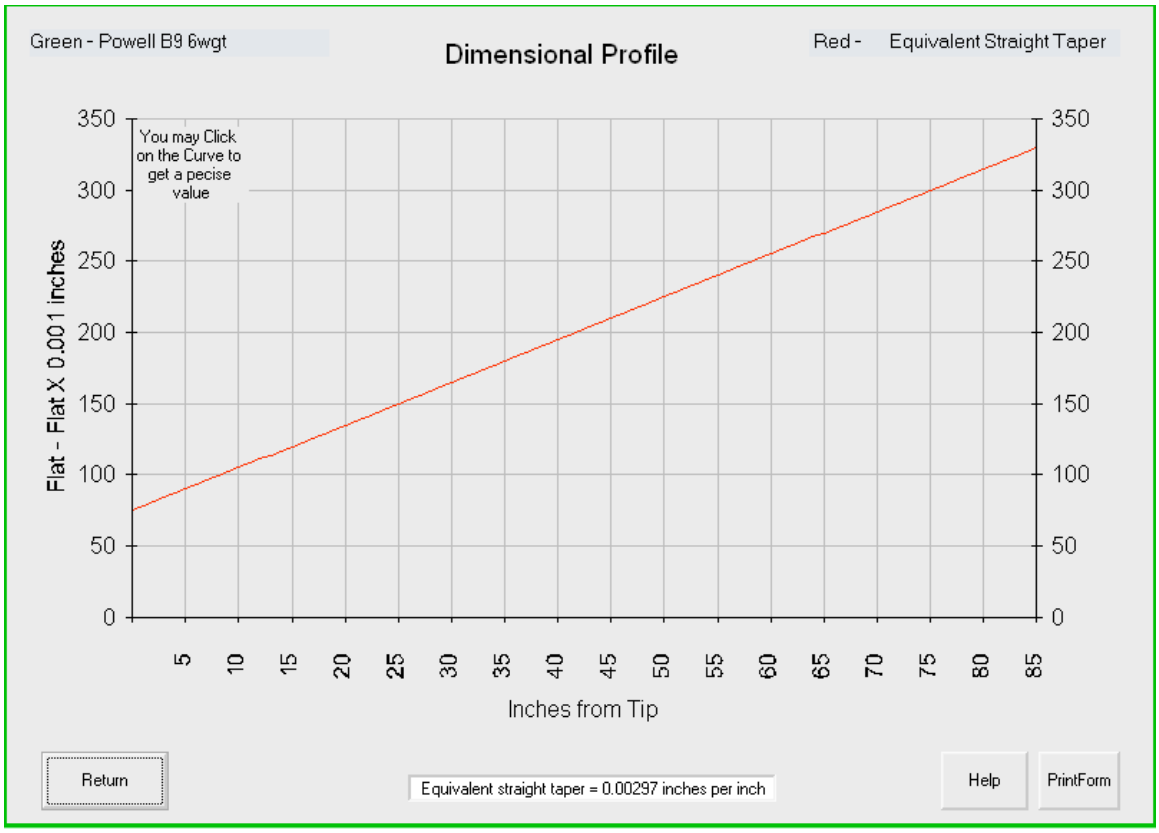
A basic look at bamboo fly rod tapers

Lots of things can have an impact on the performance of a bamboo fly rod. The quality of the cane, the type of glue used, flaming or heat treating, all make some difference. But the overwhelming factor is the thickness of the material. The effect of thickness variation is exponential, meaning small variations can quickly make a big difference in the way the rod flexes. That is why fly rods tend to be described and defined by their tapers.

So lets take a look at the major categories of bamboo fly rod tapers. First, imagine that it is the mid 1800's, and you are sitting down to design a fly rod with this new method, split and glued up bamboo. Most likely, you start with nothing but the intuitive knowledge that a fly rod is skinny at the tip, and fat at the butt, and you would start by connecting those two points with a straight line. That's not such a bad idea, and you would soon find out that the slope of that line had a major impact on the feel of the rod, and that the starting thickness at the tip determined the weight of the line that could be cast with the rod.

Skipping forward some years, a man named E. C. Powell, codified such tapers, and determined that a good basic slope for such a taper increased in thickness .003 thousanths of an inch for each inch of rod length. Mr. Powell designed rod tapers in 6" increments. For each increment the thickness of an individual cane strip increased .009, but when the rod was glued up that thickness was doubled to .018, which resulted in a .003/inch slope. He called that slope a B9 taper. The thickness chart below describes such a taper for an 8 foot 6 weight rod. The taper starts at .075 thickness at the tip, and ends at .363 at the butt at 96". The ferrule dimension at the 48" mark is .219, just about perfect for a 14/64th ferrule, exactly what you would expect on an 8 foot 6 weight of moderate taper. If I wanted a 5 weight 7 ½ footer, I would start the tip at .068, which would produce a tip that would respond nicely to the 5 weight line, and the center dimension would be .203, exactly right for a #13 ferrule. Again, exactly what would be expected on a 5 weight rod of moderate action. Mr. Powell himself described the B9 taper as an all purpose fly rod, easy for just about anyone to cast, having both good accuracy and distance casting capabilities. There are curved Powell tapers as well, a description of which is beyond the scope of this essay.



I should point out that the program I used to generate these charts calculates only to the front of the handgrasp on the rod, so the charts stop at 85", even though all the rods are 96" long. The program also generates an "equivalent straight taper" line on the chart, which gives you a good idea of the average overall slope of the taper, a useful bit of information if looking at a taper where the actual measurements zig zag around a bit. On the other charts, the green line is the actual taper. On the chart above, the lines overlay each other.

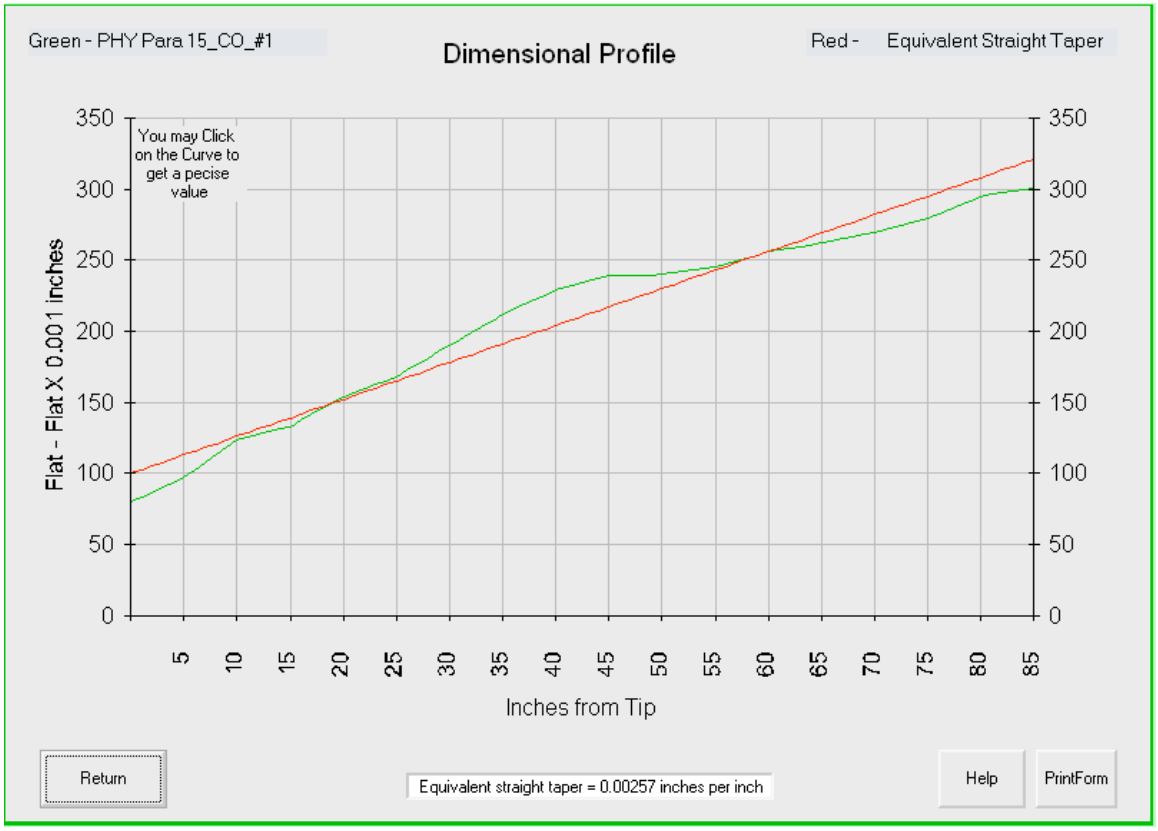
So, to continue with the discussion of straight tapers, the Powell B9 formula produces a medium fast action, and by varying the starting thickness of the tip and the length of the rod, you can produce useful tapers in just about any line weight. But suppose you want a slower, more relaxed action. What happens is you start lowering the slope of the taper. That works for a little bit, but if you lower it too much, the rods starts to develop a mushy feel, in which the butt of the rod no longer has the strength to turn over the tip with any authority. Conversley, If you start raising the slope, you will reach a point where the butt of the rod stops bending, and other than a bit of leverage, contributes nothing to the cast. The overall weight of the rod may start to feel opressive as well, depending on the caster's level of arm strength.

Lets look now at somewhat slower tapers, those than can be described as having a progressive action. In order to make them work without feeling mushy, a drop in taper is introduced in the tip area, which allows the tip to remain responsive, even though the butt is a bit weaker. These tapers are quite popular, and in my own opinion best showcase bamboo as a rodmaking material. They offer a good

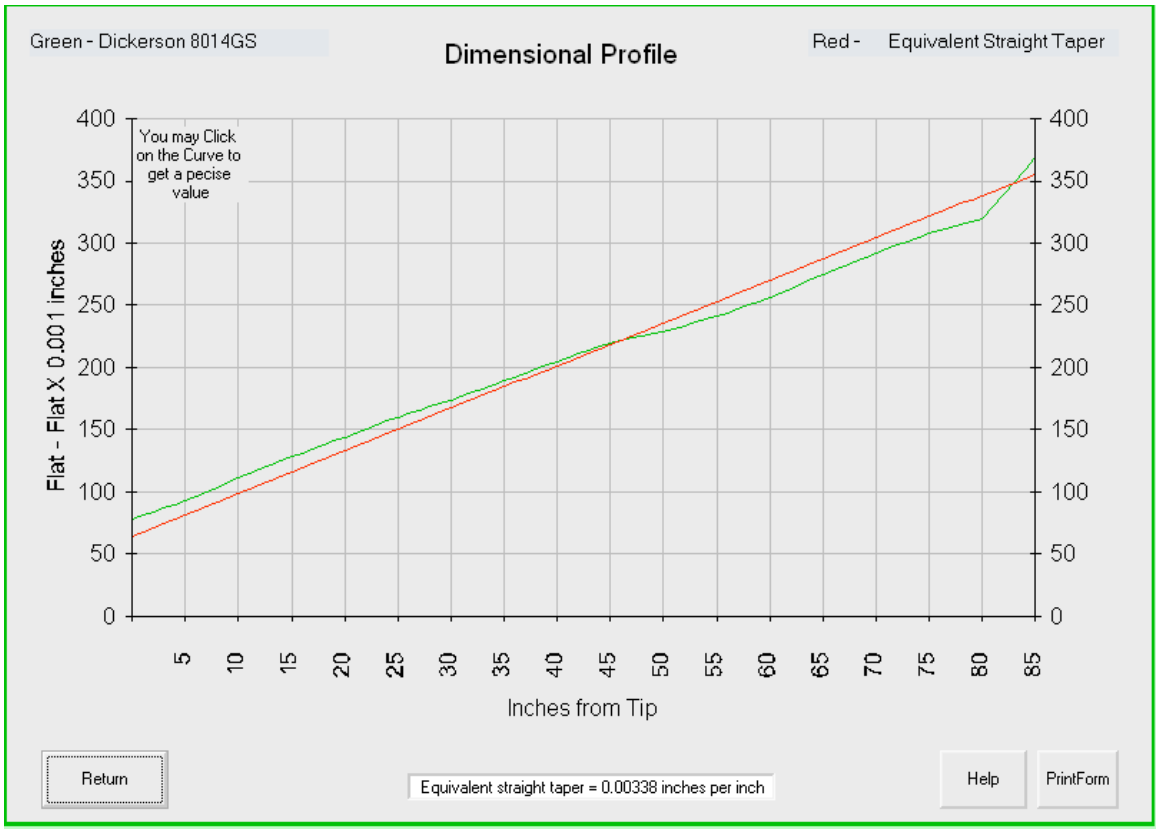
compromise between light weight and performance. They require a little slower, more controlled casting stroke, but are not tricky to cast with a little experience. The series of tapers by Everett Garrison are excellent examples of this kind of taper, constructed around an average slope of about .0028/inch.

The taper depicted is the Garrison 212E, an 8 foot 6 weight, with a very smooth action. Characteristically of such tapers, if you are casting it and start extending the casting distance, the amount of increasing effort seems directly proportional to the increasing length of line. That, and the reasonable weight of such a rod makes them easy to fish with during a long day on stream. Such tapers have always been popular on the West coast with those who fish for steelhead, which requires long days on the stream, casting heavier lines, and keeping the fly in the water. The other Garrison tapers are all very similar, varying by length and line weight, but following the same design philosophy. Both the Garrison tapers and the Powell tapers are mathematically derived, and their originators made the tapers and the mathematics public, so they usually will be depicted as very smooth curves or straight lines.
The remaining examples will show irregular tapers, which might be a result of the fact that they were not published, but rather taken off of existing rods, and show the result of manufacturing tolerances as opposed to the planned design. Or they may have been derived from experience by adding or subtracting material from an existing rod, as opposed to a mathematical approach. There is nothing wrong with that, it's a time honored approach.

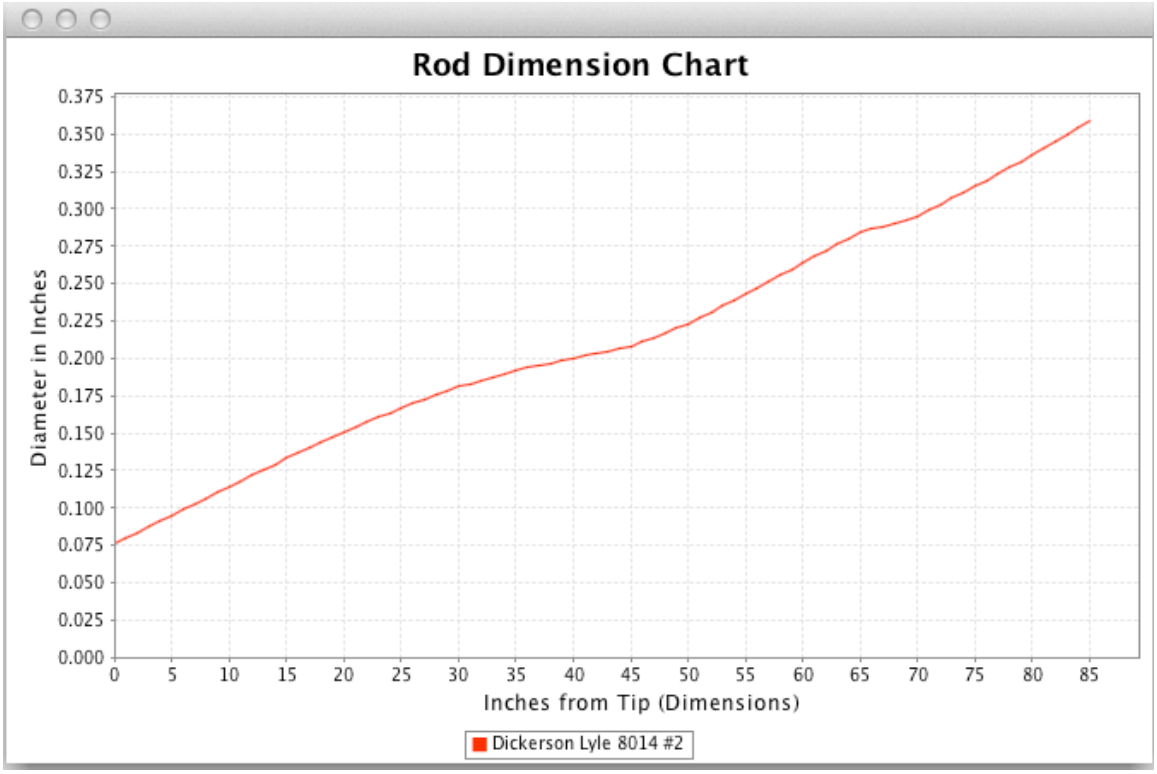
Another approach to fly rod tapers with a lower than average slope is the much misunderstood parabolic taper. A wise friend once advised beginning rod makers that the first tool they should purchase is a shovel for all the BS they were going to hear. The actual derivation of the term “parabolic” is again beyond the scope of this article. But discussions by people writing catalogs to sell rods, and therefore people influenced by them are virtually always nonsense. No rod bends like a parabola, and no mathematical or engineering derivation of a taper looks like a parabola. Rod makers all agree, however, that a parabolic taper is one with a reasonably strong tip, a very strong middle, and a weaker, full flexing butt section. The principal designers of such tapers were Charles Ritz, working with Pezon & Michel in France, and Paul Young in the USA. Both designed large numbers of such tapers, and both apparently did a lot of experimentation to get them exactly right. I consider them the most difficult tapers to design correctly, particularly in longer lengths. The big trick is to get the full flexing butt just right. If it flexes just a bit too much, you have a rod which will not cast the line with any authority. If it does not flex enough, all you have is a rod which casts like a progressive taper, but which weighs too much because of the heavy middle. Even a correctly designed parabolic rod requires some skill on the part of the caster, who will be required to make a full, but slowly accelerating stroke with a controlled stop at the end. The longer the rod, the more skill is involved. Many people can easily cast a shorter rod, such as a Young Driggs River, but a Para 17 or a Ritz Fario Club is a different experience. In any case, here is the taper chart for one of many versions of the Young Para 15, one of the most popular parabolic tapers ever designed.



The 15 in the name refers to the fact that it is fitted with a 15/64th ferrule, a full size larger than what is found on a similar progressive taper. That is quite typical. The result is that a parabolic rod weighs a bit more, and that the weight is felt more in the middle of the rod. So there is a penalty in felt weight by the caster. The upside is that a well designed parabolic rod will cast a very long line for its size and weight. I mostly don't feel the extra weight is worth carrying around, unless I'm going to be making long casts all day long. To each his own.
There will always be people who prefer a fast rod, and there are a few different approaches to that as well. If someone asks me about a fast rod, I always think of Lisle Dickerson, although there certainly were many others. Here is a Dickerson 8014, one version of his classic 8 foot 6 weight.



Note the very fast average slope, of almost .0034/inch. In a way, this is kind of an atypical taper from him, as I would normally expect to see a step down taper, meaning that the tip would be about .015 lighter than the butt at the ferrule station, which would require the use of a ferrule made to accommodate such a taper drop. The result on the rod action is to force most of the bending into the tip section, producing a much faster action that many prefer. You will also sometimes see a difference in the slope of each section at the ferrule, with the tip having a slower slope than the butt. Here is a look at another version of the 8014, that exhibits the dual slope method. My guess is that the original had a step down taper that got averaged out by the taper program, something you have to watch out for.



As the title indicates, this was a basic discussion. I have touched on length vs. weight, hollow building, weight of components, and the variety of other variables that make rod design so interesting. Then there is the ultimate variable, the caster. A wise old friend once told me that it is impossible to design a rod that everyone will like, no matter how good you think it is. It is equally impossible to produce a rod that everyone will hate, no matter how bad you think it is. I hope that this little exercise has given those just getting started with cane rods some basis to start figuring out what they do or do not like.