

Atlatls, or Spearthrowers: Studying Ancient Weapons

For The Archaeology Show podcast on Archaeology Podcast Network, January 2017

[SLIDE] Hello. I'm John Whittaker, I teach Anthropology at Grinnell College, and I'm fond of saying that archaeologists have the best toys. Atlatls are one of my favorite prehistoric technologies.

The atlatl or spearthrower is one of the earliest mechanical inventions, a simple tool that allowed a light spear to be thrown faster, harder, and farther than by the hand alone. When everyone's ancestors lived by gathering wild foods and hunting large game, throwing a light spear that traveled fast and hit with a lot of power at a distance was a great advantage over having to get close to large dangerous animals with a hand-thrown javelin.

The atlatl is basically a stick with a handle on one end, and a hook or socket on the other to engage the spear, mostly called a 'dart' by American archaeologists and atlatlists. [SLIDE] There are many forms around the world. The principle is simple: [SLIDE] When you throw a ball or a rock, you use the strong slow muscles first, stepping forward and swinging your body, and then your arm. The throw ends with the light, fast muscles, snapping the wrist, which gives most of the velocity, so Nolan Ryan can throw a baseball up to 100 mph. An atlatl, like your wrist, acts as a lever to flip the dart away. Modern dog-ball throwers work the same way. [18 SLIDE SEQUENCE] When you snap your wrist with a spear and spearthrower, you in effect have a much longer wrist, so you can accelerate a light spear up to 60 or 70 mph, enough to get great penetration. A hand-thrown javelin, which travels much slower, must be heavier to do damage, and closer to the target. Prudent prehistoric predators preferred projectiles, with longer

range and striking power. Among other effects, you don't have to be large and strong to use an atlatl, so smaller people, women and young folk, could have hunted more successfully.

[SLIDE] Spearthrowers were used in most of the world starting in the Pleistocene "Ice Ages" at least 30,000 years ago in Europe, and possibly earlier. The earliest examples we have are some of the carved antler pieces from the caves of France and Spain. They depict the Ice Age mammals hunted there, reindeer, chamois, mammoth, and others. Spearthrowers probably came across the Bering Straits with the first people to enter North America. We have atlatl hooks made of fresh Pleistocene animal bone from some Florida rivers. These probably date to some 13,000 years ago, the time of the Clovis culture. [SLIDE] Clovis folk were early hunting-gathering people, most famously associated with a distinctive large spear point which has been found in a number of mammoth kill sites. Hunting elephants with stone-tipped spears is not a job for the faint-hearted, and it was the atlatl that made it possible. George Frison, a Wyoming archaeologist, experimented with Clovis points and atlatls on African elephant carcasses and showed that you can indeed inflict a killing wound with such weapons.

[SLIDE] Atlatls survived into modern times in a number of places. American archaeologists mostly call spearthrowers atlatls because they were recognized in the late 1800s by archaeologists working in Mexico and South America, where they are common in the ancient art of a number of cultures. The word 'at-latl' or 'atl-atl' comes from the Nahuatl language of the Aztecs and related folk. When Cortez conquered them in the 1500s, the Spanish were met with showers of spears. The Aztecs used atlatls for warfare because the heavy dart gave better penetration against cotton and leather armor than a light arrow, and perhaps for symbolic reasons. [SLIDE] The wide-spread myth that they could penetrate Spanish armor is only partly true - stone-tipped darts do not penetrate steel plate, but they proved very effective against more

lightly armored soldiers, and the Spanish learned to fear them. Several elaborate gilded specimens were sent back to Spain as plunder and survive today.

[SLIDE] Bows and arrows did not reach Australia in prehistory, and the Australians used spearthrowers to hunt kangaroos and other game, including the large Pleistocene versions. One of the fascinating things about atlatls is that many different forms developed. On the small continent of Australia in historic times and to the present there were a number of quite different kinds of spearthrowers among the different native peoples. 'Woomera' is the most familiar of many Australian names for them, and the most common form, used all over central Australia, was flat or scoop-shaped, with an attached hook at one end and a knob of resin at the handle, which often held a sharp flint. These spearthrowers were Swiss Army knives: shovels, clubs, musical instruments, carrying trays, and butchery tools, so nomadic desert people could travel light with a small but efficient tool kit. [SLIDE] The Australian atlatls tend to be quite large and capable of propelling a relatively heavy dart.

[SLIDE] The best known prehistoric atlatls in North America come from the Southwest, where finds from dry caves mean that we have examples of perishable artifacts that do not survive under most conditions. The Southwest is where I do a lot of my research. The Basketmaker culture was ancestral to the later prehistoric Pueblo cultures, which in turn gave rise to the various tribes in the southwest today. Basketmaker folk were early farmers living in small pithouse communities, often using canyons and the shelters in them. [SLIDE] They hunted for their meat, and rock art depictions show the symbolic importance of atlatls. [SLIDE] Basketmaker atlatls are small and light. They are beautifully made, sometimes with ornamental feathers and stone weights or fetishes attached. [SLIDE] The surviving darts are also light, usually made of a willow shaft with fletching feathers attached, and a hardwood foreshaft which

held a stone point. [SLIDE] The atlatl would be held with a “split-finger” grip, between the first and second fingers, with the fingers inserted in loops of hide or sinew.

Bows and arrows replaced atlatls and darts in most of the world. Arrows are lighter and faster, so easier to shoot accurately and at longer range. You can carry more ammunition, and it is much easier to learn to use a bow than to become skillful with an atlatl, although atlatls are capable of almost equal accuracy at close range in practiced hands. In North America, this transition happened began around 2000 years ago, with bows moving west. It was much earlier in the Old World, and most archaeologists believe the bow was invented there, possibly in Africa, and spread.

[SLIDE] It is often difficult for archaeologists to tell precisely when this transition occurred. On most of the continent, the only evidence of ancient weapon systems that survives are the stone points, and these are not very clear evidence one way or the other. In late prehistory, all over the continent, people used small triangular points with a lot of minor variations like where notches were put for attaching them to the arrow. Everyone agrees that these were arrowheads. Atlatl darts in general must have heavier points, and probably most of the larger points of many forms that the American public calls arrowheads actually tipped atlatl darts. But there is a middle size where points work for either, and we should remember that all bows were not the same - differing in size and power. Likewise there were many forms of atlatl. The weight of the stone point can be compensated by the materials of the shaft and its length. And we must expect that there was a period of transition and experiment when bows and atlatls were used together. In some places, like Mexico, bows and atlatls were both used, with atlatls

preferred for war. In the Arctic, spearthrowers survived for throwing harpoons with a line attached so seals in the water are not lost, while bows are useful for smaller game.

From ethnographic examples we learned how atlatls were used, and with modern experiments we can study their capabilities and understand how they work. Archaeologists are not the only ones interested; there is a small sporting world of atlatls, connected to wider public interest in prehistoric life and 'primitive' or pre-industrial skills and technology. [SLIDE] Although none of us grew up in a world where if you couldn't use an atlatl you didn't get breakfast, there are quite a lot of people who have worked hard to develop their skill, and a lot of low-key competitions around the country and in Europe where you can test your skills against others. So we have a good idea of what kind of accuracy ordinary skillful people can develop with an atlatl, and archaeologists who have not developed such skills themselves should watch those who have and avoid writing silly stuff like "you can only use an atlatl by throwing at a large group of animals." Any real hunter knows that just shooting into a herd almost guarantees a miss, and real hunters aim at a particular target on a specific animal in a group. [SLIDE] Atlatls are accurate enough for small game and powerful enough for the largest - 30,000 years of success testify to this. The best atlatlists today can hit a target the size of a dinner plate, or the kill zone of a deer, 9 times out of ten at 15 to 20 meters (or yards). Ten to thirty meters is the range at which most hunting or fighting with early weapons was done, whether we are talking about spearthrowers, bows, or muskets.

[SLIDE] With systematic experiments and modern instruments we can understand atlatls in ways our ancestors never could. For instance, we can compare atlatls and bows, which are quite different systems. [SLIDE] Bows work by spring power, and atlatls as a lever. Atlatls do flex during a throw, and the dart flexes quite dramatically, and oscillates for a while in flight.

[SLIDE] The curving motion of the atlatl flipping the dart means that the dart must flex and recover to keep the point on target during a throw, but this flex and the spring back does not add energy to the throw. It is often claimed that atlatls ‘accelerate the dart to more than 100 mph’ but that also is not correct. [SLIDE] A series of experiments with very strong and practiced throwers and a variety of atlatls, shows that 60 to 70 mph is about as fast as an atlatl dart can go. One hundred mph and above is arrow speed, from a strong bow. But that does not mean that an atlatl is a weak weapon. Even the light darts used with Basketmaker atlatls are much heavier than an arrow and thus pack a lot of penetrative momentum and kinetic energy. This too we can show experimentally. We used a pig carcass (humanely killed, and eaten afterward) as a target with replica Basketmaker atlatls, and found that we could drive a stone-tipped dart right through the pig if we didn’t hit a bone. Others have done similar experiments.

[SLIDE] Information from modern experiments with prehistoric technology allows us to consider larger issues, like why the atlatl fell out of favor and was replaced by the bow. If early bows and arrows were relatively weak, and had less penetrating power than atlatl darts, what was their advantage? I think it is mostly that bows are so much easier to use. This too I have shown with experiments, having one of my classes, all novices, learn to use both, and seeing how much faster they could reliably hit a target with a bow. And bows continue the trend in weaponry, which is to rely more on technology and less on human strength, moving the hunter or warrior farther away from prey or enemies, while shooting more accurately, more often, and more powerfully. This trend continues today with firearms to guided missiles.

[SLIDE] If atlatls interest you, the best place to start finding out more is the webpage of the World Atlatl Association at [Worldatlatl.org](http://waa.basketmakeratlatl.com/) <http://waa.basketmakeratlatl.com/> Here you can find all sorts of information: links to scientific articles, ethnographic examples and plans for

building gear both primitive and modern, a calendar of sporting events, and my large annotated bibliography of atlatl articles. A famous anthropologist, Frank Hamilton Cushing told us over 100 years ago that if you want to study a prehistoric technology you should “make yourself an artisan of it.”