

Making a Flight Bow

Few flight bows are commercially produced, and the construction of his own record-making bow is the dream of many an ambitious archer



The Yeoman flight bow at full draw. Angle shown is approximately correct one for maximum flight.

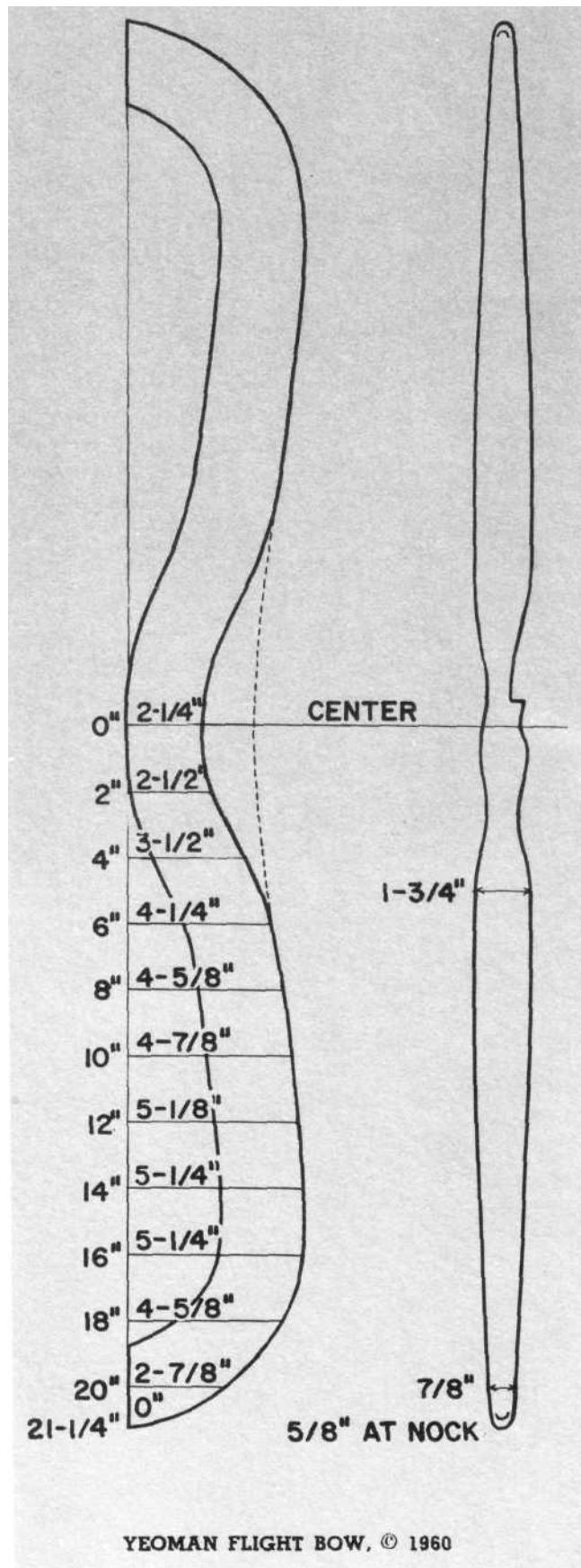
THE flight bow is the ultimate in the bowyer's field. Many flight bows are made, shot once and then abandoned. Or, they may shatter during that single use and go into discard that way. Just the same, flight bows serve a valid purpose in the archers' world, for they are somewhat like the Formula cars in international racing—paving the way for future developments based on their performance.

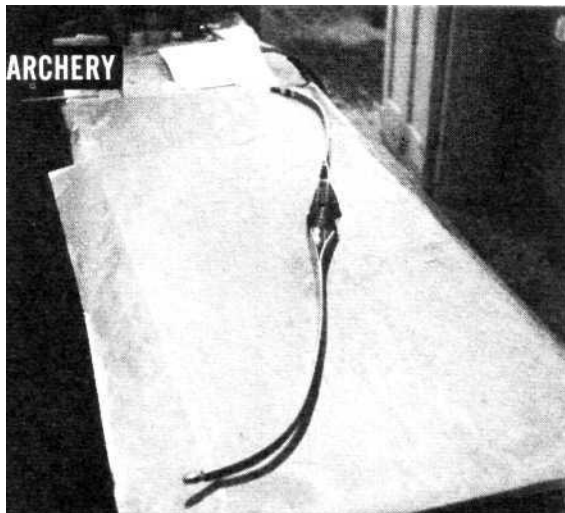
To make a record-setting flight bow is the aim and dream of many a bowyer—a goal all too seldom realized. Because flight bows are the final word in bowery they are seldom, if ever, commercially produced. You just cannot go into your nearest tackle shop and buy a flight bow. You may be able to have one made for you, if you're lucky, but essentially the flight bow is a personal thing. It conforms to you and to your ideas. It may be the result of months of planning and days of work and when once it's finished, you will be faced with the decision as to whether or not you'll overdraw just once, in the big gamble which may—or may not—pay off.

For these reasons, any plans for a flight bow must be offered somewhat diffidently. They are the end product of someone else's thinking—not yours—and they may not embody the ideas and principles which you, as a bowyer, feel are necessary for success. However, the bow which resulted from these particular plans is a lovely thing, light in the hand, sweet in performance with no harshness on the hand. Surprisingly enough, there seems to be no drastic stacking up at the end of the draw and there is comparatively little pinch. However, since all good flight shooting today is done by means of the hook, the matter of finger-pinch is relatively unimportant.

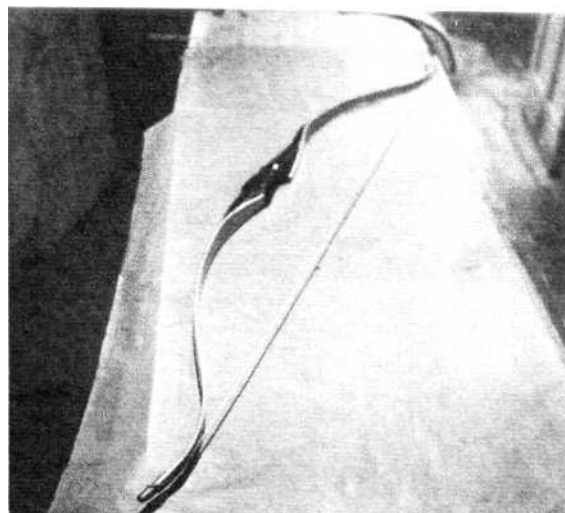
The plans have been designed by Frank Bilson, one of England's foremost archers, and in his capacity as head of the Yeoman Bow Company, a liveryman of the Worshipful Company of Bowyers. These then are the plans and specifications of the Yeoman Flight Bow (Copyright 1960)

Many flight bows, following the precedent established by the Turkish and Persian bowyers, carry the big *siyahs*, or ears, which impart additional impetus and cast. Now *siyahs* were developed long before our new synthetics and it is our contention that using modern fiberglass, it is no longer necessary to incorporate them in flight bow design. Since the *siyah* is not an integral part of the limb-arcs, it is slow moving in relationship to the bow itself. Thus, with the materials available today, i.e. those





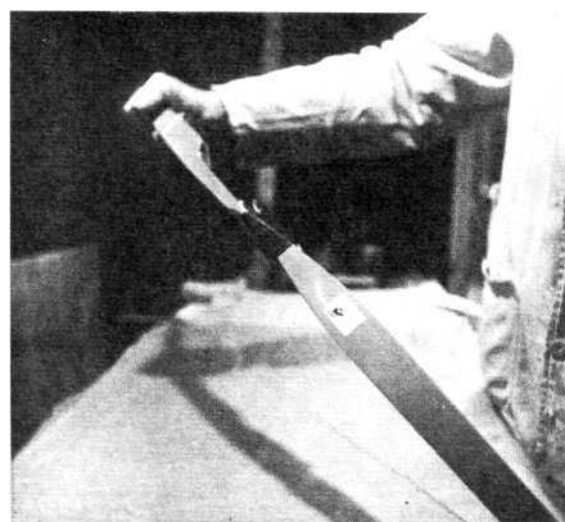
Elongated view of the bow shows powerful curves which impart cast; retain smoothness in shooting.



Here the bow is braced. Comparison shows way in which power is converted within bow when braced.

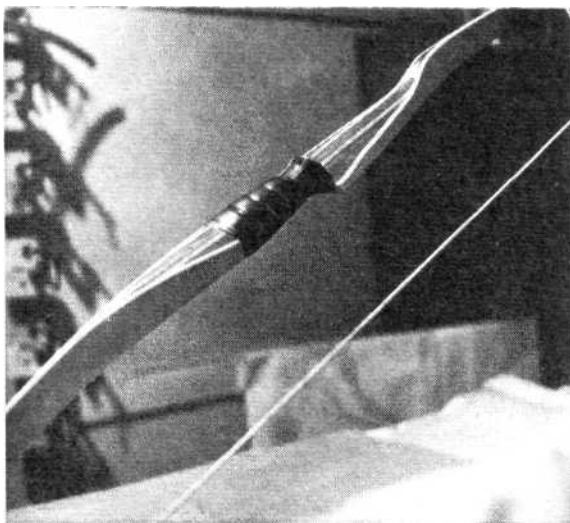


Ornamental nock beautifies bow. Thin strips of plastic strengthen any inherent weakness in bow.

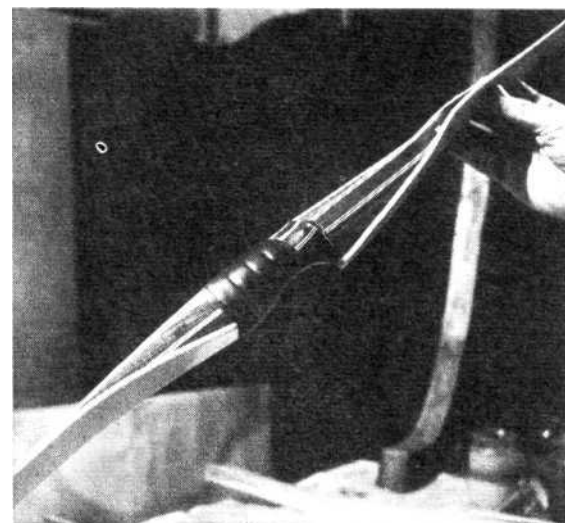


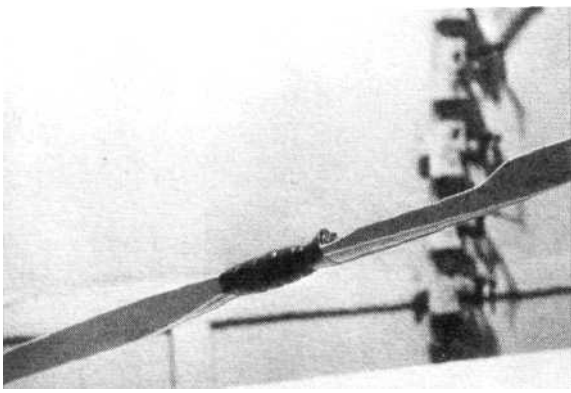
View of the braced bow, showing a part of upper limb cut away to form "semi-center shot" section.

With center-shot device, force of the string is exerted down center of bow with greatest effect.



This is a view of the finished handle of a good target bow. Also shown is laminated handle riser.





The "feather" arrow rest is seen above. This is great aid to efficient use of plastic fletchings.



After taking laminated bow from clamps, excess glue must then be removed from handle and limbs.

which inherently do the work formerly given to the siyah, the addition of the ears results in a lowered performance.

Dr. Paul Klopsteg has advanced the theory that the ideal bow for cast would be based on the principle of the uncoiling arc. These plans are adaptations of his theory using fiberglass both for the backing and the facing in the two limbs.

MATERIALS

For a 48" bow you will need the following materials:

Four (4) Maple Laminations 24-1/2" x 1-7/8" The taper on these should run from .68 thousandths of an inch down to .45. An additional .15 thousandths will give you, in your finished bow, an increased draw weight of approximately 20 pounds. Thereafter the draw weight increase is partially nullified by the mass increase.

One (1) Handle Riser. This should be of any good hardwood, with walnut being a good choice. 8-1/2" in length, the riser tapers at both ends.

Four (4) Fiberglass Strips 24-1/4" x 1-7/8" Personally I prefer Bo-tuff, but any similar material can be used. Get strips which measure .40 thousandths in thickness.

Twelve (12) C-clamps. Glue. Urac-185 by preference. One (1) Former. See instructions which follow. Rubber wrapping. Thin plywood battens. Grease-proof paper.

INSTRUCTIONS

The former is cut according to the scale shown. Your material is any block of sufficient length and thickness, free from knots and twists. The basing line, along which the inch-stations are located, should be perfectly flat. If a block of sufficient thickness is not available, you can make one by gluing sheets of plywood together

in order to get the right dimension. The width must be a minimum 1-3/4" and it may be advisable to have it an inch wider. Since this is a one-step glue-up, you can use the spare width to place brads, in order to hold the materials in position.

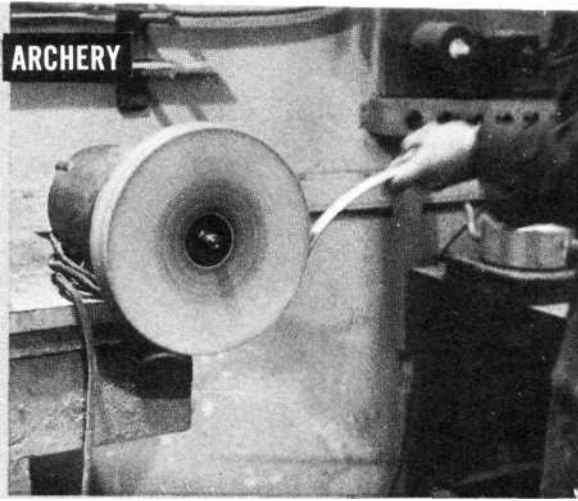
When the former is cut, you can rout out the excess material along the base line so that the jig follows the working area. This is not essential, but unless you are using extra large C-clamps, it will facilitate the clamping. Be sure that the working surface is absolutely flat and free from splintering.

Cover the former with two layers of your grease-proof paper, holding it in position with Scotch tape or thumb tacks. This will keep the bow from sticking to the jig with any expressed glue.

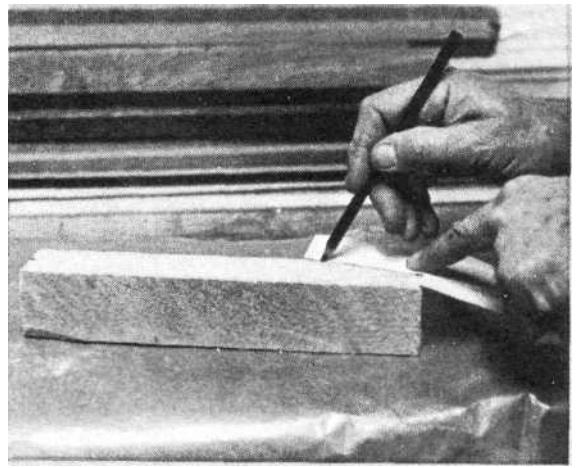
Prepare the fiberglass and the laminations carefully. The pair of lams which will be on the back of the bow will have a 1/2" overlap at the center and accordingly must be feathered or chamfered to form a smooth overlay. Set up your series in a dry run, clamping as you go so that when you are ready to glue you will know what you are doing.

With the backing down and the first pair of lams, you are ready to set the handle riser. Since this block will come above the line of the bow belly the lams and glass will not meet over it and they must be feathered down to lie as smoothly as possible.

Having finished your dry run, you will now do your actual gluing up. There are six surfaces to be covered—the insides of the glass and both sides of the laminations. Make sure that with the latter the taper runs along the outside of the pairs and that the flat sides are together. If you are using Urac-185, work carefully in a room with as low a temperature as you can manage.



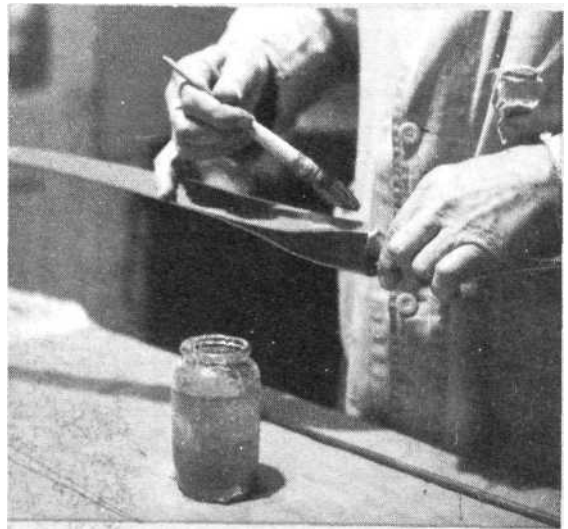
A wheel with lamb's wool buffer is used here to apply final glossy finish to the nock of the bow.



French curve would come in handy to mark curvature of handle riser, but other ways can be used.

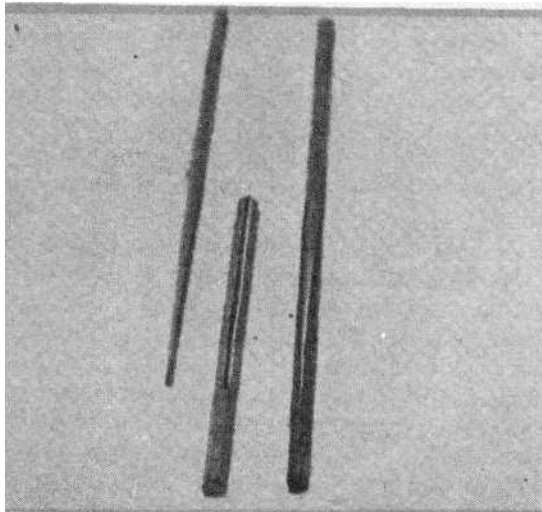


If French curves are unavailable then cut your own patterns in reverse and use them for marking.

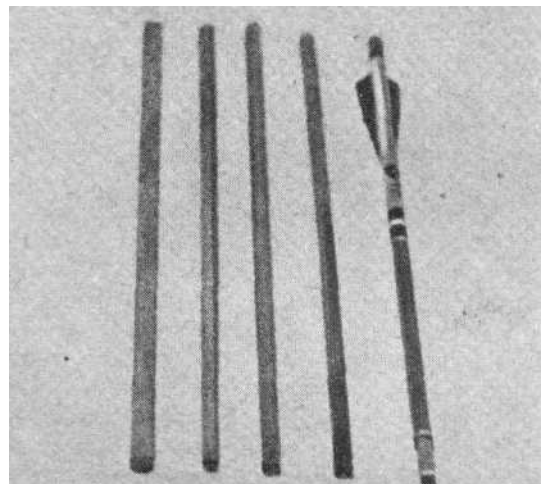


Finish the bow with series of coats of plastic-based elasticized varnish, to protect from wear.

Shaft (left) and footing (center) are used when you decide to make your own target arrow (right).



Successive stages show how the gradual rounding of the shaft is done with planes and sandpaper.



Being a heat-curing adhesive, the lower room temperature will give you more time to finish the work.

Once your glue is applied, thoroughly but not too thickly, cover your glass-lamination sandwich with more grease-proof paper. Over this lay a strip of rubber wrapping, 2" wide and running slightly longer than your bow. Now take your battens and lay them along the surface, in the place of the more conventional pressure blocks.

Apply your clamps, working out along both limbs from the center and putting minimum pressure on at first. When all the clamps are in place go back to the handle and increase the pressure on each in turn. Don't attempt to tighten them beyond hand pressure since this will glue-starve your joinings.

Now set your bow aside in a warm, dry place. The ideal temperature is just above 80° and it should be maintained for at least five days. By that time the glue should have made a specific weld, but remember that Urac and other urea-based adhesives make a firmer bond as times passes.

The limbs of the bow should now be reduced according to the profile given here. The best method is to cut with a hack saw, the blade having been turned flat so as to give you a firm guide as you cut. Make the cut 1/16 wider than the profile and finish by rounding both back and face toward the core. During this process you should tiller the bow, as you would any other, remembering that if your laminations have been tapered correctly and

your gluing-up done with equal pressures down along both limbs, the curves should need very little fixing.

Lay out the arrow rest on your handle riser, remembering that the view given here is from the back of the bow. Remove the wood with a draw shave and finish off with a file. The handle can then be covered with leather.

Nocks are cut with a file, rounding them in carefully so as to avoid any friction on the string. At the throat of the nocks, bring a groove down the back of the re-curve so that the string will lie there when the bow is braced. Due to the working of these curves the string will not entirely clear them until the bow is nearly at full draw. It is vitally important that these nocks are exactly in the center of the re-curves, since to off-center them in any way will cause twist and may easily ruin your bow.

This finished bow is designed to take a twenty-four inch arrow and will give you just about 45 pounds at full draw. You may want to overdraw it, to gain that extra few yards, but it is not a course that can be recommended. Far better to practice until you are sure that you are getting the maximum flight from your arrow before you experiment with overdrawing. A snapping or shattering bow is not only dangerous but it represents the waste of all your time and energy spent in making it.

Psychologically, too, careful handling is greatly to your advantage, because getting gradually used to your bow will imbue you with the confidence you need. •

Now comes the fined part of making your arrow. It is finished by a careful sanding of the shaft. It calls for meticulous and time-consuming work, but it's still a pleasure to many archers who desire a set of matched arrows.