from the currently posted 12./2002  
edition at SCA.org , Siege Ammunition  
Specifications section on Pages 7 and 8)

“Small siege ammunition: intended to  
simulate smaller, lighter projectiles used  
as light antistructure and antipersonnel  
missiles (i.e., ballista javelins and ten  
(10) pound stones as used in Perriers).  
***No small siege ammunition may weigh  
more than 1 pound.***

1) Four-tennis-ball clusters - secured  
with filament tape and duct tape  
(punctured and tied with cord also  
acceptable)

2) Spliced golf tube javelins - splices  
must be secured with cord and/or  
filament tape. ***Striking tips may be  
either a single (un-punctured) tennis  
ball tied on and taped with filament and  
duct tape,*** or a thrusting tip with a  
minimum of 3" of foam between the  
striking surface and the end of the  
javelin, and a minimum diameter of 2.5".  
***It must have at least 1 inch of  
progressive give and cannot bottom on  
the tube.*** Additionally,  
the end of the tube must be capped with  
a minimum of 1/8" heavy leather, or a  
35mm film container lid, or a 35mm film  
container- securely held in place with  
filament tape. The tubes may be  
reinforced with medium density foam,  
such as pipe insulation, in order to  
prevent crush damage. Film canisters,  
PVC rings (may not be more than 2  
inches long), and similar non-brittle,  
non-metallic lightweight reinforcements  
(securely attached) may be used at the  
butt end of the javelin. ***Nonrigid  
fletching may be used. Javelins will be  
at least forty-eight (48) inches and***

*clearly marked with yellow tape for the length of the shaft.*

3) Other javelins - *materials such as Siloflex or similar semi-rigid, shatter resistant tubing can be used, as long as the minimum diameter is equivalent to golf tube and the rest of the construction meets the standards for spliced tube construction.* Avoid excessive weight. PVC is not shatter-resistant and is not considered legal for ballista javelins.

Specialty siege ammunition: intended to simulate specialty ammunition (i.e., flaming oil pots or flaming javelins) or effect weapons; (i.e., diseased animal corpses or the heads of decapitated messengers). Specialty missiles will have damage determined in the scenario rules. Most effect weapons will have little or no damage potential, and therefore should be used sparingly.

Specialty Siege Ammunition may be used as long as it does not exceed the weight or construction materials limitations of the approved ammunitions.”

My Ammunition exceeds the retention requirement in Section 2 with the internal addition beneath the tapes of cross strands of Artificial Sinew to further secure the ball from shearing forces with no other effects on performance.

Unpunctured Tennis balls have a positive internal pressure to increase their response in their original use. This means they respond to most of an impact rather than absorb it. In close

observation in operation in battle on the field at War of the Roses in Concordia, East Kingdom this year, the EAD's performed very well and showed no sign of deterioration after heavy use, though some covering tape needed repair or replacement. On the Target range during practice however, some interesting effects were observed. When being launched at a single supported layer of 15/32 Particle/Chip Board at distances twice the Minimum Safe Shooting Range, the standard Javelins/Bolts launched from approved inspected Engines that shot well within the acceptable Maximum Range Limit permanently deformed the surface of the Target and rebounded several feet. This material had not been exposed to excessive dampness or previous impacts. The ends of the missiles were subjected to inspection by Toshi, Oskar, and Myself and were consistent throughout, and had been fabricated to specifications with new Penn™ Tennis Balls.

We then punctured the EAD of a Javelin/Bolt with a small slit 3/8 long and launched it at the same target. The Missile dropped with only inches of rebound and left a greatly reduced mark in the target. The launches were repeated switching between both EAD variants with consistent results.

Dissection of the Missiles upon return from the event showed no deterioration to the rear surfaces of the ball in either situation. The slit which had been done in the front of the EAD for expediency had propagated about 1/32 of an inch after many impacts. A solution to this will also be recommended in this report. A Missile with the same frontal slit was launched against a wall with a deep Puddle beneath to check Water retention

and did ingest a moderate degree of Water. The solution will also address this situation.

Further testing was done by drilling a small Hole in increments 1/16, 3/32, 7/64, 1/8, and 3/16 inch, puncturing a 1/16 hole, and making a 3/8 inch slit in new Tennis Balls . These were then hit with a firm blow from a 5 pound Mallet to simulate the deceleration impact against a solid target while attached to a combat shaft. A short piece of 160 Siloflex™ mounted in a large wood block was used to support the ball. The desired effect was to get a resisted deflation with out complete deformation and investigate propagation of the punctures. The results from this are also included.

Finally, the new variant EAD was tested compared to the standard tip and a reasonable Quick Fix laid out to apply this modification to existing Missiles with out requiring reconstruction.

The following are the details of the  
Materials,  
Methods of testing,  
And  
Results

Test 1

Materials:  
8 new Penn™ Tennis  
Balls  
1/16, 3/32, 7/64, 1/8, 3/16  
drills,  
Ice Pick and Exacto™  
Knife with #11 Blade  
5 pound Mallet

2-1/2 "long piece of 160  
Siloflex™  
4" x 6" x 12" wood block  
drilled to seat pipe 1-1/2" deep

#### Actions:

The new balls were drilled at a point between the seams with a single hole of the above sizes. One was pierced with a single hole from the Pick and one was pierced to full depth with the Exacto™ blade to make a 3/8" slit. One was retained in original condition as a Control. The block was placed on a solid Workbench and the pipe placed in the hole. Each ball was then placed on the pipe and hit with the Mallet with a moderate stroke (approximately 30ft/sec. equivalent to about a 150ft/sec. impact), 10 times. An observer was use to watch the degree of deformation from the blow. After the initial test, the best performing drilled ball was tested 50 times as were the slit and Pick punctured ball to later be opened and checked for deterioration.

#### Results:

<u>Ball</u>	<u>Hole</u>
<u>Compression*</u>	
<u>Deformation**</u>	
Control	none
Moderate/	Marked Rebound
50%	
Punctured	1/16
Progressive	
70 to 75%	
Drilled 1/16	
Progressive	
75%	

<u>Ball</u>	<u>Hole</u>
<u>Compression*</u>	
<u>Deformation**</u>	
Drilled 7/64	Rapid
Progressive	90%
Drilled 1/8	Rapid
	100%
Drilled 3/16	Fast
	100%
Slit	3/8
Fast	
100%	
*This was based on felt resistance to the blow and tendency of the Mallet to rebound.	
**Visual interpretation by observer	
The slit ball showed no noticeable propagation of the slit but, on the original Bolt where the impact was on the slit it did. Neither of the 1/16 hole balls showed any indication externally or internally of deterioration or potential Punch Through. The balls that completely deformed and took the impact of the Mallet between the surfaces and the pipe showed only minor scuffing internally to less than .001 inch on dissection.	
Comment:	
The venting of a New Tennis ball with a 1/16 hole either drilled or pierced absorbs impact effectively and due to the progressive release of air tends not to fully "Bottom Out" under impacts standard to use in a SCA Combat Legal Ballista/ Arbalest. Larger Holes or slits are likely to bottom and	

present, in the extreme, the possibility of eventually damaging the structure of the ball. There is no apparent propagation of a round puncture in this test.

## Test 2

### Targets:

3 Units  
15/32 Pressed Chip Board  
2 feet wide by 4 feet tall,  
supported by the Ground  
and angled 2x4 studs anchored  
to the top with no  
secondary bracing.  
Weight approximately 5  
pounds.

### Delivery Device:

Standard Docmo style  
Arbalest/Ballista,  
Inspected to Society  
Standards and  
shooting at maximum  
range of 76 yards with  
Regulation Size and  
Weight Missiles.

### Missiles:

46" Siloflex™ Shaft  
deburred both ends  
2, 3\* pitch, curved, pass  
through, Eva Foam Vanes  
New Penn™ Tennis ball  
Secured with 2 artificial  
Sinew ties, Fiber Tape,  
and Duct Tape

### Variant 1

As Above with  
New Penn™ Tennis ball  
drilled with 1/16 hole

and seated with hole  
roughly centered inside end of Bolt

#### Variant 2

As above with  
Ice Picked 1/16 hole in  
ball

(The changes to the above  
Variants were made to test for  
propagation of the puncture in a  
Pierced vs. Drilled hole. No  
slit ball was used even though  
there was no evidence that the  
ball in test one had begun to fail  
but, the known potential for a  
cut to propagate more readily  
than a circular hole was  
considered enough to negate its  
use.)

#### Range and Conditions:

Calm wind  
Distance 20 Yards  
Target was indoors and  
dry

#### Actions:

The Targets were placed 2 feet  
apart inside the bay and the Engine  
(Black Princess) was chocked at 20  
yards distant. One of each Javelin/Bolt  
design was used, Standard Unpunctured,  
1/16 Picked, and 1/16 Drilled. Bolts  
were launched cyclically and the first  
impact to each target was with a  
different missile. Ten shots were  
launched at each Target. Impact  
assessment was made by Mike Russell  
(Michael the Rebel Saxon Archer) and  
myself.

#### Results:

The unpunctured EAD  
consistently dimpled the surface in about

a 2.5 inch circle and caused degradation  
to the target splintering out bits on the  
back. Both 1/16 holed Missiles left little  
or no dimpling and only did noticeable  
damage when they hit a previously  
impacted area. The unpunctured  
Missiles rebounded 3 to 7 feet relative to  
the reactive flex of the target. Whereas  
the punctured EADs left little or no  
mark, rebounded 1 to 3 feet relative to  
the same flexion, and did little or no  
bursting damage to the rear of the target,  
except where they hit the same point as a  
previous impact. Dissection of the  
EADs after shooting showed NO  
deterioration or tendency to "Punch  
Through".

#### Comments:

The unpunctured EAD tended to  
react to impact rather than absorb it.  
The punctured EADs released energy by  
venting the Air progressively and  
delivered less impact. The Targets, like  
a Human adversary, received lower  
impact damage and therefore creating a  
higher safety factor. Progressive  
compression appears to also avoid the  
concussive damage that promotes  
"Punch Through".

#### Test 3

#### Variations from above Test:

#### Target:

Concrete Wall at 20 yards  
with 4.5 " deep puddle at bottom  
(Monsoon Memorial Day)

#### Missiles:

2 Javelins/Bolts  
with one slit at tip of EAD from  
War of Roses

and one punctured rear per earlier tests  
with the hole centered, roughly, inside the pipe facing rearward..

#### Actions:

The Bolts were Launched 10 times each against the wall and allowed to fall into the puddle after impact. The Aim Point was low in order to assure that the elastic action of the ball would place in the Water as soon as possible to create the greatest opportunity to ingest Water.

#### Results:

The front slit EAD ingested water at varying levels on almost every occasion. The Rear punctured EAD ingested little if any Water over the duration of the test. Water could be squeezed out of the front slit ball fairly easily and generally amounted to between .5 and .9 ounces. There was too little to readily measure the amount of intake of the rear punctured ball. It was hard to tell what was Wash Out from the puddle and tube, and what was ingested in the rear punctured unit once the Water collected in the overall tube was dumped.

#### Comments:

Both types of puncture readily released most of their Water when squeezed with the puncture pointed down but, the rear puncture ingested much less fluid.

#### Conclusions:

It appears from my tests that:

A) An EAD design using a Tennis ball in good condition with a 1/16 hole and no larger, Punctured or

drilled, absorbs much more energy and deforms progressively on impact much better than does an unmodified ball of the same nature.

B) The rebound from the above device is greatly is notably reduced.

C) There appears to be little “Punch Through” effect under the above conditions with a new ball.

D) If the EAD has its puncture set within the pipe’s I.D. when encountering Water, it has a low ingestion rate and is easily emptied should it acquire any.

E) There appear to be no adverse effects from this modification.

#### Solutions:

In as much as many of the Javelins/Bolts involved here are already made and it would be a major inconvenience to rebuild them, I propose this reasonable and efficient solution, if punctured EADs are to be a preferred and/or accepted system.

A piece of 1/16 Steel Rod of about 50” can be purchased from Industrial Supply companies for about a Dollar. The end can be sharpened with a file or other tools to make a flat sided pointed tip. A 3/4” thick wrap of tape near the tip will still pass even “Pass Through” vanes internally and reasonably center the point at the back of the ball. With a Variable Speed Drill as the driver and SLOW speed, it is possible to drill the existing EADs to match the performance of this EAD variant.

OR

A drill or 2 or 3” piece can be epoxyed into the end of a 1/2 dowel and

set up the same way and may even be drilled by hand.

I also strongly suggest the both the front and rear of new Javelin/Bolt pipes be deburred to further reduce any chance of “Punch Through” and rearward to reduce String wear.

*The information in this Report is currently being reviewed.*

**Do not do any modifications at this time. This is still under study and there is no need to ruin your good Bolts. Much more research is needed!**

We need others to do similar tests and also do the test with old, beat-up Balls to see if they react the same way. Please, volunteer.

Contact me at:  
[Graywolf@handgonnes.com](mailto:Graywolf@handgonnes.com) if you are interested in assisting or have questions.

There have been no further reports on the Large Pet Balls (6” Tennis balls found in Pet stores) as a viable Large Rock for Siege Engines. We await further reports.

Please excuse the lack of Chapter 2 on Gastraphetes. Oskar

has been heavily involved in the Ballista EAD Tests.

Though there is much more that could be added here, I will save some for later. As always, more news is welcomed so please submit it.

## In the Air

Before the craziness started with the Tennis ball thing, I had a chance to get some Atal-Atal time in. I bought mine last year at Pennsic from the nice shop that specializes in them. I bought an inexpensive model and 3 Spears. Backyard stuff was fun and accurate but, I got a chance to drag out a few friends and have an open field 100 yards long and 100 yards wide to play in. Our littlest guy, about 5’6” and 150 pounds with a little practice was getting a good 50 yards and a 4 foot circle. The Old Man here, could carry almost 60 with a little larger grouping. We had a Big Puppy over 6’2” and 290 pounds that threw consistently over 85 yards and, well, let’s just say, he had REAL tight groups. It became the Afternoon Recreation. It started to be fun just to watch him throw. WOW, we felt like we needed to go Mammoth hunting.

This could be one of the most under rated missile weapons out there. I wonder if anyone has considered a 4’ Ballista type Javelin and tested it for Combat. These “Spear Chuckers” could do amazing things.

Now that they’re hooked on Primitive, I’m gonna dig out the Sling!

We had two excellent opportunities to show off our Engines at War of the Roses and a Local Demo,



both here in North East. The Engines were both visually attractive and socially, Magnets. The machines drew people with both their size and design, and also their accuracy. After the actual challenges had been done, we had many folks begging to try the Engines. Heavily supervised, they got to loose a few rounds and left with a whole new appreciation of Siege. It was suggested that we do a similar activity at an upcoming event in about 10 weeks. When we went to the meeting to set up the interaction between the SCA folks and the Club, the Chairman of the event asked that assemble our own event and not be part of his! His explanation was, we attracted so much attention that he was afraid that guests would ignore his activities to spend time at ours and he used the Demo as an example. WHAT A COMPLIMENT! Needless to say we are setting up a special SCA Showcase, with lots of support.

## We ain't done yet!

Remember that Bungeelista thing?

Siegfried was nice enough to explain the reasoning behind the rulings on these Engines.

### Siegfried Speaks:

Ok, no one else is speaking up to explain the past, so I will. I was around, on this list, back in the 'day' of Kaz, when these rules were being created.

There was a reason, a driving force, behind these rules that is not obvious in the rules, and that no one yet has stated. The big problem, at the time, was a mix of non-acceptance of Siege

with a smattering of disgust thrown in.

Some people, were not liking siege (choose anything, and someone won't like it). Siege was beginning to get a bad rep, and there was one real "problem" with it. And it came down to Bungelistas.

The problem was that we were giving these weapons, the "extra special power rules" - The all powerful kill through shield. Yet there was no "check" on that power. More and more and more people were creating these things, and killing with abandon.

Realize that you can build one of these, I would wager, for about \$20 at Home Depot and maybe an hour of time (which is exactly what was happening). You buy a 2x2x8, cut it in half. Now put the wood in a 'T' shape and put a big screw into it to hold it. Tie a bunch of surgical tubing onto the 'arms' as a string. Route/saw/chop, a notch into the stock to hold the string when drawn back. Now all you have to do is mount it on a quickly constructed wood platform, with a few bolts to allow it to rotate up/down (and maybe side/side) Done, with less than an hour's work. And you have a weapon that can kill through shields (and, for the record, really doesn't look much like a ballista, or even a Great Crossbow).

Now, add to this, that you can easily and quickly pull the tubing back by hand into the notch. Load it, then slap the tubing out of the notch with a sword/hand.

So now you have a kill through shields machine that has an extremely fast fire rate. One person can man it, and get easily 6 shots off in 30 seconds/12 in a minute. Add another person to load, and you've probably sped up a few. At the time, there weren't range

requirements, so these didn't even have to be powerful. As long as it left the launcher, it killed through the shield.>

Now, whether you 'like' this idea or not - look at it from the point of view of average Joe fighter (or Sir Stickjock if you will). You show up to a battle, and there are 5 Bungelistas that 5 people threw together last night in their spare time. "Lay on", is called, and suddenly there is a slew of "kill through shield" ammo flying towards you, and extreme rate, by these folks that just spent an hour and \$20 to do so.

It was decided, that these were:

A) Unbalancing the game  
B) Blatantly non-period looking (yes, they could be made period-looking, but often weren't)

C) Giving siege a bad rep. People were seeing siege engineers NOT as someone with knowledge of machines, who understood them, who spent time creating them to use in battle. But as punks with \$20 who wanted to be able to wipe the field clean and giggle the whole time.

Given that, a number of rules were put into place to try to stop A-C.

1) Machines must functionally work like they would have, so no "stretchy strings". They had to "act" period. (Which ends up making them look period as well...)

2) The minimum range was instituted. To ensure that any machine was a well constructed machine, and not a quickly thrown together, under powered thing.

3) Mechanical cocking devices were required. One, again, to make it a more accurate simulation of period devices... Secondly, to slow the fire rate down, to a more accurate speed (and a more game balanced speed)

4) Requirement of a crew, not just a single operator...

As for "punks" they still have to invest in armor and authorize in order to be able to participate, still a sizable investment in time and money.

Or not ... again, at the time (I do believe this isn't the case many places anymore) that wasn't required.

Siege engineers were often non-contacts, and therefore only needed a "Scout helm" (Freon anyone?), Kidney belt, and cup. Enough of those laying around to borrow.

And in some places, needed no authorization, or as much authorization as a scout/water-bearer needs ... the non-contact box checked on an "Authcard", which in many kingdoms is almost a "freebie".

Again, now, with the whole weapon inspection process and such that machines go through, it is a much more organized, and again, respected, system.

Siegfried

"Nuff, Said

Comments?

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Be in the next Issue.

## Reports from the Known World

These are Rumors and Comments that have  
come the Editor's attention...

Democracy is two wolves and a lamb  
voting on what to have for lunch.  
Liberty is a well armed lamb contesting  
the vote!  
Benjamin Franklin

PAX SVPERIORE  
VI TELARVM  
(Latin)  
"Peace through superior Firepower"

"Are you sending that to Iraq?"

"Is that a Missile on there?"

"Hey, is that an Iraqi Anti-Aircraft  
Gun?"

"I followed you for 5 Miles to find out  
what that is."  
(Various comments from Folks seeing  
my Arbalest standing in the back of my  
Pick-up Truck)

Got More?

Send 'em in and I'll

Publish them

# Nose Newts

I wish to thank the “Pikestaff” (The East Kingdom’s official Newsletter) and its fine Editor for her kind assistance again..

Please look to the [www.sca.org](http://www.sca.org) site for further contact information, directions, and details. Please feel free to forward information on your events to me. This is Vacation season and wherever you are your information may attract traveling SCAians.

Please also remember that these are SCA activities not Ren Faires. This means that a reasonable attempt at Period Wardrobe is required and there are specific Rules apply to the activity. Be sure to check with the host before going to ensure you are prepared and have a good time.

If I get enough articles and things to fill up more issues this section will become more timely, and. I will miss less of your Events here. In order to keep this a full and interesting publication I alone can’t fill the pages enough in a shorter period to make it worth your time to read.

(Please note that, for now, Local is considered within 150 miles of Springfield, Massachusetts.)

## **June 28, 2003 Bearing Arms/ Forrestgate/ Hightstown, NJ**

The Canton of Forrestgate in the Barony of Carillion is hosting a fine Combat event at Etra Lake Park. This one day event will involve Single and Melee Combat plus a special “Barrier” event. There is a Tourney to find a Successor to the current Baronial Rapier Champion and both Thrown Weapons and Archery. There will be handsome Dayboard by their superb Cooking Artisans. The site is dry.

For further Info and directions go to:  
<http://forrestgate.eastkingdom.org> or See your Pikestaff

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## **July 11-13, 2003 Great Bards a Fire/ Glenn Linn/ Warrensburg, NJ**

Now this sounds like a fun time. This will be a running competition, friendly of course, of Story Telling, Song Singing (Groups and Single), Instrumentals (Groups or Single). They may even throw in some Fencing and Fighting. Day Board; Feast... The Camp discreetly damp. Resv. By July 5th For Info contact the Shire of Coill Taur Or the latest “Pikestaff”.

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Nose Newts cont.

**July 18-20, 2003 Great Northeastern War XVII/ Malagentia/  
East Hebron, ME**

Hack and Slash, and a whole lot more this should be a great action event. It's also the last chance to get warmed up for Pennsic (and recover in time). The event is again at the fully modern equipped, beautiful Hebron Pines Campground in Hebron, ME. Events will include Fighting, Fencing, Archery, A&S competitions and displays, Shopping, Dancing, and Great Revelry. There are haves a Potables Challenge, Youth activities, and even giving a War Point for Classes. There expected to be a great number of Merchants as well. This is a well rounded full spectrum event.

Payment for the activity will be taken at the gate. No Reservations are being taken, except for Merchants, Classes, and the like. For further details, go to [www.gnwar.org](http://www.gnwar.org) , [www.sca.org](http://www.sca.org) , or the latest Pikestaff.

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**Add your event to the list.**

**Contact me at:**

**[Graywolf@handgonnes.com](mailto:Graywolf@handgonnes.com)**

**Join the Fun.  
Become a Member.  
Contact,  
The Society for Creative  
Anachronism.  
Get more Info at:  
[www.sca.org](http://www.sca.org)**

# Beyond the Horizon

As it stands now the next Issue will be released after Pennsic. We can look forward to another and even more exciting gathering this year. I hope to see and meet many of those I've spoke with over the last year. My Artillery unit will be bringing at least 5 Engines. We will be camped with Bergental near the North Gate. If you are looking for me just look for the guy with the Bomb emblazoned on his tunic.

I have seen a great effort by local Engineers to build and develop first rate engines. I expect to see some very impressive work at least on display at Pennsic. If a good bunch of us show up we will have a very handsome Siege line. Just a few things to remember here... Be sure you test your new Engine before you bring it. There isn't much more embarrassing than setting up your beautiful, new machine and have it Fail, mechanically or safetywise in front of friends and Marshals. Be sure to know your Engine. Quick concise answers to pertinent questions will not only help you through Inspection but, speed things up for all of us. If possible, bring spare parts for critical sections of the Engine, Just in Case. Most of all, bring a Sense of Humor. No one is trying to keep you from playing. We want to keep you playing Safely! Arguing with the Marshals will not help get a machine with a problem on the field and will not solve the problem. If possible, most of us will gladly suggest a reasonable solution or repair. If we can't then we can't.

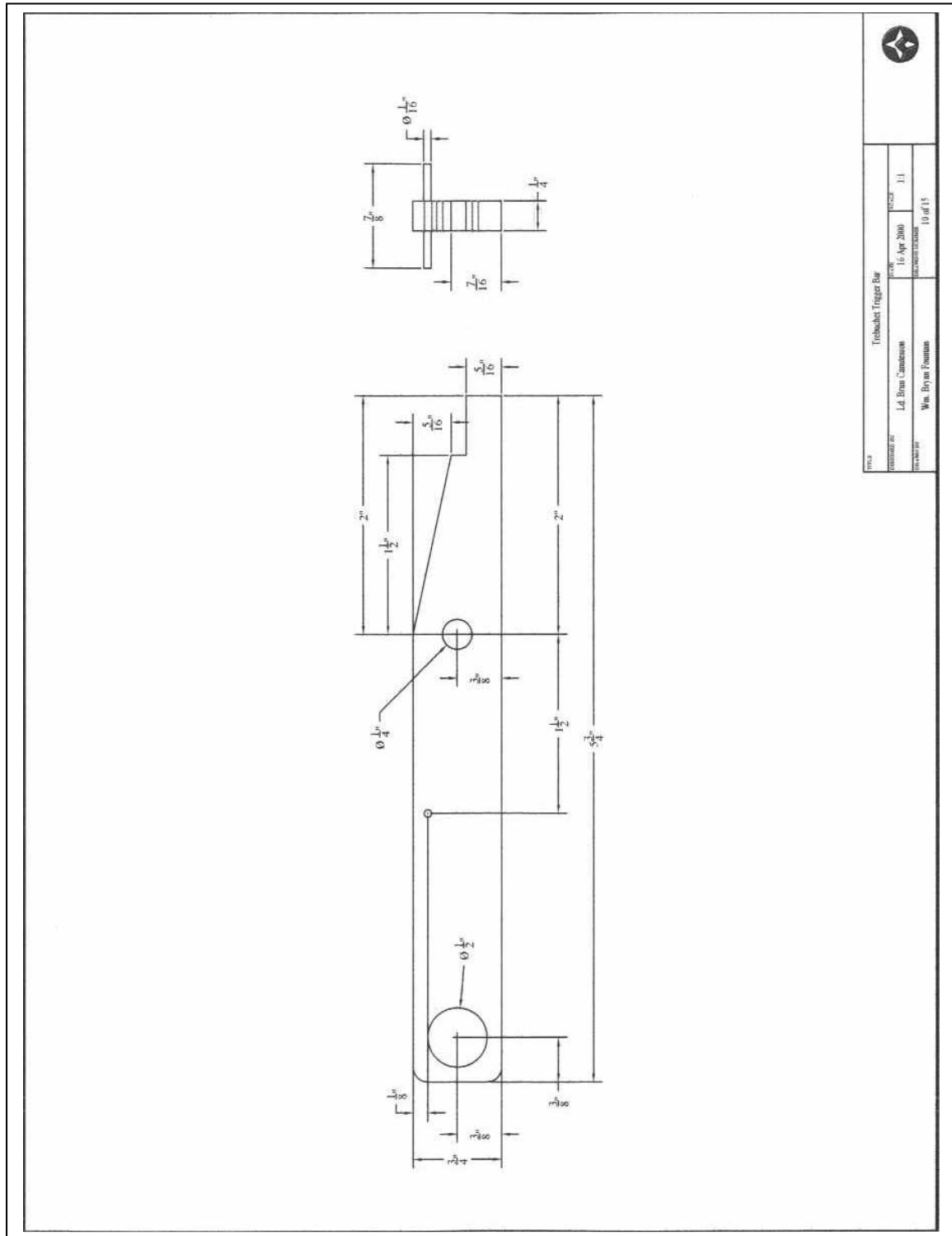
Even though there is some controversy about the current EAD's, don't make any changes to bolts that currently conform to the rules. If and when any changes are made to the rules you will know. If you can't show that you have permission to use an Experimental Variant don't use it. If you want it reviewed start now. If you bring an example to show us fine but don't expect that there will be time or situation to demonstrate it.

Be willing to learn. This gathering is one of the finest environments in which to share Ideas, Theories, Tales, and Comradery. I'm looking forward to seeing you there.

On to Pennsic!

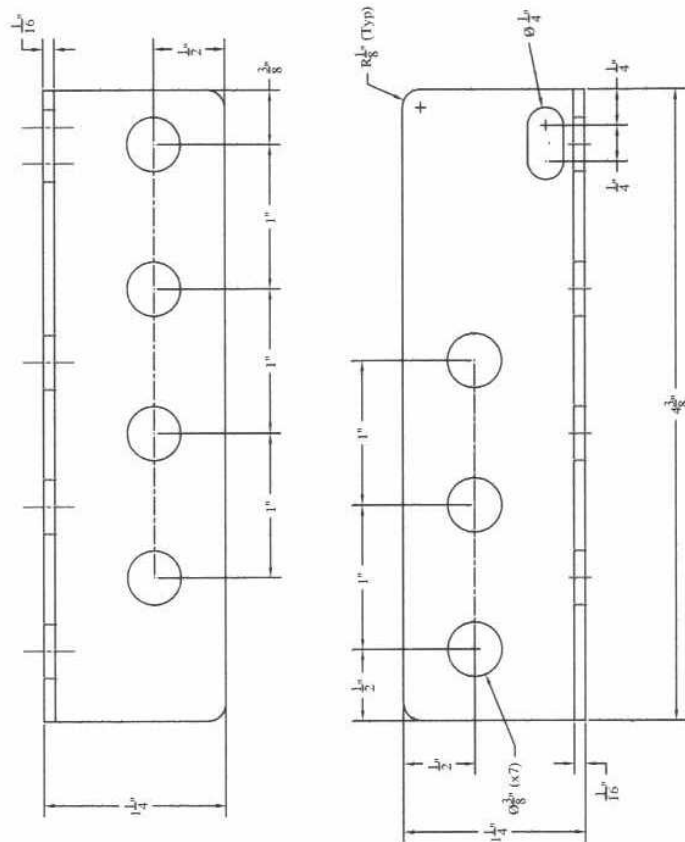
Graywolf

The following pages are of a design for a heavy duty trigger. If you have trouble getting them to display contact me personally.





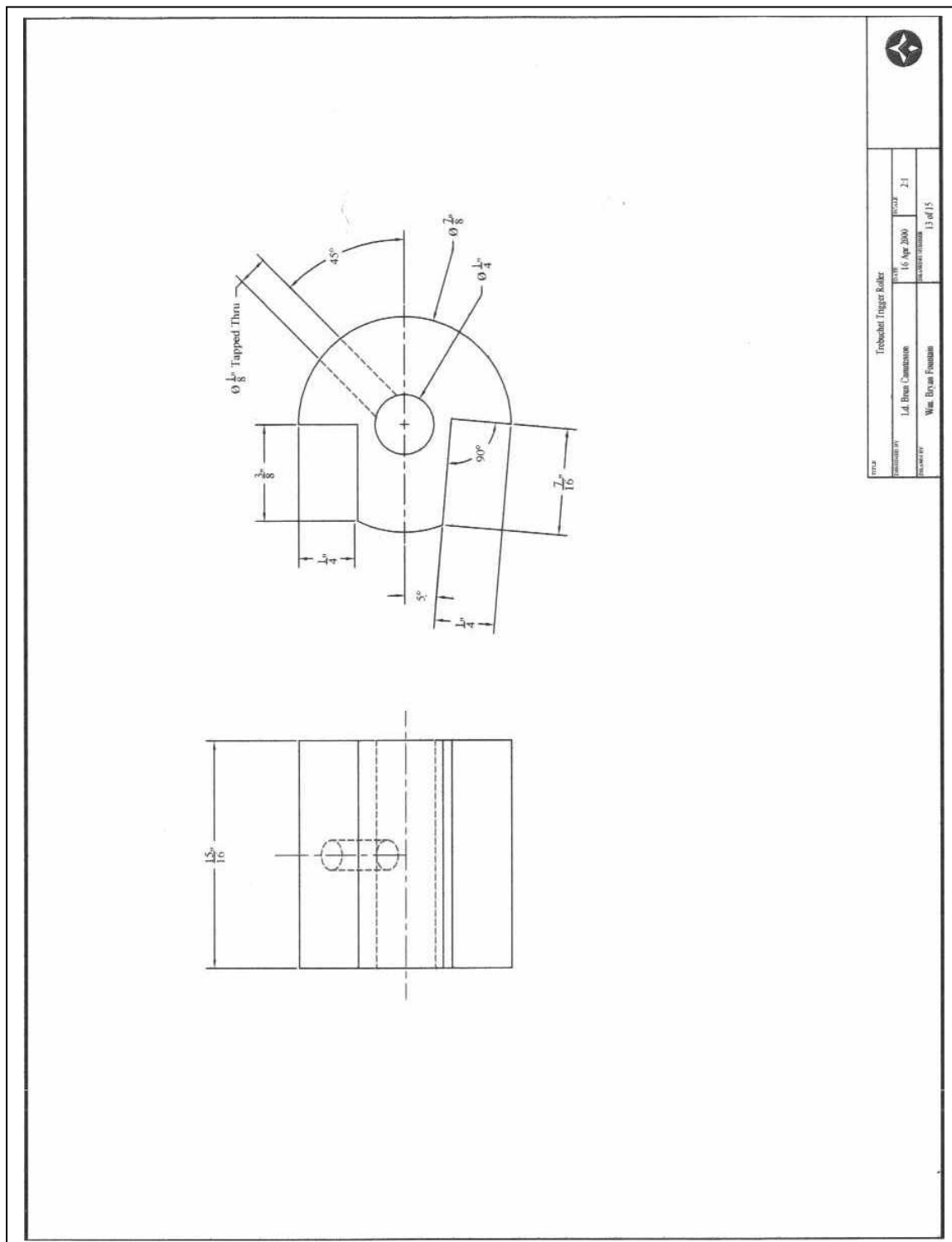


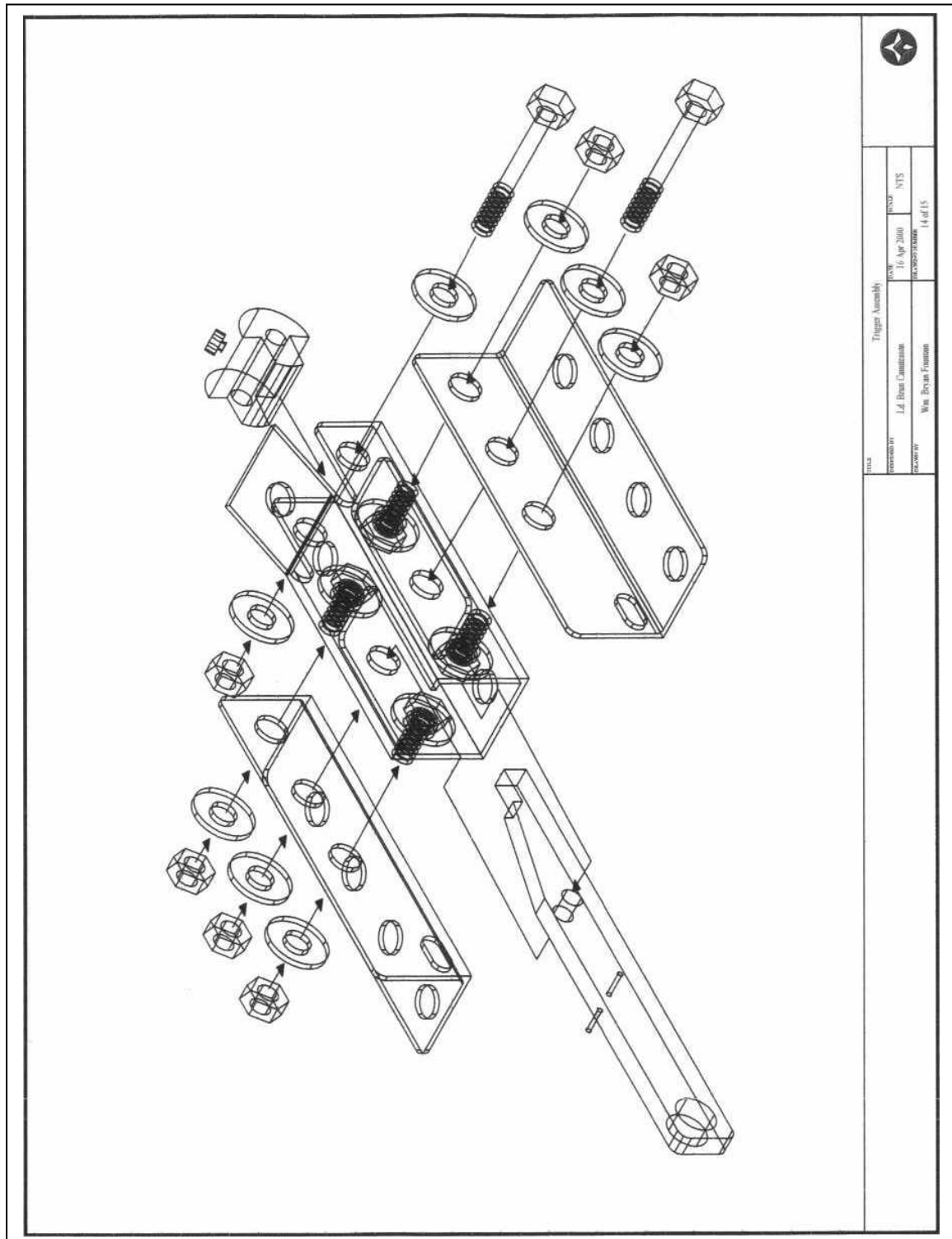


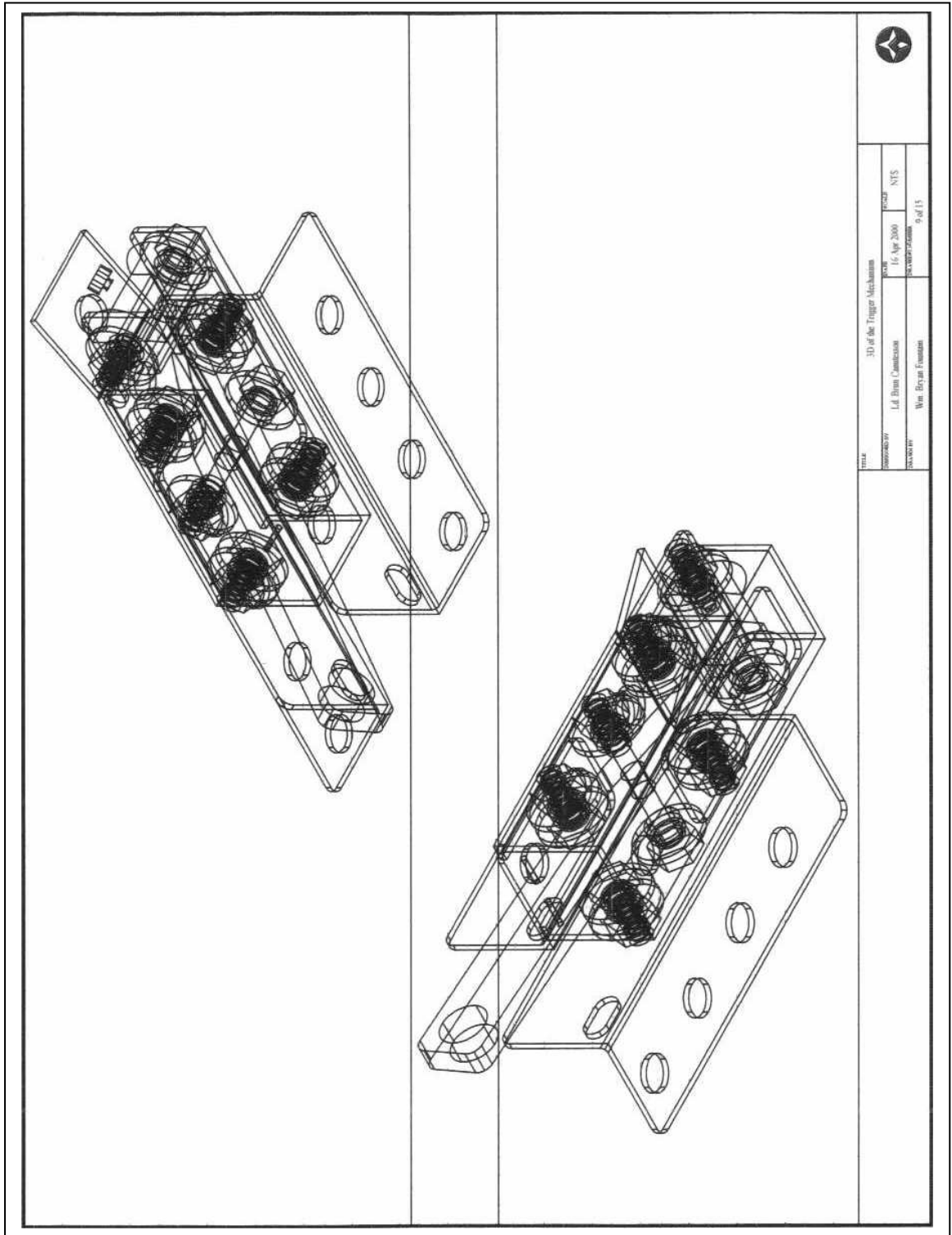
Note:  
This is the left hand "Bracket" for the trebuchet trigger. Since both a right side and a left bracket are needed, make sure the right bracket is a mirror image of the one illustrated here.

Trebuchet Trigger Bracket (Left)			
DESIGNED BY	L.J. Burt Cammerman	DATE	16 Apr 2000
CHECKED BY	Wm. Bryan Fountain	SCALE	1:1
		12 of 15	









Title			
3D of the Trigger Mechanism			
Author	16 Apr 2000	Project	NTS
Reviewer	Win Bryan Freeman	Examination	9 of 15

