PROJECTILE POINTS

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Due, I believe, to the lack of a working knowledge of the bow and
the atlatl, the tendency with some archaeologists is to date sites
by the size of projectile points. In this paper, the writer hopes to prove
this method is wrong.

The pre-historic peoples, and especially the nomadic peoples, lived
by hunting. The atlatl and spear, or the bow and arrow, were in daily
use during a period covering many thousands of years. These peoples
were thinkers, inventors and experimenters, and it is reasonable to
expect that they all made and used very efficient projectile points. The
sole purpose of a projectile point is to pierce the hide of an animal and
to enter the body cavity deep enough to cause a hemorrhage that will
in time kill the animal. Two agencies will cause the penetration—speed
and weight. The amount of hemorrhage is governed by the width of the
projectile point and the depth of penetration. Of course the hemorrhage
will be greater and death will be faster if, say, the heart is pierced, but
a shot with sufficient depth any place in the body cavity will cause the
death of an animal.

After some years of experimenting, I have found a blade from 20 to
25 mm. in width and from 30 to 50 mm. in length to be a very efficient
projectile point. This width is sufficient to open a large tissue area and
will cause copious hemorrhage. The length of 30 to 50 mm. is really
immaterial and I prefer a point 35 mm. in length because of less break-
age.

Keeping in mind the fact that the purpose of a projectile point is to
pierce and cut, anyone who will do a little experimenting will find that
blades running over 50 mm. in length will be discarded after two or
three shots, whether used on an arrow or a fore-shafted spear for obvious
reasons. The long blades are difficult to make, the thickness and width
are too great for ready penetration, breakage would be heavy, and with
very few exceptions the large type of blades are of a width that tends
to very poor hafting.

The diameter of arrow shafts found in dry caves varies between 8
and 10 mm., that of fore-shafted spears, between 8 and 13 mm. It can
readily be seen that a blade 80 mm. long by 35 or 40 mm. wide in such
a haft would make a very unbalanced job. Blades of this length, I be-

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lieve, are either hafted or unhafted knives, or possibly lance points, although to this writer's knowledge none have been found hafted on lance shafts.

Just what the length of a point used on an arrow is supposed to be I don't know, but we do read so much about "points" being of such a length and weight that they must be considered dart points. Campbell\textsuperscript{324} pictures what she calls dart points that measure from 30 to 67 mm. Steward\textsuperscript{325} refers to dart points measuring 38 to 45 mm. in length. Baker and Kidder\textsuperscript{326} call attention to "the apparent total absence from all respectably ancient deposits of small, light points suitable for the tipping of arrows; and . . . the presence in such deposits of large points, of size and weight appropriate with the heavier, longer darts propelled by the spear-thrower." In Basket Maker Caves of Northeastern Arizona, by Guernsey and Kidder, there are pictured points that measure from 30 to 50 mm. found hafted on fore-shafted spears. I have proved that points of this size are not of such a length and weight that they cannot be used as arrow points.

With me it is immaterial whether the peoples that occupied a site used bows and arrows or atlatls and spears. I am only trying to show that projectile points within certain limitations could have been used on either an arrow or a fore-shafted spear.

I do believe that the bow is entitled to more antiquity than it is generally given. The bow and arrow and the atlatl and spear are complicated weapons and, as they were both used in Europe during the early Neolithic times, I suggest that it is more reasonable to assume that they were both introduced to this continent by peoples from Europe than to suppose that they were re-invented here at a later date. Could not the people of Basket Maker I have been a small, isolated group that had never seen the bow? It must be remembered that no atlatls have been found in northern Colorado, Wyoming, Montana or the western parts of Nebraska, South Dakota, or North Dakota, and this is country that was occupied by nomadic hunting peoples. The round head that changed the Southwestern scheme had the bow and arrow with him, and was undoubtedly from the North and I don't think it unreasonable to assume that his ancestors had the bow with them during their migration across the Bering Strait and along the open east corridor.

The Projectile points from Signal Butte I and II are within a range

\textsuperscript{324} Campbell, E. W. C., \textit{American Antiquity}, Volume I, No. 4.
of from 25 to 45 mm. in length. In the Sun River bison traps of Montana
the points run to average lengths of 25 mm., but it is postulated that
these points were used to irritate the animals, causing them to stampede
over the cliffs. In the long fall they were badly broken up and were
dispatched with stone hammers. In various other pole and cut-bank
traps throughout the state, points of an average of 45 mm. were used,
the animals were uninjured in trapping and were killed by shooting.
Points falling within a range of from 25 to 45 mm. comprise 90 per cent
of the points used by the nomadic hunting peoples of the plains country
and are highly efficient for use on either the foreshafted spear or the
arrow. It is well to note that the Folsom blades fall within this range.

Tests for accuracy, penetration, and distance were made with both
the bow and the atlatl by the author. The bow used (Plate XII, Figure
1, a) is from an Osage orange sapling and was made entirely with a
hand-axe and a hunting knife. It will pull about sixty pounds and is a
weapon anyone could manufacture. The arrows (Plate XII, Figure 2)
are of various lengths, weights, woods and projectile points.

Two atlatls (Plate XII, Figure 1, b and c) were used, one of Osage
orange and one of birch. Both atlatls are close reproductions of atlatls
from Basket Maker burials, as are the spears, which are of hardwood
dowels of different lengths, haftings, and fletching.

I wish to thank Mr. Earl A. Morris of the Carnegie Institution and
University of Colorado for making it possible to measure the atlatls,
and Mr. Donald Scott, Director of the Peabody Museum of Harvard,
for the report, Basket Maker Caves of Northeastern Arizona, 1916–17,
by Guernsey and Kidder, which I used freely for dimensions of spears,
projectile points and probable way of holding the atlatl for throwing
the spears.

ACCURACY TESTS

Any close degree of accuracy is impossible with the atlatl and the
spear. The atlatl is held in one hand, between the first and second
fingers, which are slipped through the leather loops. The thumb and
the third and fourth fingers tend to hold the atlatl and, when shooting,
throw a pressure on the atlatl that gives added speed to the spear. The
first and second fingers also bridge or hold up the spear and at the same
time exert a back pressure which holds the cup of the spear against the
spur, which is at the end of a groove in the atlatl (Plate XII, Figures 4
and 5). When shooting or throwing the spear, the arm is extended as
far back as possible and the spear is held close to the head of the
thrower (Plate XIII, Figure 1). The throw is a fast overhand sweep.
This lifts the spear to a height above the head equal to the length of both the arm and the atlatl and this uncontrolled throw is the cause of the large angle of error. I consider myself an average individual, have an expert rating with both large and small bore rifles, a few trophies from archery tournaments, but after six months of intensive practice with the atlatl and spear I wouldn’t be sure of hitting a buffalo at thirty yards once out of ten shots. With a bow, anyone can register eight hits out of ten shots at this distance and on this size target after a week’s practice. The angle of error is just too great with the atlatl and spear for it to be an accurate weapon. Checking myself and watching others shoot the atlatl, I figure the angles for both elevation and windage to be in each shot from two to eight inches, and a person knowing anything about ballistics can readily figure the chance of a hit on an animal at even close range. We read about peoples that now use the atlatl and spear and about the hits they make at this and that distance on this and that animal, but I am very much afraid it is like the stories we hear of hunters killing running deer at six hundred yards and Robin Hood splitting arrow shafts at one hundred yards. It makes good reading but that is all. Of course those things do happen to us all once in a lifetime, but I am talking about consistent killing accuracy.

I believe the pre-historic hunters that used the atlatl and spear did their hunting from ambush, along game trails and around watering places, and then in groups and at relatively close range. Game was plentiful, and with several hunters shooting into a herd of buffalo, deer or elk, some shots were sure to be hits. A hit with a fore-shafted spear meant meat on the rack, because the spear does have plenty of penetration.

Thirty-six shots were made at a regulation archery target, forty-eight inches in diameter, at thirty yards. The arrow used (Plate XII, Figure 2, b) was a rough arrow that anyone can make. The hits were 31 out of 36. The spear (Plate XII, Figure 3, a) was sixty inches long, one-half inch in diameter at the middle, tapering to three-eighths inch in diameter at each end, and carefully made for balance and perfectly fletched, and it shot beautifully. The hits were six out of thirty-six.

**PENETRATION**

In making the penetration tests, steel points 60 mm. in length were used, as they are much more practical and efficient than stone points and because identical points could be used on both the arrow (Plate XII, Figure 2 d) and the spear (Plate XII, Figure 3, b). A fence of inch
boards was used as a target. The distance was thirty yards. The arrow is from a set the writer used on an elk hunt in the Jackson's Hole country in Wyoming. In Plate XIII, Figure 3, is pictured the elk that was killed. The penetration was completely through the animal. The bow was the same weight as the bow used in these tests. Using wood in these penetration tests is both fair and practical, because of the uniformity of the wood. The penetration of the arrow was 36 mm. (Plate XIII, Figure 2, b), that of the spear, 40 mm. (Plate XIII, Figure 2, a).

I consider the atlatl and spear to be as deadly a weapon as was ever invented, and that any thin-hided animal in the world can be killed with it. The same is true of the bow and arrow.

As far as I am concerned, this penetration test tells the whole story. Penetration was the all-important thing to a hunter because it meant a kill. Here are points of 60 mm. in length showing approximately the same penetration when used on both the arrow and the spear. The arrow gets its penetration by speed, the spear by weight. Keep in mind the size of these points, and if it matters, they weigh more than stone points of the same size.

**DISTANCE**

The arrow and spear used in this test are shown in Plate XII, Figure 2, a, and Figure 3, c. The point hafted on the arrow is a flint point 87 mm. long and 37 mm. wide. It is used to show that a statement like "Here occur projectile points of the Pinto type, much too large and heavy to be considered arrow points" is entirely without foundation. The point on the spear is of flint, 37 mm. long, 27 mm. wide, and is normal for use with the spear, or any arrow. The best distance with the spear was 81 yards. The arrow was shot 137 yards. If this large point were used on a spear and did hit an animal and kill it, the results would be the same were it used on an arrow.

I believe anyone who will give this subject a little thought and consideration, and who will do some experimenting with both the bow and the atlatl will find other means of dating a site than by the size of the projectile points it produces.