

The

# ATLATL

“Too long have I hunted mammoth alone!”

Rich McWhorter

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Margie Takoch, Editor  
710 Fernwood Rd, Wintersville, OH 43953 USA  
Email [theadlatl@1st.net](mailto:theadlatl@1st.net)

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## The Physics of the Atlatl: Flex: Irrelevant . . . or not

*Nathan Steckel and Chris Vincent*

The physics of the atlatl has been a much-studied topic over the years. Many experts have exhausted the resources of the physical and spiritual world in trying to determine just what the ancients were doing when they threw their spears with the aid of a notched stick. Prior to the summer of 2005, this research was limited to a select few. That is until two inquisitive high school students and their physics teacher decided to tackle the ancient conundrum once and for all. At the request of a local enthusiast, the students set out to discover which throwing technique was really the best way to gain distance and accuracy: a full follow through or an abrupt stop.

The experimental process was kept as scientifically accurate as possible for two high school students. We hypothesized that the sudden stop of the throw (about the two o'clock position) would allow the potential energy of the flex of the spear to contribute greatly to the kinetic energy given to the spear and in turn add to the initial velocity. It was determined that this phenomenon would be similar to the casting of a fishing pole, in which a flexible rod with the weight of a lure is used to promote a greater initial velocity. In "Stop That Cast" of the August 2006 issue of *Field and Stream* the author, John Merwin, states that, "a smoothly accelerated forward stroke ended with an abrupt halt is the key to both accuracy and distance. Do it correctly, and you'll add at least 20 feet to your cast. The stop is what makes it all work."

To test this hypothesis, a flexible spear was repeatedly thrown for a given start point by the same person with both a half throw (no follow through) and a full follow through. These throws were measured for both flight distance and accuracy from a centerline. These two measurements were then used to determine the actual flight distance and this data was averaged over the numerous trials.

Through a course of eighty-eight trials in which techniques were alternated to maintain consistency (see data tables) it was found that the flexible spears thrown with a half throw went an average of 7.6 feet or 6.3% further than the spears thrown with a full throw. The accuracy from a centerline was also greater, but at a mere 2.08 foot difference, more research would be required for a more decisive conclusion.

In April 2006, John Whittaker and Andrew Maginniss published an article in *The Atlatl* titled "Atlatl Flex: Irrelevant." Their findings indicated that flex had no effect at all on velocity of a spear leaving the atlatl face. They stated that, "the atlatl would have to stop or slow down enough that the flexed hook end could rebound and 'catch up; to add spring force to the throw. One could imagine a throw with *no follow through . . .*" [Italics added]. It was our findings that if the atlatl was suddenly stopped at about the two o'clock position, the flex of the spear was able to 'push off' from the stationary atlatl and thus release its elastic energy. We believe that this is what contributed to the greater distance in our trials.

While it is true that we are not established members of the atlatl community as Mr. Whittaker and Mr. Maginniss undoubtedly are, our own experience has led us to respectfully question their findings. Our own experiment though cruder and less sophisticated, nonetheless showed a clear advantage to throwing flexible spears with a half throw, contrary to Mr. Whittaker and Mr. Maginniss's findings.

*Nathan Steckel and Chris Vincent*

*in collaboration with Mr. Rick Schwentker and Mr. Leroy Koch*

### Half Throw

### Full Throw

Linear distance	distance from center	actual distance thrown	Linear distance	distance from center	actual distance thrown
89.50	24.00	92.66	80.50	9.00	81.00

99.50	14.50	100.55	104.50	21.50	106.69
110.50	0.50	110.50	120.00	6.50	120.18
116.50	11.50	117.07	109.00	11.50	109.60
112.50	10.00	112.94	118.00	3.50	118.05
114.50	8.50	114.82	117.00	5.50	117.13
114.00	3.50	114.05	124.00	26.50	126.80
136.50	4.50	136.57	116.00	26.50	118.99
126.00	5.50	126.12	133.50	3.50	133.55
125.50	2.50	125.52	126.50	0.50	126.50
130.50	3.00	130.53	111.00	17.50	112.37
138.50	10.00	138.86	99.00	22.00	101.41
99.50	18.00	101.12	127.00	9.00	127.32
135.50	5.50	135.61	96.00	24.50	99.08
108.00	29.50	111.96	145.50	10.00	145.84
119.00	11.50	119.55	125.00	11.50	125.53
142.50	5.00	142.59	140.00	3.00	140.03
132.50	2.50	132.52	127.00	36.00	132.00
152.50	17.50	153.50	116.00	13.00	116.73
133.00	4.50	133.08	132.00	16.00	132.97
148.50	1.50	148.51	133.00	4.00	133.06
141.00	16.00	141.90	129.50	17.50	130.68
102.50	13.50	103.39	100.00	22.00	102.39
124.00	4.00	124.06	134.50	19.50	135.91
119.50	16.00	120.57	116.00	11.00	116.52
154.00	8.50	154.23	144.00	19.50	145.31
137.00	21.50	138.68	126.50	27.50	129.45
116.00	20.50	117.80	115.00	10.00	115.43
120.00	15.00	120.93	110.50	11.00	111.05
119.00	15.50	120.01	127.00	8.50	127.28
156.00	10.00	156.32	123.50	29.50	126.97
121.50	18.50	122.90	94.50	23.00	97.26
114.50	22.00	116.59	123.50	1.50	123.51
118.50	31.00	122.49	127.00	27.00	129.84
142.50	1.00	142.50	108.00	6.00	108.17
151.50	9.50	151.80	134.00	6.50	134.16
149.50	18.00	150.58	94.00	16.50	95.44
150.50	5.00	150.58	139.00	11.50	139.47
104.50	24.00	107.22	90.50	10.00	91.05
124.00	21.00	125.77	104.00	18.00	105.55
140.50	11.00	140.93	140.50	9.00	140.79
127.50	7.50	127.72	129.50	3.50	129.55
138.50	3.00	138.53	106.50	5.50	106.64

Average distance: 127.77

Average distance: 120.17

Accuracy from center: 11.76

Accuracy from center: 13.84

