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The Atlatl and Dart

An Ancient Hunting Weapon

by Thomas J. Elpel

Through the eons of prehistory, primitive peoples from all over the world developed hundreds of unique weapons for hunting game. Among all the technologies invented the atlatl and dart was the first true weapons system, consisting of both a projectile and a launching device. The atlatl, essentially a spear-thrower, was developed in Europe more than 30,000 years ago, and in North America about 12,000 years ago. By comparison, the bow and arrow first appeared here only 2,000 years ago.

Today there is a resurging interest in atlatls for sport and hunting. There is even a World Atlatl Association with national and international competitions. I met in the metropolis of Manhattan, Montana (population 800+) with modern day atlatl guru William "Bob" Perkins. Perkins has an engineering background. He has devoted his life and skills to uncovering the secrets of the atlatl, studying why mathematically it works so well, and theorizing how it evolved over the years to become more efficient. He manufactures these ancient weapons for sale at his home. His fascination with the atlatl earned him the nick-name "Atlatl Bob".

The atlatl throwing board consists of a stick about two feet long, with a handgrip at one end and a "spur" at the other end. The spur is a point that fits into a cavity at the back of a four to six foot long dart. The dart is suspended parallel to the board, held by the tips of the fingers at the handgrip. It is then launched through a sweeping arm and wrist motion, similar to a tennis serve. A fine-tuned atlatl can be used to throw a dart 120 to 150 yards, with accuracy at 30 to 40 yards. The atlatl is the tool ancient peoples used to "bring home the bacon", said Perkins.

Perkins started researching the atlatl in 1984 as an engineering student at Montana State University in Bozeman. He made and tested his first atlatl as part of an archeology course in replicative study. He became fascinated with the mathematics of the system and made it his life's work to discover and replicate the secrets of this age-old technology.

Eighty percent of the technology lies in the dart alone, according to Perkins. "The dart is like a long, loose spring," he explained "and when accelerated by the atlatl it compresses and stores energy. That energy is then used to push itself away from the atlatl, enabling the dart to launch smoothly and effectively."

The mass of the stone point, according to Perkins, is a integral part of the mechanics, resisting acceleration, causing the back of the dart to travel faster than the front, thereby compressing it like a spring. To Perkins, the stone point is more essential for the mechanics of the system than it is for tearing through the flesh of the animals it is meant to kill.

The other 20 percent of the technology of the system lies in the atlatl board used for launching the dart. The first atlatls were just rigid platforms, Perkins noted. Over time the atlatl underwent a technological evolution much as rifles evolved from muzzleloaders to breach loaders, to lever actions, to automatics, he said. The first major improvement in the technology is what Perkins describes as "launch geometry". Archaeologists found pictographs and artifacts of throwing boards of different

lengths, long boards for long distances, and short boards for short distances. Changing the length of the throwing board changes the point in the swing when the dart is launched.

The dart lays almost flat on the throwing board before it is launched, but lifts away as the board is swung in an arc. The nock at the back of the dart remains engaged on the spur of the throwing board until the dart is tangent to the arc of the swing (perpendicular to the board). A long throwing board causes the dart to become tangent to the arc much sooner in the swing than with a short board, so the dart launches high into the air at a long-range target (and right over the top of any close targets). A short throwing board allows for more follow-through so the dart is pointing downward when it launches; this enables the hunter to aim at short-range targets.

Later in the evolution of the atlatl it was discovered that flexible, rather than stiff, atlatl boards could store and release energy much like darts do. This led to the development of the atlatl weight. The purpose of atlatl weights was controversial among archaeologists, who speculated that it was either a counterbalance to steady the board or a "magic charm." Perkins has demonstrated mathematically that it was neither.

The weight has an effect similar to the mass of the projectile point on the dart. It resists acceleration, forcing the spring of the atlatl to store an equal and opposite amount of energy to that stored in the spring of the dart. "The technology employed here is impressive even by today's standards," Perkins noted.

If the flexibility of both atlatl and dart are in a functioning relationship to one another, the result will be similar to that of a diver diving from a spring board. In this system, the diver's legs are bent, like the dart, and store energy to be used in pushing away from the board. The diving board, like a flexible atlatl, is bent back, storing energy to be used to push the diver away from board. With the diver and diving board pushing each other away at same time, the launch of the diver is considerably higher, smoother, and more powerful than if the diver had used a fixed rigid form. The weight in the atlatl system therefore serves as a timing device to bring the flexibility of the dart and the board in tune with each other, much as one might adjust the timing of a car engine.

Perkins is continuing to reveal the secrets of atlatl technology. He discovered that ancient people applied "stealth-like" technologies "mathematically analogous to the B-2 bombers in use today". One style of atlatl weight, used by people living in what is now the eastern U.S. was demonstrated to serve as a type of "silencer" for canceling the zip-like sound of the atlatls' swing!

Laws vary from state to state governing the use of atlatls for hunting. In Montana legislation was introduced into the House and Senate a few years ago to create a special two-day atlatl season that would immediately precede the normal archery season. The first version of the bill passed the House, but the bill died before it could be reconciled between both the House and Senate versions. Nevertheless, it is legal to hunt with the atlatl in Montana during the general rifle season as long as you stick to the basic hunting rules-wear hunter's orange, have a valid license, and shoot only during daylight hours. Be sure to check the laws in your own state before hunting with an atlatl.

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