

On All of the Great Critics Who Never Contribute, but Know So Much

Part 1: No Good Dead Goes Unpunished

Recently, being stuck at home (Thanks China!), I have little to do but work in my shop, make stuff, throw, exercise and wonder at the stupidity of some people. Feeling a bit surly due to being trapped at home, the last of these activities is relevant to this paper.

Since our little group of throwing aficionados started making and refining our own throwing knives, I have given away quite a few. I've also tried to help others wanting to DIY their own knives, based on what we have learned since we started. Locally, I have also helped friends make their own Darts in my shop, with some guidance. Making your own can be highly rewarding. Try it some time. You just might learn something.

A few weeks back, at a knife throwing contest, my son and I met a very nice lady and her friends. While talking, she mentioned that her husband was competing. Later he came by and we introduced ourselves. As we talked, I asked to see what he was throwing. When he handed them to me, I observed (without my glasses) that they appeared to be of two different thicknesses. He quickly corrected me and stated that they are of three different thicknesses. He didn't seem to be happy about it.

When he went back to competing, I suggested to his wife that I would be happy to send him a set of our Darts for free to try. She graciously accepted the offer and we continued drinking and observing the contest. I had a lot of fun and a lot of beer that day.

It was probably a week later that I received an e-mail from her requesting pricing on our Darts. I replied that I was happy to honor my commitment to provide a free set if she would pay shipping. All I asked was for her husband to let me know what he thought of them. You see, we like to get feedback, especially when giving away our steel, skill and unique Darts. She agreed and about a week later I finished and sent them to her.

Later I would find that her husband posted a video throwing our Darts. Of course, I still don't know if he liked them, but I liked the video. Later, I was notified by my son that there was outrage from the peanut gallery over ripping off Tom-Tom's beautiful Arrow design. After four years of making our knives and publishing our papers, no one has ever mentioned before that our Darts were a copy of the Arrows. I thought it was a joke!

I have never bothered to go on Twitter or Facebook to exchange ideas. Now I know why. So when my son shared the comments he found on one of these "social" apps, I was also shocked at the level of vitriol regarding this heinous crime. My son thought it was hilarious, so he had to tell me. Then I got to wondering why anyone would see any relation between my Darts and Arrows. Apparently they are not familiar with knives. You know . . . Handle, Blade and Tip! Aside from being balanced for no-spin throwing, our Darts share generic attributes of all throwing knives: a pointy tip, a blade and a handle. None of their unique attributes are shared.

Being balanced for no-spin throwing requires placing most weight in the handle. There are several approaches to this end: use scales, make all or a portion of the handle wider than the blade, slowly taper from a wide handle to the tip. I have seen all of these variants in handle-heavy knives. After experimenting, I decided on a handle that is wider than the blade, hence the overall shape.

I readily admit to using Tom-Tom's naming convention, instead of some macho name—Ravager, Penetrator, Wood-Raper, etc.—I went with the shape. With a handle powder coated neon green, I thought it looked sort of like a dart with green fletching. I also believe that Tom-Tom would not lay claim to having sole ownership of this naming convention. You know . . . needles, toothpicks, javelins, talons, etc.

So, if you are **not** one of the self-righteous pin-heads who believe that their greatest contribution to the world is attacking those who actually do things, read on for my thoughts on knife design. If you are one of those who feel better about themselves by attempting to diminish the efforts of others, it's bed time.

Part 2: So, How Did We Come to This Design?

Before designing my Darts, I observed and used many knives. The knives that I enjoyed throwing the most were the SZCOs. After throwing these for a while, I decided to grind off a portion of the tip (shown below) since I saw no function beyond esthetics and I wanted to shift the balance a bit. The next modification was to tape two SZCOs together for increased weight. I was slowly getting a feel for what I wanted in a knife.

Frustrated with modifying other knives for proper feel and balance, my next step was to design and make my first set of Bellablades. Realizing that I would need a design that shifts a large portion of the weight to the back of the handle, I did as Tom-Tom and others have done: I made a bulbous handle tapering to the blade. I used a plasma cutter to make the first three. Now I was ready to throw my own knives.

As I was still new to no-spin throwing, I listened to the experts talking about consistently locating the back of the handle in the palm of your hand for indexing. This seemed to be a bit arbitrary, especially for someone trying to learn to throw. Even with my own design (yellow ones below), I still had an indexing problem. Although they felt better (balance and heft), I still had to use a magic marker to mark the BP.

I finally hit on the idea of having an abrupt, tangible demarcation between the handle and the blade which would allow for me to index using my *index* finger—much easier . . . for me. After playing with other approaches, I decided to design a more abrupt angle between the handle and blade.

In order to confirm this concept of the abrupt angle, I made a crude prototype (shown below) from a piece of scrap steel. I skipped all of the other steps we perform when making our knives. I just wanted to test the effect of a noticeable transition between handle and blade. The prototype confirmed the theory.

I still keep it around, but since it was soft, it has lost about a half inch from tip breaks and being reground.

Once I was happy with the prototype, I made a detailed spreadsheet in order to design based on weight, length and balance requirements that I had determined by experimentation. This has allowed for variations like the “Needles” and “Offset Darts” of different thicknesses and lengths while maintaining the precise balance points that we like ($39\% \pm 0.5\%$) and satisfying weight requirements—no guess work!

We never even intended to sell our Darts. Anyone who found our sight in the early days would be greeted with our statement, “Bellablades, the best knives you’ll never own!” Even though we do occasionally sell some, we don’t make the purchase process very easy. Not a great sales strategy, but our primary purpose has always been improving our knives. Our first improvements focused on the design. **Done!** Now, we focus on improving our process: quench system, heat-treat technique, decarb protection, etc.

You see, Bellablades was and still is a DIY sight. We **make** our knives, start to finish. We publish papers on our findings from research and testing. As we learn more, we share our knowledge and experience.

So, what do I get out of my efforts? Just the satisfaction of finding a better approach. If you are one of the whiners, you probably don’t understand that. When we do occasionally sell a Dart, the funds go into more metal and toys for continuing to play and design stuff. Remember, I’m retired.

So, let’s compare Arrows and Darts for their unique attributes.



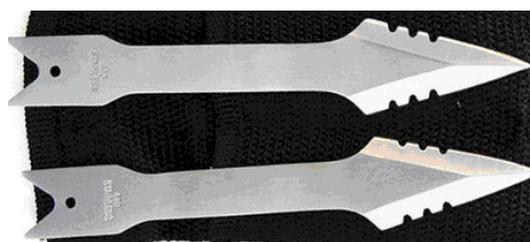
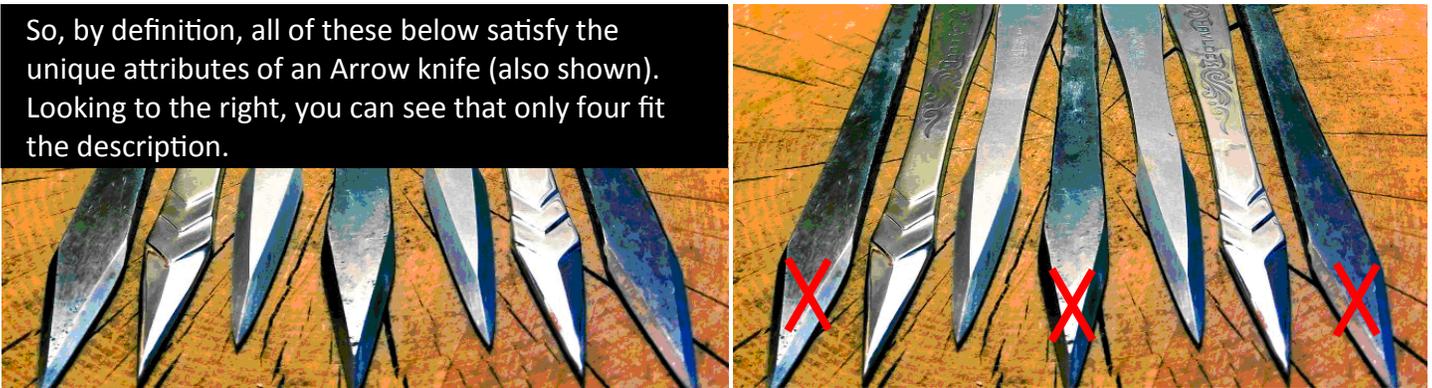
Part 3: So, What's an Arrow Got that My Darts and Other Throwing Knives Don't?

So, what makes the Arrow design unique among throwing knives? I have **my** assumptions in that regard:

1. The tip: The tip gives the Arrow its name (I assume!). The wide back portion of the tip, relative to the blade, tapering to a very narrow point, forms the shape of an arrowhead (broad-head). The four symmetrical bevels allow for deep penetration and complete the illusion of a sharp broad-head.
2. The blade (part between the tip and the handle): There is no discernable separation between the handle and the blade. The handle slowly tapers toward the broad arrowhead tip. This gives the Arrow an artistic, smooth look and a smooth release.
3. The handle: The handle is bulbous toward the back, slowly tapering toward the broad-head tip. Overall aesthetically pleasing and shifts weight to the handle.

All three of the above Arrow attributes make it unique among throwing knives!

So, by definition, all of these below satisfy the unique attributes of an Arrow knife (also shown). Looking to the right, you can see that only four fit the description.



As shown above, the broad-head design has been around for a long time, in one form or another. What Tom-Tom designed was a functional work of art with the three attributes shown above that make it unique among throwing knives. No argument!

We consider our Darts to be more functional for **us**, due to their unique attributes. We'll look at them next.

Part 4: So, What's a Dart Got that Arrows and Other Throwing Knives Don't?

As previously stated, I have always assumed all throwing knives have three attributes in common that define them: a pointy tip, a blade and a handle. Therefore, the uniqueness of a design must be based on one or more of these features being unique to that specific design. Here are the unique features of our Darts:

1. The tip: Like any throwing knife, the tip is "pointy"! We designed our Darts with an offset tip bevel (Bearded RATs contribution from a lucky mistake!) for extra strength, while still allowing for deep penetration. We started with a 20° tip angle and over time, as we gained confidence in the strength of our design, reduced it to 16° for improved penetration. The offset bevels taper toward the back of the tip. Originally the taper was 5°; it's now 3°. **I must mention that we have never seen, before or since designing our Darts, any tip with the same offset geometry!**
2. The blade (part between the tip and the handle): We designed them with an abrupt transition from the handle to the blade. This gives us the ability to easily find the balance point (one inch behind the transition point) without first balancing it on a finger or marking it like I originally had to do with other knives.
3. The handle: Like the blade, the handle is straight and the sides are parallel. It has a rounded back end like many, many others. Having observed gouges on the backs of other knives after a long time of throwing, we beveled the back of the handle to reduce tip-to-handle collisions.

I find the combination of unique DART attributes, combined with the precision of the machining process, has produced a unique thrower. From an engineer's point of view, I find its clean shape to be aesthetically pleasing. You can disagree on any and all points, but if you've never actually gone through the design and implementation process, I really don't give a shit!

I have great respect for Tom-Tom and his knife design, as well as his throwing skill. My son actually bought an Arrow after I had made my first knives. He has since gone to a set of Offset Darts. It could be familial solidarity or he just prefers them. Maybe he realizes that it's cheaper to let the old man make a set for him.

In closing, I thank you for reading to the end of my prolix response to "Social Media" **TROLLS**. Maybe they were just getting a bit surly as well. I also urge you to continue purchasing Arrow knives. They're less expensive than our Darts and we really won't mind! Now that's what I call a sales pitch! Stay well!

By the way! If you had read our previous papers you would have a better appreciation and understanding of the design/engineering process used to produce our unique **THROWING** knives over the past four years!

