THEORY OF ROD ACTION:
WHAT IT MEANS TO YOU
AND A PLAN FOR THE ROD OF THE FUTURE
By A.J. McClane

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I SUPPOSE I will be called an unkind realist in wanting to standardize fishing tackle. After all, confusion stimulates research, many opponents will point out. But, like Grandpa said, "that's a flibbety-gee argument." If I sit down to write an article I want a typewriter with a standard keyboard, clean white paper and a heartless red pencil--you can't work without the tools of your trade. Things like hook sizes, gut diameters, spinner blades and fly rods should have specific qualities. In the case of the first two items a standard has been established--even if it isn't wholly logical. Spinner blades and spoon sizes are just a bunch of vagrant numbers. Picking up a trayful of spinners is like looking at the innards of a pin-ball machine. You find 00, 000, 6, 8 and then more blades with similar figures and they're all different sizes anyhow. In the case of fly rods you're really working in the dark, as the intangible quality of action is more difficult to measure with the eye.

Various types of rod fittings differ in weight and are misleading unless you understand the details of rod construction. Only the exact weight of an unmounted stick can supply accurate information. I have long felt that the weight of the unmounted sticks should be marked on every rod; very small differences in tip weight, for instance, make a vast difference in rod power. I have a 5-strip, 2-piece, 8-foot rod, which is labeled "4 ounces." The unmounted tip stick weighed 3/4-ounce, the raw butt 2 ounces, the ferrule approximately 100 grains. Yet I also have a 5 1/2 ounce rod of cheap manufacture marked "5 1/2 ounces" which barely equals the 4-ounce rod in power. The reel seat weighs 1 1/4 ounces to begin with and the tip (complete) weighs 5/8-ounce. You can see where all the "power" went, if we are to judge by total weight of a fly rod.

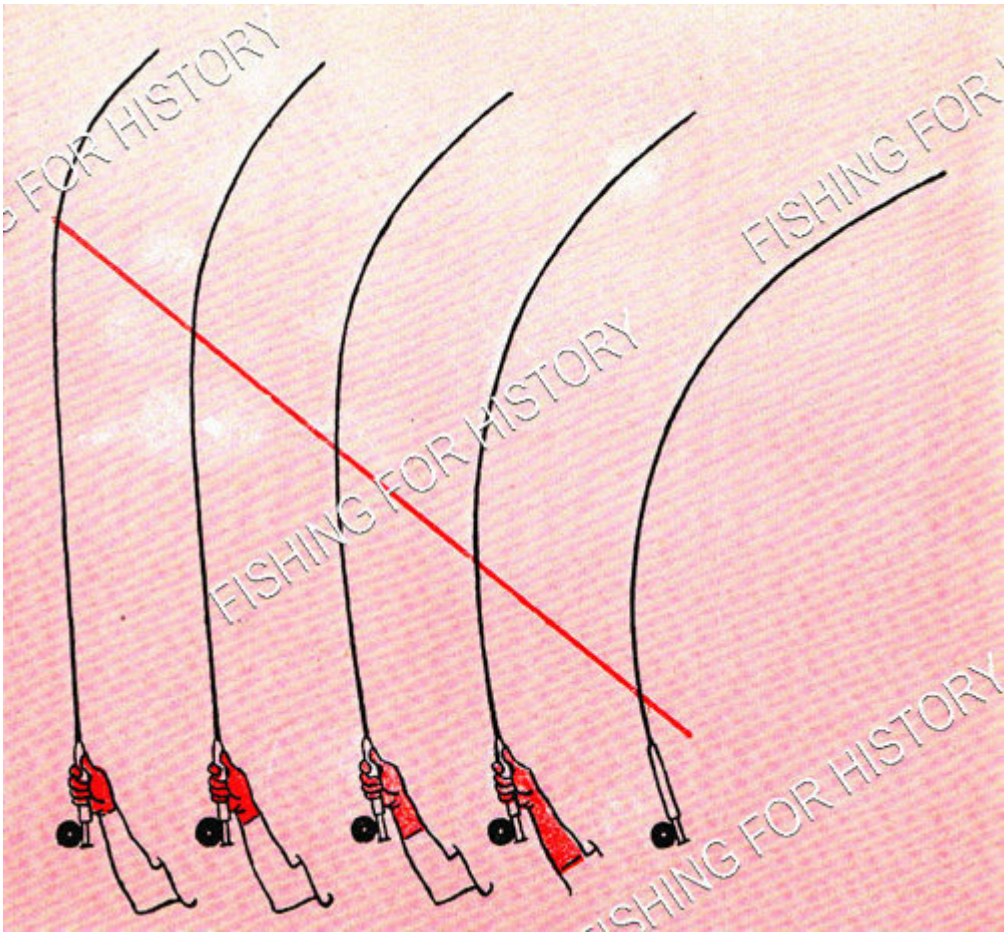

Figure 1a. The above illustrates the progressive loading point of a parabolic action. The corresponding effort applied by the angler is indicated by the amount of color on the arm. At the first stage the rod is loaded for ten feet--hand and full wrist effort; then to thirty, forty, and a maximum seventy-five feet for this rod. Effort at maximum will vary with the individual.

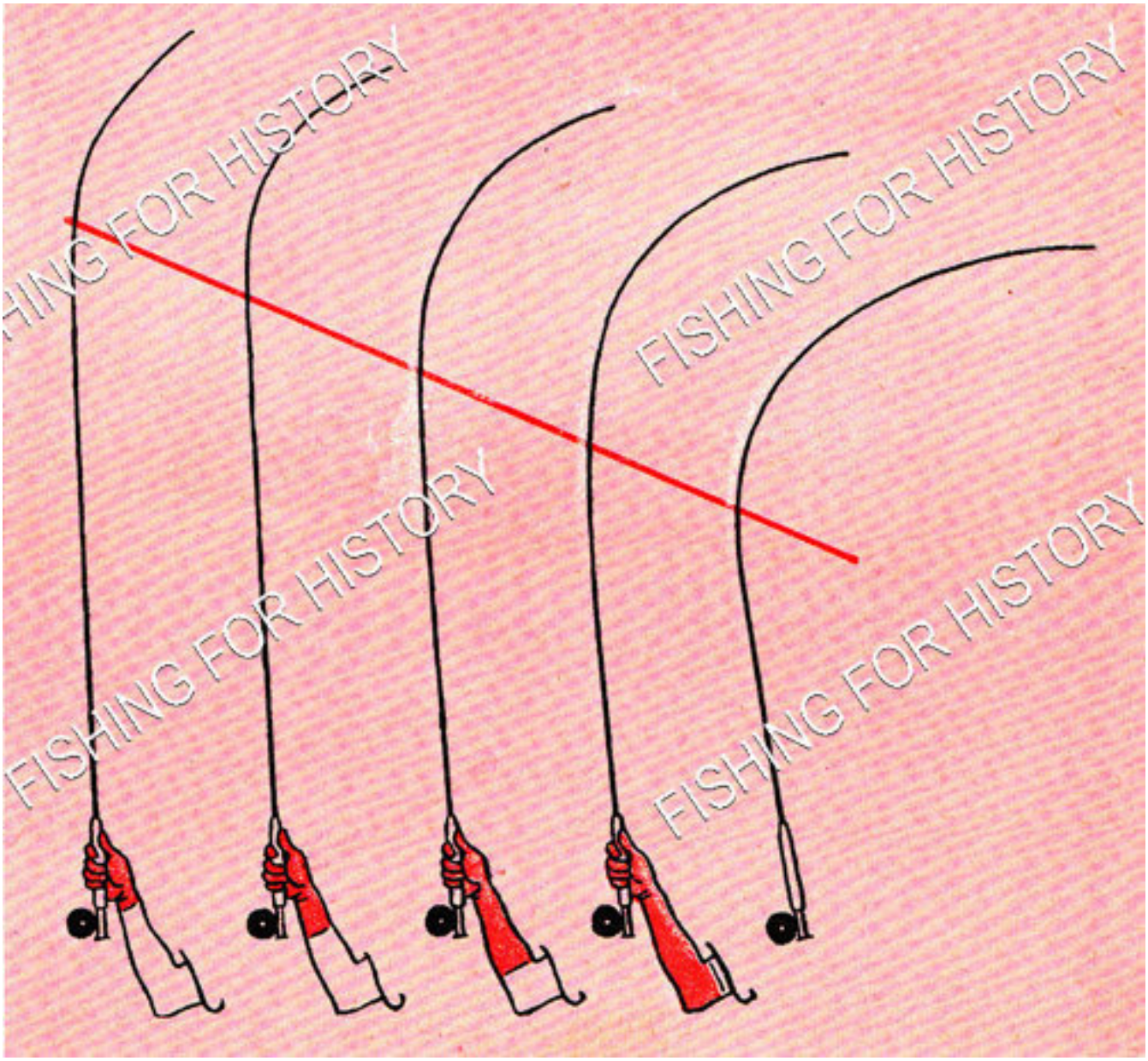

Figure 1b. This is the common tip action. Note the continuous high loading point. It is less progressive which is an advantage for short casts but reaches the maximum loading at fifty feet which precludes long casts. The effort required is proportionately greater at thirty and forty feet where the angler does most of his casting. Long casts are impossible to make because at the fifty foot maximum the butt shrugs the load off, putting stress on, the tip. This is the proper rod for a beginner nevertheless.

Hollow-built construction removes all the soft, pithy fiber of bamboo retaining only the hard outer enamel of the cane, which reduces rod weight considerably. The finest aged cane will never equal the power of heat-treated cane, and here again we have two power potentials that are not identified by rod weight alone. So the first thing the rod of the future should have is complete specifications marked on the butt, which can be simplified by a key such as "RS-1" (reel seat 1 ounce), "B-2" (butt 2 ounces), "TP-3/4" (tip 3/4 ounce). In addition it can be marked "HB" (hollowbuilt), if the rod is, and "TA" (tip action) or "PARA" (parabolic) or whatever the case might be. It would cost the manufacturer a few more cents to have the rods marked, and the expense could be added to the retail price. Then, and only then, would we have something to sink our teeth into.

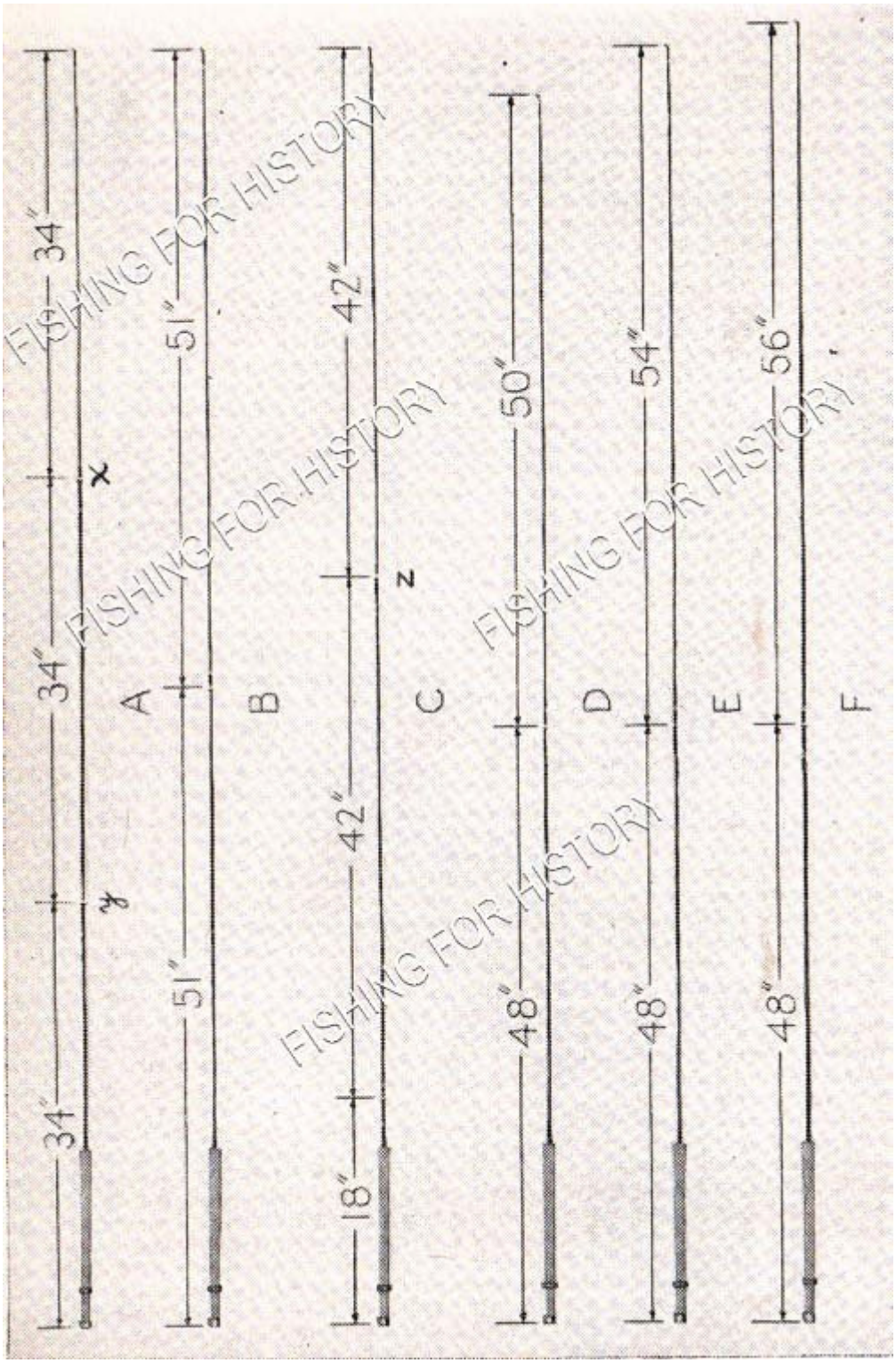

Figure 2: Rod A is a typical three-piece rod which breaks down into 34 inch sections for convenience in transportation. Rod B is a duplicate in two-piece construction, impractical because of its length. Rod C is the solution, a compromise in a 42-inch length retaining optimum efficiency (refer to text). Rods D, E and F are ideal two-piece designs with extra long tips. The longer tip becomes progressively more efficient because of the reduction in damping effect on rod action, and the ability to "load" with a light line.

The fact that rod action is a dynamic or moving capacity and not a static capacity makes spot checking your own rods, or a rod you intend to buy, a difficult job. About all you have to go

by is "feel." With experience this quality of the hand is developed. In this department last November I made passing mention of the fact that there are four major rod actions and numerous minor ones. I used the term "minor" in the sense that these are basically modifications of the major curves, and they imply a specialized use. This special application of an action is achieved by four methods: (1) slight changes in the diameter of the cane, or (2) heat treatment, or (3) slight change in profile taper, or more complex (4) changing the location of the ferrule.

Method (1) is an obvious and elastic approach which applies to all actions. The idea is for the builder to decide what he considers an ideal set of specifications, and by proportionately adding more or less wood to the master model, build a series of rods that can be labeled "salmon," "steelhead," "bass" or "trout" action. This is a negative approach in that the builder is giving the angler more or less wood to swing, depending on what he wants the rod for, and while it often works, the possibility of building a more suitable rod with *less* wood exists. A complete or soft action may be ideal for the trout angler, for instance, but to merely add more wood to make a steelhead rod out of the same action is completely off track.

Heat treatment (2) is the one approach least understood today, but it will play an important role in the rod of the future. As a modern example, we have the parabolic rod. *Normal* parabolics are made by heating the raw cane to a temperature of 360 degrees F., while *competition* parabolics are heated to 375 degrees F., both these maximum "cooking" points being reached after a specified period of pre-heating and gradual increase. The reason for more heat is to give the competition rod more speed. It's just like cooking a steak. A knowledge of how the beef reacts to heat is required of the chef, and so it is with bamboo--it can be served semi-raw, burnt, or cooked to perfection. The physical reaction of bamboo to heat involves many factors such as modulus of rupture, reduction of modulus in elasticity of bending, increase in stiffness with a change in vibration and damping, resistance to decay, etc. Naturally, the parabolic is not alone in being affected by heat treatment--but this action is to a great extent directly dependent on it.

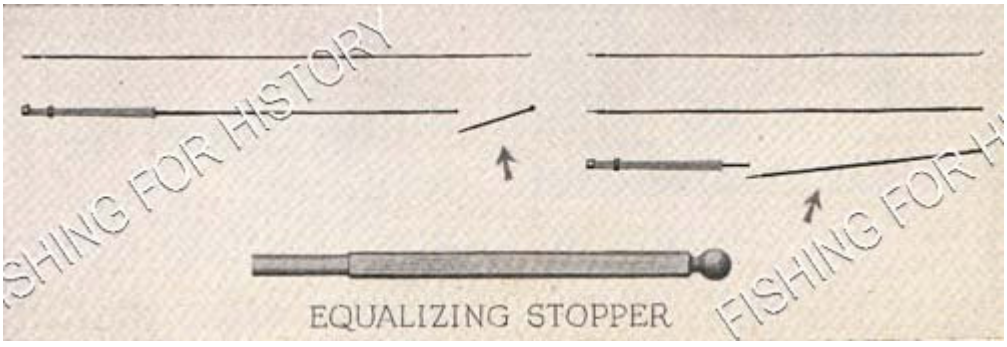

Figure 3. The transportation problem is solved for rods D, E and F, by the use of an equalizing stopper, a plug of cane that takes up the vacancy left by a short butt section. The angler can travel without fear of breakage.

In the case of (3) slight changes in profile taper, we can examine the tip action rod. A *normal* tip action has its maximum "loading point" or point of maximum stress under the pull of a line, located at, or several inches above the ferrule. A *competition* rod with the same action has its loading point from ten to twelve inches above the ferrule. This is achieved by more abrupt tapering of the tip section in a competition model.

The reason for a high loading point is because the platform caster wants a short, fast tip that

goes flick flick flick from one target to the next in a minimum of time and with split-second control of his back and forward cast. The problem of the accuracy caster is to "hold" the fly over the target, gradually lowering it to the water on successive casts. The danger of the fly dropping out of control is minimized if the action of the rod is high. You can readily understand this if you visualize a long mop handle with a fly rod tip on the end, the line traveling high, fast, and in tight loops. As a fishing rod this exaggerated taper would wear your arm down to a nub. It requires a fast, chopping motion to keep the fly going.

Many rods bought by anglers today have too fine a tip. I call these weapons 'snow-jobs" taken from the army expression which has no relation to rods or snow, but makes the point quite clear. A fine tip feels lively in the hand, as long as you remain in the store waving it around. But, by the same token, when the rod is loaded and full power applied, an excessive bend occurs which breaks up the smoothness of the action. You automatically compensate for this by throwing elbow and shoulder into the cast. To be more graphic, if you visualize this fine lip action as an inverted L, and your casting arm, which acts as an opposing force, as the letter L, and you put one under the other, you can see how little you are accomplishing. You have two levers, one working against the other. With most casters such a condition leads a broken rod tip--or having line, leader and fly pile up on the caster's neck. If the rod doesn't fall apart, the best you can hope for is to make your biceps equalize the speed of the line.

There is no sure cure for too fine a tip, but such a departure from normal would show up under the plan for standardization, as this portion of the rod would take an exaggerated bend on a deflection board. If you do own such a rod at present, you can help it along somewhat by wrapping and varnishing.

First spread a light coat of varnish over the upper 12 or 15 inches of the tip; next, wrap the tip carefully with light silk and flame the windings. Two more coats of varnish are then applied, the guides reset and then varnished overall. This reinforcing will prevent weakening of the cane fibers and add 75 per cent more life to the tip.

Method (4) is an innovation of Charles Ritz, inventor of the parabolic, and it bears some discussion at this point. It is generally conceded that long tips make the best rods. A three-piece rod never approaches delicate action of a two-piece rod. The three-piece does have an advantage in transportation, but whether this is a sound point or not is open to dispute. Let's take two sample rods for a moment--an 8 1/2-foot (102-inch) three-piece, and a standard 8 1/2-foot two-piece (Rod A and B Figure 2). The top ferrule of the three-piece is fitted 34 inches below tip-top guide. It weighs approximately 70 grains. On the two-stick rod, the ferrule is fitted 51 inches below the tip-top, or 17 inches lower than three-stick ferrule. Now the average portion of an HDG line weighs 30 grains *more* than the same portion of an HEG line. What do you conclude happens when you move 70 grams 17 inches closer to the tip-top guide? You are overloading the stick by a weight equivalent to more than two line sizes! Even though the two rods are made with identical amounts of wood, the three-stick rod becomes overloaded at ferrule x, and at ferrule y there is further stress. To correct this overloading, the taper of the rod has to be reinforced.

There is only one practical means of accomplishing this, and that is by making two sections of the three-piece rod 42 inches in length (Rod C) and adding an 18-inch butt section. Here again we have a 102-inch rod--a happy medium to be sure--but it will fit the regular 43-inch rod case which satisfies the needs of transportation and at the same time has 80 to 90 percent of the efficiency of the "ideal" two-stick rod. The extra short butt reinforces ferrule z and has no damping effect on the rod action.

Bearing in mind that long tips make the best rods, the two stick rod offers many possibilities by shortening the butt and lengthening the tip. Charles and I tested 37 different sticks last year and, after passing the best of the lot to various anglers, the two rods voted the finest were an 8-foot 2-inch (98-inch) with a 48-inch butt and 50-inch tip (Rod C), an 8 1/2-foot, (102-inch) with a 48-inch butt and a 54-inch tip (Rod D), and an 8-foot 8-inch (104-inch) with a 48-inch butt and a 56-inch tip (Rod E). The latter is one of the finest rods I've ever handled, it is extremely accurate and throws long leaders to perfection. These rods are not easy to transport, but their efficiency justifies their inconvenience. In order to prevent tip breakage when traveling, an equalizing stopper made from a piece of cane is plugged into the butt ferrule (Figure 3).

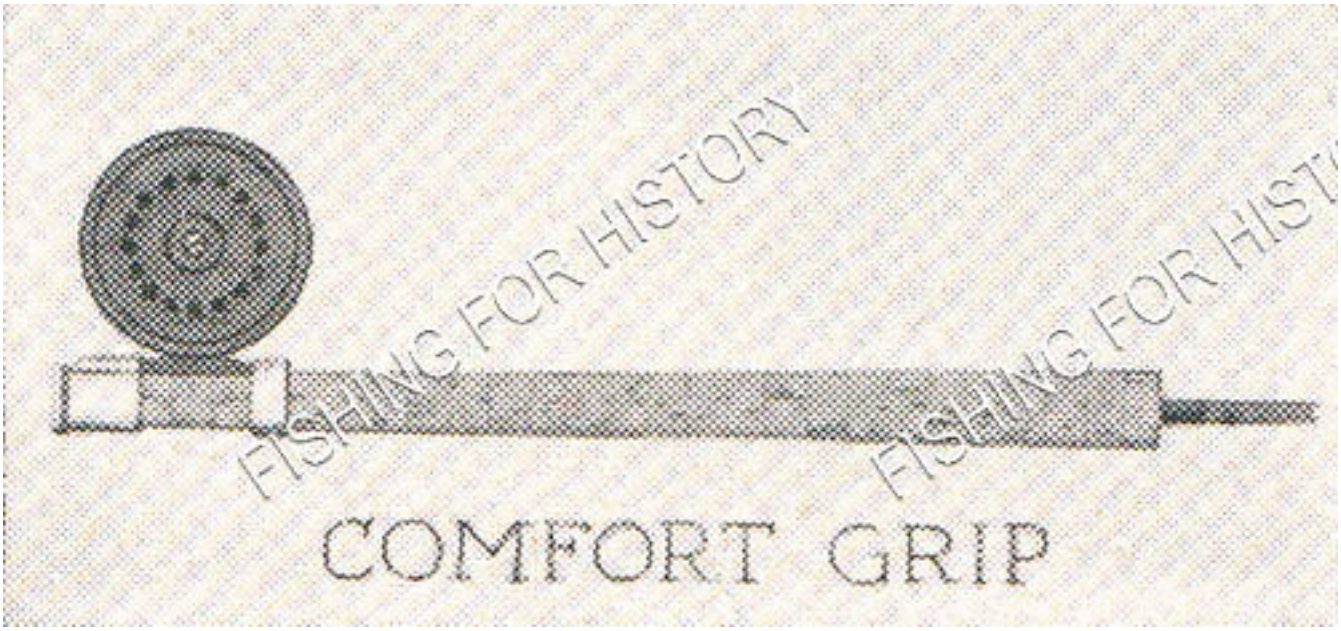

Figure 4: The comfort type rod grip is longer than most, yet it ranges considerably less in total weight because of the elimination of the reel seat. The shape aids in the angler's development of casting proficiency and is suited to any style.

My next wish for this "super-rod" is one born of many blisters. The average fellow comes home with a cramped paw that feels like the foot of a duck. He doesn't have a strong hand to begin with, and he finds it necessary to change his grip at least three times an hour; thumb on top, index finger on top, index finger on top and thumb on side. Often he finds it necessary to slide from some place around the reel seat to the top of the grip. A comfort-type grip (Figure 4), about 9 or 10 inches in length, permits any change the angler may care to make and the extra cork rings have a negative effect on rod weight. Th diameter of the reel seat insures steady seating of the reel and secure locking with a plain aluminum ring. Handles with screw locks and plastic reel seats may increase the weight of a rod up to 1 1/2 ounces.

Further application of action specialization through ferrule placement comes back to the tournament caster, and possibly the bass bug angler who wants a long rod to raise his line clean and high. In either case, a *higher* ferrule would give these casters a localized breaking point without the need for an exaggerated rod taper--*this means the elimination of a fine tip.* In terms of practical fishing (the bass angler) it means elimination of the necessity to *add more wood in a soft action rod* to achieve the proper action for a "bugging" rod. To digress for a moment, the fly rod of the future might possibly have a short butt and a long tip, or vice versa, or, if it's a three-piece rod, a short butt with a medium length mid-section and tip. I

don't believe an action can be perfectly developed in two pieces of cane of equal length, without great expense in time and effort to the builder.

I have tried to depict the two actions (Figure 1) that would be most suitable for two anglers--the beginner and the expert--and illustrate the reasons for my choice. Accepting the fact that the beginner is not going to cast over 35 or 40 feet in his first year's work, or perhaps I had better say cast 30 and shoot 10, the tip action is by far the best tool. This action has a high loading point to maximum which means that for medium-range casts the rod is going to do most of the work. Theoretically, the "loop" of the back and forward cast will stay within bounds or in a plane above the ferrule. This means less chance of a graveled back cast. As long as the beginner doesn't try to overload the rod by tossing long shots of which the rod is not capable, everything comes easy. The danger point in his career is when he suddenly finds he *can* cast. Below the rod's 50-foot loading point (or beyond the angler's 50-foot range), he is trying to flex a stiff butt section which shrugs off the working load no matter how hard he pulls and pushes. I have arbitrarily set 50 feet as a maximum load. In the general run of tip action rods, the maximum bend occurs with a line load ranging from 40 to 50 feet. If the beginner suddenly finds himself holding this much line up, then it's time to go to a parabolic.

The tip action is without a doubt the most common cause for an advanced beginner's writing: "Dear Editor, I own a so-and-so rod that weighs five ounces and I can't cast more than thirty-five feet with it--would you recommend a heavier line?" And all the sage can honestly answer is that "it's worth a try." This is an unfortunate situation because the angler is still floundering around years later. If for no other reason, standardization of rod actions would help immeasurably. While talking with a manufacturer the other day, he pointed out that his experience indicated that few anglers are interested in their rods to the extent that critical factors of workmanship are a consideration when buying. This I doubt.

In a practical sense, the object of the angler should be to choose his rod and the desired action not by how far it casts, but how efficient the rod is for the work he does. The maximum performance of the rod should be at the distance which you normally cast. I like tip action rods, in fact I own quite a number of them. The advantages they offer a tyro are just as valuable to me. What the tip action lacks in push when a long cast is needed, I try to make up for by stalking my quarry. For small, eastern streams, where short casts are the rule, a soft tip action, almost verging on what has been labeled "wet fly" or complete action, is very popular. The reason is that a lighter line can be used with the softer rod, whereas the normal or stiffer tip requires a heavier line to work the rod. The only way out--so that you can have a powerful tip action that will work with a light line--is to lower the ferrule. The disadvantage of tip action rods is that when you are faced with low water conditions, strong head winds, or a new river that turned out to be just a little bigger than you expected--that extra power just doesn't exist. It's a ruthless merry-go-round.

A parabolic rod does not feel good in the hand when it is waggled back and forth without benefit of reel and line. In fact, it doesn't feel good until you have at least twenty feet of line in the air. This would not be of any help to a beginning angler, yet it is by all odds the ideal rod. To clear up a few hazy points I want to first point out that the curve profile of a parabolic does not resemble a parabola. Under the progression of power (or varying forces of casting) a *series* of parabola-like curves occur progressively--hence the common name "progressive action." This is the reason why it appeals to the expert caster--because of the progressive loading point, the rod is flexed for the distance you have to cast and not subject to overloading as it would be in a tip action. The disadvantage of the parabolic is in the need for perfect left-hand line control, as it tends to throw a wide loop unless the line is "coaxed" in a fashion

known as the double-line haul. The maximum loading point of the normal parabolic is 75 feet, which is a big advantage over a tip action rod of the same dimensions.

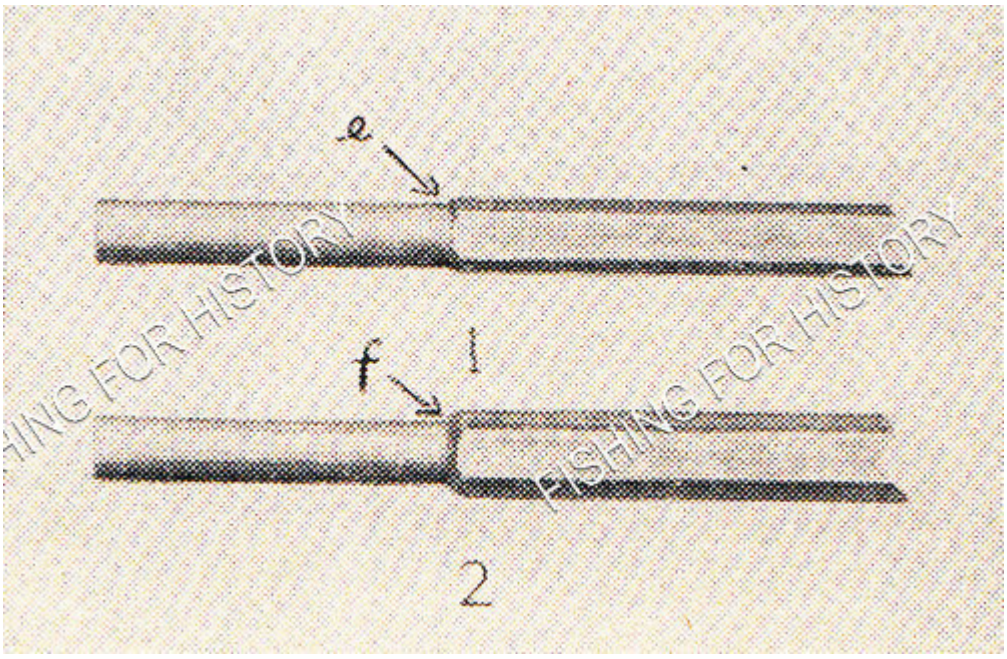

Figure 5: Here are the end diameters of two tip sticks rounded to fit the butt ferrule. No. 1 is reduced very slightly at point c for the Parabolic Safety Ferrule, due to the fact that the tip stick is .020 smaller than the butt diameter. No. 2 rounded to fit an orthodox ferrule is more deeply cut at point f, because tip and butt end diameters are the same.

In the matter of ferrules, I have not as yet had the opportunity to thoroughly test the Feierabend type, but I have tested the Parabolic Safety Ferrule which is quite different from orthodox types. This ferrule is really a by-product of the parabolic rod. There is a .020 step-down between the upper end of the butt section, and the lower end of the tip section of a parabolic rod. Normally in rods of different action these diameters would be identical. The object of the step-down, however, is to get maximum strength from the cane (Figure 5). If the end diameters of two sticks are the same, the tip would have to be rounded deeply to fit the ferrule at point f thus removing the outside fiber of the cane which would considerably weaken the shoulder of the ferrule. If, however, the tip section is smaller, the process of "rounding" becomes a minor operation (point e) keeping most of the power fibers and requiring just a slight scraping of the corners. The ferrule, of course, takes up the slack .020 to make a perfect union. In theory some may feel that this would spoil the action of the rod, but in practice, it has proven very sound. Rod building is a very contradictory business throughout.