

## Arrow shooting

### Brief

Much is made of the longbow arrows ability to penetrate plate armour. We will make a film using the best of our knowledge and the most accurate of kit to show what happens when you shoot arrows from English war bows at Agincourt era armour. The aim of the film is not to talk down others' films, but to set a new standard in accuracy and honesty of presentation; to finish with a film that shows it really how it was, not how legend has it.

We will have to focus narrowly for a number of reasons, but mostly, in the time we have, it will allow us to examine in depth, one singular aspect and do it well. This will help keep the story clear and provide a result that has real meaning, rather than some true, but general statements. We will look at Agincourt and use both the items and the accounts to drive the story and so in essence we will answer the question "Could the English archers at Agincourt shoot arrows that penetrated French armour and thus injure and kill the knights within?"

This is still a large question, but between us, it is a question that we can answer and make a damn good film about it. There will not be time to make an exhaustive 'scientific' film, but we can make a comprehensive one that will still easily fill the day, but there will be one glaring hole that we cannot address this time around, but we could return for a part 2 if interested; but we must address it in this video. The French knights specifically mention they are worried by the arrows piercing their breaths. This suggests that we should return with a helmet and go again at a later date (properly raised helmet and visor not possible in a short time frame). This quote will be talked about and if we did decide to come back, then we would have the body of knowledge from part 1 to build on.

There is an obvious part 2 to this film, but I think it is important to do part 1 regardless and if anyone wants to do a part two then I think it is there to be done and just as important, but do not feel you have suddenly committed to a second film we have not even discussed.

### Filming outline

#### Words

1.

Tod in front of Logo door

Hi, its Tod here and today we have a very special film for you. I say 'we'; because I have assembled a fantastically talented group of people to try to answer that very question.

(Cut to group shot with VO)

And this is our mighty team; Joe Gibbs War bow Archer, Will Sherman from Medieval [Arrows.com](http://Arrows.com), Kevin

Legg from Plessis [armouries.co.uk](http://armouries.co.uk), Dr Toby Capwell and myself from Tods [Workshop.com](http://Workshop.com)

And we have come together to answer the question we have wondered for years; “What did arrows do to the knights at Agincourt in 1415?” We are going to shoot arrows at armour. The tests we are about to perform have no pre-decided outcome, so what you see will be real as best as we can arrange it as we try to answer that burning question once and for all.

This test will require highly accurate reproductions of the bow, the arrows and the armour....both metal and fabric elements.

Each specialised craftsperson has supplied a historically accurate reproduced item, as close as we can come to what we believe were normal items at Agincourt.

The victory at Agincourt was attributed to the longbow, so lets start with Joe Gibbs our archer; half man, half hydraulic machine, Joe is capable of shooting a 200lbs bow, but today he will be shooting a mere 160lbs mountain yew longbow. We have chosen this weight as we believe it is in the mid-range for longbow weights.

Will Sherman has supplied the arrows and as best we can tell they are correct. The heads are based on a find from the Agincourt field itself and they have been forged in wrought iron. Inventories of the time have differentiated between ‘heads’ and ‘heads that have been steeled’. We have assumed that this is case hardening; a mass production technique they used to make the surfaces of ferrous objects very hard.

Kevin Legg’s job was to produce this fabulous breastplate. Based on a piece from the Churburg armouries and dated 1390 it would have been similar to those worn at the battle. It may look ordinary and a little plain, but in fact this is variable thickness, as armour was, and is 2.5mm at the front and 1.5 at the sides and made from unhardened 0.5% carbon steel – just like the original piece.

At the outset, we decided that this needed to be done as well as we could if it was to have any real worth so our equipment had to be right and used right and this team can do that.

To understand how the weapons and knights interacted you need to understand what happened on the campaign and this shows us how we should be testing the armour.

TOBY DOES THIS BIT IF HERE

Toby sets the scene of the battle explaining that the English made some bad tactical decisions that left them exposed to a massive French force, but crucially they had brought a large force of archers. Good tactics by the English and bad tactics and discipline by the French allowed the archers to come into very effective play, allowing them a pivotal role in the ensuing battle. Crucially flat shooting enmasse.

PUTTING THIS HERE GETS US SOME ACTION EARLY ON

We know they were flat shooting, but we don’t actually know what distance this means. It could have been 10m or it could have been 80 or 90m depending on what was meant by ‘flat’ and we simply don’t know. To help with our understanding we are going to do a simple test and look at the energy of the arrow at 10m, 25 and 50m and see how much

energy is lost. We have a chrono graph set up behind the screen and joe will shoot and get us some readings.

We can see from this that the arrows at 50m still have 87% (whatever) of their speed and using the formula  $e = \frac{1}{2}mv^2$  we can see that the arrow still carries 75% (whatever) of its energy and at 25m maintains 85% of its energy. Do the same for momentum using  $p = mv$ .

The next stage is to test the arrows against the armour and we have gone to great lengths to get the equipment correct but to make the results as valid as possible we must mount the breast plate onto a rig that reflects the human body and with the various layers that formed the armour, it wasn't just the breast plate, it was a system of layers, so lets look at those.

We have a rather crude ballistic gel torso, a layer of arming jack, which is made of a layer of fine linen, 3 layers of linen canvas and an outer layer of wool. Over this goes a layer of 9mm solid and riveted maille provided by Mark of Cap a Pie.co.uk, then the breast plate and finally a jupon of linen and cotton wadding based on XXX made by Chrissi Carnie of theSempster.co.uk. This has been mounted on a mobile base allowing movement when it is struck; just like a body.

IF HE IS HERE TOBY DOES THIS BIT

Toby Capwell talks through the layers of the armour and gives a shout out to Mark at Cap a pie.

For our test we want reliable strikes on the armour, so we have set the plate at 25m which will give Joe a good chance of striking it and of course we now know that at 50m the energy would have been x% lower and the momentum would have been x% lower. The various screens you see are covering cameramen and equipment.

Joe 'LOOSE!' Joe shoots

We observe and issue oooohs and ahhhhs

Well, we can see that impressive as Joes shooting and lovely as Wills arrows are, how did they fare against Kevins Churburg breastplate? What was killing those knights?

Group discussion, bringing up the concept of lucky shots, ricochets, and sheer volume of arrows, trip hazards, wet ground and finally the accounts where they are worried about their breaths.

There are so many accounts of the devastating role that archers played at the battle that it is clear they were an effective and deadly force, but we are trying understand the mechanism of that success; if the arrows could not pass through the armour what was happening?

Lucky shots. It is a catch all term. Adlib, under the arm, slip back of the leg, trip up on shafts, poor armour at the side, broken strap exposing parts. And this got us pondering the role of the jupon as regards ricochets. So lets test that first and then hit the side of the plate and finally at just a maille section over jack as if he is hit under the arm or through badly fitting plates.

The other aspect to this is were the archers aiming for the trunk at all? If they can't go through the armour perhaps there were better targets. This picture from Paul Dolnstein, a Landsknecht who illustrated his diary, although 90 years later, this picture clearly shows every man who has been shot has been shot in the face, legs or arms.

A series of tests are set up and filmed.

Quick discussion about results.

This does leave us with one particular area that we have not been able to look at. The survivors said "we were feared for our breaths" so they were most worried about their visors. Were the archers aiming for the trunk at all? If they can't go through the armour perhaps there were better targets. This picture from Paul Dolnstein, a Landsknecht who illustrated his diary, although 90 years later, this picture clearly shows every man who has been shot has been shot in the face, legs or arms. If we assume that leg and arm wounds are not essentially fatal, then we are talking about shots to the head. And that Kevin, (meaningful look) means we need a proper helmet and visor. But not today.

Our ancestors were amazingly skilled at finding even tiny improvements in performance and so they would have known exactly how different heads performed and which would stand the best chance of getting through – we don't. pause. But we will need to.

Will has made us both wrought heads and steeled wrought heads and Joe is going to shoot them at these flat plates at 5m. This test is simply to show which head performs the best against 0.2% steel, 0.5% steel and 0.5% hardened steel at 1.5 and 2.5mm. We can't shoot at the breast plate because small changes in where it lands will have very different effects because of the curve so this way we can test them under the same conditions.

Joe shoots, Will explains the arrows, Kevin explains the metal. 1.5 and 2.5 sheets of mild, unhardened and hardened.

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We all discuss the results

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"Guys, what a day! Thank you so much for your input, I think the work we have done today is really important in advancing the knowledge of the weapon and armour at the time of Agincourt forward. We took authentic arrows, shot them at authentic armour using an authentic bow at an authentic distance and we found out a great deal.....Blah blah. It is clear we need to come back to shoot at a helmet and hopefully we can find the time to do

that, but like all experiments, we have answered many questions, but raised many more. Hopefully we can address these in the future.

Thanks for watching and you want to catch more films like this one, please subscribe.