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OLD MASTERS

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H. S. TAYLOR
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G. P. BRYANT
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JILES
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McMEEN
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RICHARDSON
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PALMER
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W. THOMPSON
1913

ARCHERY

by

ROBERT P. ELMER, M. D.

FORMERLY CHAMPION ARCHER
OF THE UNITED STATES

THE PENN PUBLISHING
COMPANY PHILADELPHIA
1926

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ARCHERY

I

HISTORY OF THE BOW

THE bow and fire have been probably the greatest factors in helping man to rise above the brutes and to treat of the history of either, in one chapter, is impossible.

It has been said that the bow exists in every country except Australia but, even there, a tiny weapon has been discovered which is scarcely more than a foot long and shoots a little poisoned arrow which the native black men carry in their hair.

Thus, if all countries have the bow, such a general dissemination means a very ancient origin and, therefore, let us try to find where that might be, so that we can have a starting point for our story.

At once the word "ancient" sends our minds back to Greece, or Assyria, or Egypt, and there we rest in the thought that seven thousand years is enough for anybody. Yet those countries were already in a stage of highly advanced civilization, a state of culture which, in some respects, was even superior to our own. What then, of the untold ages that preceded such periods of brilliancy, when men were slowly evolving from their almost simian forms to the kind of people we know?

Did the Rhodesian man, that human ape, or the Pithecanthropus erectus, whose jaw-bone was found in a Javan river beach, or the Heidelberg man, whose fossilized skull was dug out from under sixty-one feet of earth that had formed over him, know the twang of the bowstring and the whiz of the shaft? No, they did not.

Those were the earliest beginnings of the human race and

their remains are very scanty, but after them came another set of men in Europe, for I cannot say much about Asia and Africa, who did leave a great deal of evidence about themselves because of the fact that they chipped flint stone into tools and weapons and, as the rich men of that time could not take their wealth to Heaven any more than they can now, they left them lying about where we can still pick them up.

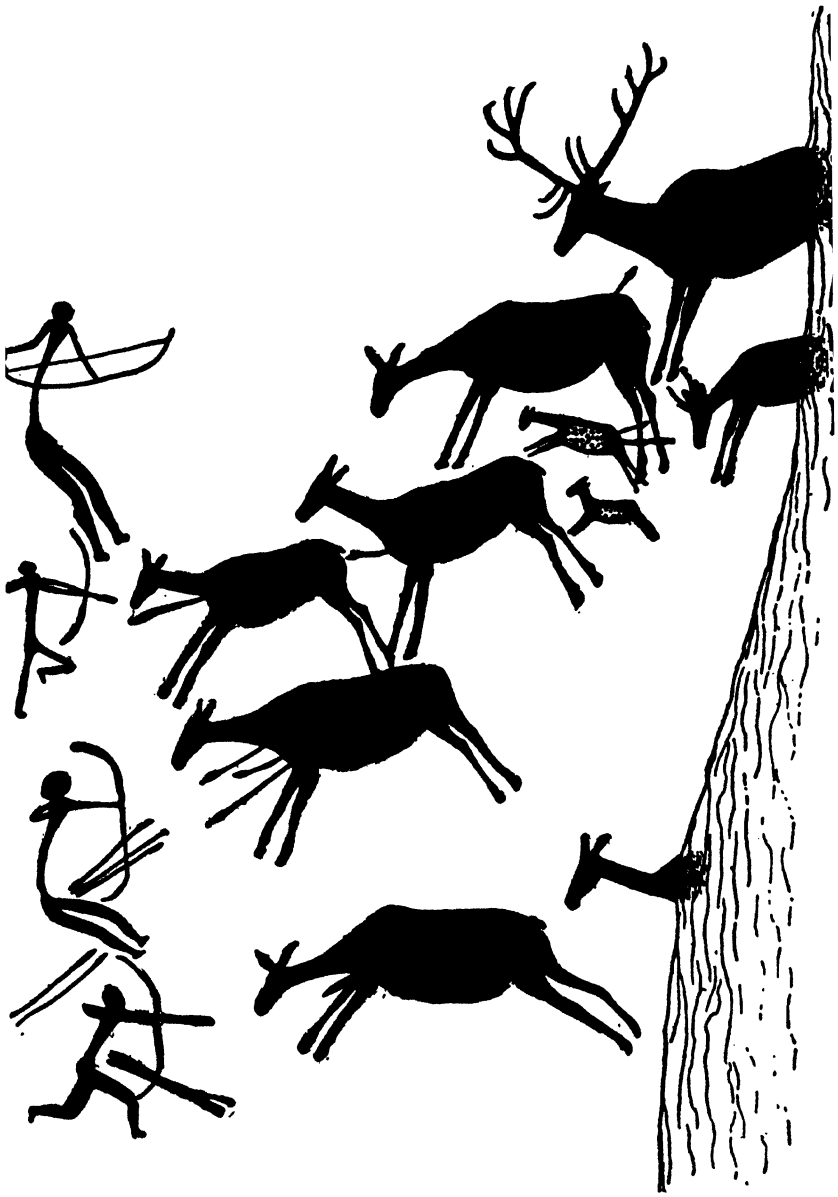
These early people are called Paleolithic, which means "old stone" because they had not learned the art of rubbing stone into smooth shapes, a later development which gave to its period and peoples the name Neolithic, or "new stone." They chipped the stone, mostly flint, into all kinds of things for which it was adapted: scrapers for hides, borers for making holes, engraving tools for cutting wood and bones, spear heads and above all, for our purpose, arrow-heads.

Now, not all of those primitive men made arrow-heads. There were many races in the world then, as there are now, and some were more advanced than others both physically and mentally. In fact we can see by the stratification of remains in some of the old caverns that people of lower intelligence were continually being ousted from their habitations and were replaced by races of a higher type.

So, skipping over the names which modern anthropologists have elected to affix to those peoples who were too stupid to shoot, let us announce that, so far as we can tell, the first men to use arrows with flint heads were of the Aurignacian race who lived at least twenty-five thousand years ago.

To appreciate what twenty-five thousand years mean it may help us to consider that during that time the Mediterranean probably closed up between Italy and Africa and opened again.

It is also but fair to assume that stone arrow-heads were a comparatively late development. Without doubt merely sharpening the stick was the first attempt at an arrow point and an artificial, detachable pile of a hard substance like bone or stone must have come very much later. Who knows but



THE STAG HUNT.—A mural painting in dark red (restored) in the "Cueva de los Caballos," near Albocacer, Castellon.—*Courtesy of the Hispanic Society of America and the Yale University Press.*

that the first maker of a stone head was not farther removed from the first archer than from us?

While formerly the only sources of information were the arrow-heads themselves, during the last three decades archæologists have brought to light—what would have seemed incredibly beyond the bounds of either hope or reason—vivid, striking, artistic pictures of the very archers, with bows and arrows in their hands. It is on the walls of deep caverns in the southwestern part of France and in Spain that these wonderful drawings occur and that they have remained so fresh and perfect through the ages is one of the world's great wonders.

The best are from caves in the province of Castellon, a mountainous district about half-way down the Mediterranean coast of Spain. Some are even so carefully drawn that we may hazard conjectures as to the kind of weapons that were used.

To understand these drawings we must speculate on the reasons for which they were made. In the first place they are either in caves, or overhanging rock shelters which by their positions on the steep sides of mountains are difficult of access, or if the cavern is easily reached, as in France, they are then carved in the very deepest recesses that a man can find, even in places that are hardly more than cracks. If they were for ornamental use they would not be hidden like that but would be in the big chambers of the caves, where they could be admired. Furthermore the drawings are always of animals that were hunted for food, even a swarm of bees being included, or in a few cases of what are presumably human enemies. Quite often the animals show arrows sticking in their sides and there is at least one lively picture of a battle between seven archers. A study of these facts leads one to believe that these pictures were religious in their nature. Caves have been associated with mystery and religious worship in all historical ages, and classic instances like the Delphian Oracle and the Witch of Endor are familiar to everyone. It is believed that

when some tribe, or influential individuals wished to petition Divine assistance to their hunting or warfare, they employed the priests, who were doubtless as sincere and earnest in their faith as any who fill our pulpits to-day, to carve an effigy of their quarry as deep in the bowels of Mother Earth as they could penetrate, where it could be seen only by the eyes of their god and his human servants, and where their supplications for his aid could not be heard by the profane.

Thus construed, it is natural that the pictures should show an augmentation of those parts of the body of the supplicant which were most to be needed in the great effort about to be made.

At least on no other grounds can we explain the enormous relative size of the legs of these archers, their wasp-like waists and fairly well-developed chests. The assumption seems safe that they were men who could run with enough speed and endurance to catch their game, or at least follow it successfully after they had wounded it with arrows.

If we may believe the word of several well-known naturalists and army officers, many Indians in Northwestern Mexico can run like that now. Track athletics have been followed by me closely for over thirty years and I fully understand what fleetness of foot means. These instances are given without comment.

"The Seris stole thousands of horses. They would break the animal's neck and with rocks, hands and teeth tear the flesh, pile great masses of it on their backs and run so swiftly that vaqueros on the best horses could not catch them. They have been known to run down horses, coyotes, deer and other game. Magee saw a number of Seri boys catch a flying bird by the tail after the bird was given a start. Señor Encinas saw a Seri run a deer down. With marvellous speed he continually headed the deer off until finally he seized it and carried it to the corral. A horse was whipped in a corral and then suddenly released. A Seri runner dashed after it, leaped

to its withers and, with one hand on the jaw and the other in its mane bore it down and broke its neck. A Seri squaw ran forty-five miles between dusk and sunrise, carrying a child to a doctor and on the way ran down a jack-rabbit to pay him with." And so on.

Absolutely trustworthy confirmation of this possibility was afforded by Dr. Pope in that portion of his story of African adventure which appeared in the Sunday newspapers of September 27th, 1925. Quoting his words:

"My archer friends (a band of Wakoma natives) tried long-distance shooting and tried creeping up dougas to get closer to game, and tried running after game, either to intercept its mad rush to escape or to run it down and shoot at close quarters.

"This latter method interested me particularly. It was a surprising thing to see two natives take after a Thompson's gazelle, one of the fleetest animals alive, and run it down. They circled and cut off and jogged along where the gazelle wore himself out with wild racing. In less than one hour they had the gazelle by the hind leg, when she sought cover in the long grass."

Allowing for the distortion of the human body, which in some cases is not so great as to be confusing, and allowing the same stature for the men of those times as we possess at present, which their skeletal remains corroborate, their bows seem to have been of just about the same length as the English longbow which we all use, that is, about six feet or a little less according to the height of the archer.

These bows indicate that considerable progress had been made in the bowyers' art. They are not merely broomsticks, which would bend in an arc, nor are they stronger at one end than at the other, as a natural branch will bend. Undoubtedly they are stiff in the hand and whip-ended, as are the native African bows of to-day.

The arrows appear rather long, I should judge at least

thirty inches, and their feathers are clearly indicated, although their points are not. Perhaps they were still used in the primitive form of sharpened sticks. It is true that some pictures of bisons in the French caves show barbed points sticking in their sides, which the archæologists have called arrows, but they may have been spears or heavy darts, or arrows of both kinds may have been used (which is most probable), or it may even be that styles were different in France and Spain.

These gentlemen of the hunt also shot in a form that would have stood the test of scrutiny on any modern range, with the bow-arm straight, the shoulder toward the mark, the elbow of the drawing arm high and free from the body and the forearm straight with the shaft.

Almost all of these mural pictures were made by first engraving a rather shallow outline of the figure in the rock and then either filling in the area with color or not, but at Laussel, in southern France, is a relief of a man cut so deep and round that it can be classed as true sculpture. Like the Venus of Milo, which classical scholars tell us is really a Minerva, who formerly held a shield against her knee, this man has both arms broken off, yet the stumps are there and their attitude is so unmistakably that of the act of shooting a bow that all who are competent to judge have agreed that this, the oldest statue of a human figure in the world, is that of an archer.

Whether these men of the old stone age are represented by descendants in modern Europe is a problem on which authorities do not wholly agree. Some think that the Irishmen from the western coast, of the type caricatured on the stage and in the comic prints, represent the last vestige of such a prehistoric race, and there are still faces to be seen in southern France with skull shapes similar to those found as fossils, but, even if so, it cannot be proved that those races perpetuated the bow and arrow. As a whole they seem to have disappeared, possibly wiped out, as savage races are to-day, by new and strange diseases to which their conquerors had become im-

mune. At any rate it is certain that not many millennia before Christ Europe was overrun with new races from farther east, probably from the vast plains of what is now Russia, who were men such as we are ourselves. That they too used the bow is abundantly proven, because vast quantities of flint arrow-heads have been found where they lived and practically on the surface of the ground.

It takes about a century for the earth to form above an object to the depth of an inch, unless there be some unusual reason for a greater deposit, and in this way the comparatively recent date of these weapons may be determined with general accuracy. However, by this time civilizations were beginning to appear and definite history to be made.

We may safely say that the first bows were of wood and of simple construction, a form that with Europeans and most tribes of savages has persisted till to-day. However, there is another kind of bow that is very ancient, is still used in Asia, and in many respects is the most efficient and perfect type ever devised. I refer, as all archers will at once surmise, to the composite bow made of wood, horn and sinew, short and powerful, and, when unstrung, so reflexed that it takes the shape of the letter *C*. Elsewhere I will treat of it more technically.

It is the bow which has sent its unerring shafts straight to the hearts of all of us married people and perhaps has even taken a shot at some of you youths and maidens, the bow of Don Cupid. This curling little weapon is nothing else than the composite bow when it is strung, when the short, powerful arms are bent sharply back till what looked like the back has become the belly and the end-pieces stand up and down like the ends of a wooden bow. This is the bow of the Greeks, the weapon with which Ulysses shot down his wife's admirers as they tried to hide behind the great table which they raised up for a shield.

Like everything the Greeks touched it became shaped in beauty, at least when strung, and in that form has persisted in

decorative art till the present time. Recently I talked on archery at a luncheon of the Penn Athletic Club, in Philadelphia, immediately following the great comedian, Mr. Fred Stone. To catch the attention of the audience with the first sentence I pointed out the fact that the Cupid's bows with which the walls were adorned all had loose strings flopping about them and then I lifted up a Korean bow to show them what would really happen if the cord were unnocked.

Not long ago I noticed what seems to me a good joke on a man dead since the classic days of Greece. In the article on Greek art in the Britannica there is a picture of the "Vase of Orvieto," on which the archers are shown in the act of shooting with their reflex bows held backward. So, as with artists of all ages, that master craftsman recorded his ignorance of subjects outside of his own sphere.

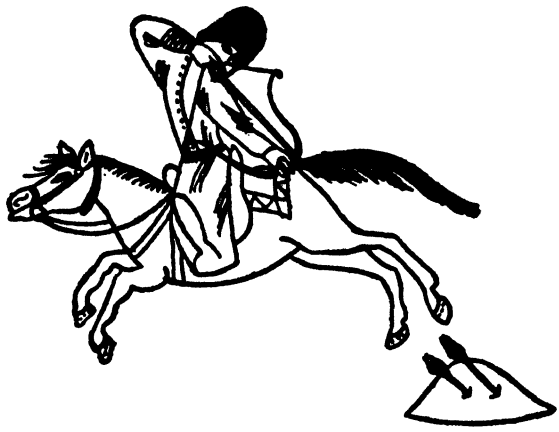
It was probably through the medium of the Greeks and the use of Eastern auxiliaries in the Roman army that the reflex bow became known in Italy. I think it was never very popular, but from the frequency with which it was drawn by Italian artists, even in the Renaissance, it must have been the only kind of bow they were familiar with, or at least for which they had respect.

Considering the great power of those composite bows, especially of the later Greek civilization in Asia Minor, I have wondered that they were not introduced into general use in northern Europe by returning crusaders.

Not long ago I read "The First Crusade" by Prof. A. C. Krey, of the University of Minnesota. It is a vital book of intense interest, consisting of exact translations of the original narratives of the expedition by men who took part in it. Personally I had no idea that so many accounts were still in existence.

All through that story of unspeakable hardship the narrators speak of the archery of the Turks with great respect, if not even fear. When the battles were in the open field the method

of Turkish attack was to encircle the Crusaders with a revolving ring of mounted archers, very much as did the American



From an Arabic Treatise on Archery in the National Library at Paris.

Indians of the plains, and shower them with arrows. There are phrases which imply that the bows of the infidels had so much greater range than the wooden bows of the Christians that the latter were powerless against them, and in one place at least their composite nature is indicated, for, while the bows are said to be of horn or bone, that statement is probably not absolutely literal. I will give some suggestive quotations:

"Soliman, having heard of the arrival of the Christians, assembled from all Romania and the territory of Chorosan fifteen thousand of his Turks, most agile archers, very skillful in the use of bows of horn and bone."

"Three thousand pilgrims entered the ruined fortress in hope of defense. But finding no gates, or other obstacles, and anxious and deprived of aid, they piled up their shields for a gate, along with a huge pile of rocks; and with lances, wooden bows, and sling-stones, they bravely defended themselves from the enemy. But the Turks surrounded the fortress, which was without a roof, on all sides. They aimed their

arrows high, so that, as they fell from the air in a shower, they would strike the bodies of the enclosed Christians, destroying the poor wretches."

"Nicæa was then in possession of Turks from the East, a valiant race of very expert archers. These had crossed the Euphrates River from Persia fifty years before and had subjected to themselves the whole land of Romania (Asia Minor). Oh, how many severed heads and bones of the dead we then found beyond Nicomedia, lying upon the plains near the sea! These people, inexperienced in the use of the arrow, the Turks had annihilated."

"But after this was all done, the Turks were already encircling us on all sides, shooting far and wide in wondrous fashion."

"There Walter the Penniless fell, pierced by seven arrows which had penetrated his coat of mail."

These entries were made in the journals in June, 1097. Two and a half years later, about December, 1099, there is a statement which may possibly indicate that the Crusaders were reduced to the necessity of using bows made of pieces of broken ones glued together, but which I think more probably means that they had come to recognize the superiority of the Turkish artillery and had adopted it.

"If Lord Baldwin had not on that day guarded our rear, perhaps they would have killed many of us. For our bows and arrows were spoiled in a rain-storm, since in that region they were fastened together with glue."

It is largely this sentence which makes me wonder why they did not take the composite bow to Europe, since it implies that they were carrying it, and yet part of the answer may be inferred from the text itself, namely that the bows would not stand the rain.

Dr. Pope says, "An elaborate composite bow would quickly lose its utility in a damp climate." Perhaps so; certainly so if the dampness meant a continued drenching in a rain-storm.

Yet I have seen bows bought in Constantinople, Canton, Korea and India, right beside the sea. I believe the reason was more psychological. The composite bow is a tricky little thing both to make and to shoot. It has none of the frank simplicity of the straight wooden bow. Though it may seem an utterly insufficient reason it is difficult for me to visualize the bowyer of Western Europe concerning himself with the many baffling turns and close fits of the different materials of the composite weapon. One must bear in mind the racial differences which produced the heavy wooden carvings of early Europe and the exquisite traceries of the East.

In 1912 one of these bows was shot over a quarter of a mile, thereby proving that the Crusaders were outranged by almost a furlong, and it is difficult for me to agree with the statement, sometimes made, that the composite Turkish bows are incapable of projecting heavier shafts as well as the yew longbow.

Turning now to the wooden bow, we find that nearly every savage tribe uses it and a fairly complete description would, therefore, make a much larger book than this. I will touch only the high spots.

African bows are perhaps the most primitive, and one type predominates over the entire continent, although other forms appear frequently. I have had several of them and, as I said before, they suggest to me the bow of the cave man. They are about five feet long, though with considerable variation, are perfectly round, with no attempt at a flat back, and are almost cylindrical for most of their length with a sharp taper, or whip end, for the last foot or so. They have no nocks, at least in most specimens, and the string, or leather thong, is fastened by simply wrapping it around the ends and tying it.

Alfred M. Collins, the noted African hunter of Bryn Mawr, brought back some bows from East Africa which were made of bamboo wrapped with cane, which had crude nocks and which had flat cane for a cord, the arrow having no nock. Some bows of the Pygmies which he had were tiny weapons

PYGMY ARCHERS

Photographed by Alfred M. Collins of Bryn Mawr, Pa.

less than three feet long, covered with monkeys' tails and shooting frail little arrows weighing about eighty grains.

As I go to print a friend has just brought me two powerful bows from Paraguay which strongly resemble the typical African bow in general appearance, although one is flatter and the other has some sap wood left for a back, a very important advance in technique. The arrows which came with them have good shafts of reed, twenty-seven inches long, and enormous heads of flat steel, seven inches long by an inch wide. Some very rare arrows from Terra del Fuego, owned by Miss Millicent Pierce, are of about the same length but have obsidian tips and are flat and barrelled, being made from the solid wall of a reed. The feathers of both kinds of arrows are small, two in number and whipped about with sinew.

The bow of the Indian from the northern part of South America is a beautiful thing to see, on account of its exquisite workmanship, like that of a good cabinetmaker. That they do such finished woodwork with such crude tools as they must have is astonishing. I have had two of them and have examined many more in the museum of the University of Pennsylvania, which has a peculiarly rich collection of South American objects gathered by Dr. Farabee. They are all surprisingly long, ranging from six feet to more than seven. Just how far they are supposed to bend I do not know, but two arrows in my possession are of great length and yet some in the museum are still longer. One of mine is five feet seven and one-half inches over all, composed of a fifty-seven-inch shaft of half-inch cane without a joint and a ten and one-half inch wooden head. The other is five feet three inches, made of a forty-two-inch shaft of jointed cane and a twenty-one-inch foreshaft of hard wood.

Dr. Farabee told me that they did not draw them all the way. Phil. Bryant said that when he shot against the Philippine Igorrotes at the St. Louis Exposition in 1903 they pushed the arrow far behind them, thus proving that it is possible to

draw, or rather shove, an arrow much farther than we would naturally believe.

In cross-section these bows are exactly like the stem of a palm leaf, usually concave in the back but sometimes slightly rounded out. The cast is very disappointing. They bend in the hand and are slow and sluggish. Dr. Pope tried one which shot only ninety-eight yards with a fifty-pound pull for twenty-eight inches.

The bows of the North American Indians are of many shapes and sizes, though they never bear the slightest resemblance to those of South America. In a monograph called *A Study of Bows and Arrows*, Dr. Pope has studied a great many with scientific care.

Most of them are short and flat and vary in weight from 28 to 80 pounds with ranges from 120 to 210 yards. There are striking individual differences. I have one little beauty that is very broad and thin, made of yew, somewhat reflexed and even backed with sinew. This is a far-western style. In the museum of the University of Pennsylvania is a great whale of a bow, nearly six feet long and made of hickory, with each limb strongly reflexed by heating and bending. It is about two inches broad for most of its length and an inch thick. I suspect that it was held by the feet and drawn with both hands.

An adequate discussion of the bows of the North American Indians is so much beyond the scope of this book that I will carry it no further. The subject has been thoroughly worked out by the ethnologists of our government and the results published in many reports. It only needed Dr. Pope to add the experiments of a practical archer.

The aboriginal bow of Japan, which is shown in ancient works of art, seems to have been a plain wooden bow about five feet long, with tapered ends and held in the middle.

The bows of to-day, which have been the national style for many centuries, are entirely different things, unlike any other bows on earth. In general they are seven feet five inches long,

WAPISIANA AND LARUNA SHOOTING FISH

and are all about an inch wide, although they come in three thicknesses, one-half, three-quarters or one inch according to the weight desired. Externally they are ornamented with lacquer, often beautifully decorated, and are bound with cane.

When these great bows are strung they look exactly like the little toy bows sold in Japanese shops, but when they are relaxed they assume a strongly reflexed shape, which is made possible because they are constructed of three lamellæ. Sometimes all the layers are of bamboo and sometimes the inside one is of mulberry. The most striking peculiarity is the marked difference in the length of the limbs, the lower being only 33 inches and the upper 57.

It has been said that the idea of making one limb so short is derived from the child's bow, or first bow of all, which is made of an untrimmed stick, thicker at one end. Such a bow has to be held near the thick end to give a smooth effect. I do not agree with this. In the first place, as we have seen, a primitive bow of the regular type was formerly used in Japan. Furthermore this weapon partakes strongly of the characteristics of the composite bow in its being made of more than one strip and greatly reflexed. Also the lower, short limb is thinner than the other, which is the opposite of the bent stick. In fact it is obviously an ingenious way of getting a fair bow out of the poor material of flat bamboo. Most of those I have seen have a cast of only 150 yards. If the arrow be placed in the middle of the bow it will hardly fly at all.

Shooting these bows is done as a set matter of inherited form, like a Scotchman playing the pipes, and an error in pose or gesture is as bad as a miss. The archer stands sideways to the target with his feet spread wide apart and toes pointing outward. The arrow is placed on the right side of the bow and drawn with the thumb. The draw begins above the head and ends at the level of the mouth, with the drawing hand as far back as the shoulder. The bow is held loosely and must turn around in the hand when it is released.

Some years ago Mr. A. Rankin Clark, United States champion in 1900, shot against a professional archer and his pupils in Japan, using their bows but our method, and beat them badly. As archery is taught in the Japanese high schools the distance is about thirty yards. When Clark moved back to shoot at eighty yards the Japanese thought the range enormous.

There is a rare Japanese bow in the Peabody Museum at Salem, Mass., which is very short and was intended to be used in the house for protective purposes. It was to the longbow as the pistol is to the gun.

The bows of the various races of the earth follow more or less these general types, but even the same kind of bow is not always shot in the same manner.

The pioneer work of investigation in this interesting subject was done by the late Professor Edward S. Morse, a young archer of the vicinity of Boston in the early eighties, who published, in 1885, a paper called "Ancient and Modern Methods of Arrow Release" which attracted the attention of leading ethnologists. In 1922 a supplementary pamphlet called "Additional Notes on Arrow Release," brought up to date the observations which he had made during the intervening years. Professor Morse was head of the Peabody Museum, of Salem, Mass. I have met him at the museum and also at tournaments where he has been present as a spectator.

Excellent and original as is his work it seems to me that because of the great amount of additional light that has been thrown on the subject since the attention of explorers and other scientists has been attracted to it, the system of classification should now be changed in the interests of simplification and comprehensibility.

The different positions of the hands and fingers were described as *releases.* To my mind this term is not so good as the one I have chosen because the real purpose of the act is to *draw* the arrow, not to let go of it, which is the correct meaning

of release, or loose. We might properly speak of a quick release, a sluggish release, an open release or a closed release, but not of a three-fingered release. It should be a three-fingered *draw.*

There are three great types of draw, two of which have many modifications:

1. The Pinch Draw.
2. The Thumb Draw.
3. The Finger Draw.

The Pinch Draw is called by Morse the Primary Release, and this, I think, is the best of his names. It is the natural method of shooting the bow which will invariably be followed by the untaught individual of any race who has the weapons placed in his hands for the first time.

By this primitive method the nock of the arrow is placed against the string and held there by pinching the end of the arrow shaft, the part of the arrow which the French call the "heel," between the first joint of the thumb and the second knuckle of the index finger. The arrow is nearly always put on the right side of the bow, but it may as well be shot from the left, and is so done by some peoples.

It is a very accurate way of shooting with a weak bow at short range, but if a strong bow be used the arrow will slip out of the grasp. To overcome this some races, including many tribes of North American Indians, cut away the wood so as to leave a bulbous end which can be held with a very strong pinch. At other times that part of the arrow is simply roughened to create greater friction. With this style of shooting it is possible to have a very shallow nock, such as any boy naturally cuts in a home-made arrow, because the arrow is held on the string by pressure on both of its sides, or it may be shot with no nock at all. Longman, in *Badminton,* says that arrows with bulbous nocks warrant a strong presumption that they are shot by primary loose, but this is by no means a trustworthy rule to follow, as nearly all Oriental arrows, which are drawn

by the thumb, and most ancient European arrows, which were drawn by the fingers, had nock-ends that were very much enlarged to prevent breaking.

The inherent weakness of the pinch, which depends solely on the friction of the skin of the thumb and finger on the sides of the arrow, led many tribes and individuals to attempt to strengthen the draw by adding direct traction of the bowstring. It is a natural step to take, as is proven to my own satisfaction by the fact that it was invented absolutely independently by some of my playmates when I was a small boy. In fact, one of them shot that way at the Eastern Tournament in 1923 although he was not entered in any contest.

I think that the term Assisted Pinch Draw might properly be applied to this method as being easily remembered and descriptive of the process. Morse called it the Secondary Release when only the second and third fingers were applied to the string and Tertiary Release when the first three fingers were applied.

At best this is not the strongest possible draw for the heaviest bows, and peoples who developed archery to the highest degree came in time to realize that it was the cord and not the arrow which was to be drawn and that the best way to do this was to hook one or more digits under it and thus pull by direct traction rather than by friction.

It so happened, for what reason I do not know, that the chief Asiatic archers made this traction with the thumb. The Thumb Draw is very powerful; by it Ingo Simon of England draws his Turkish bow of 100 pounds weight at the present day, to say nothing of the vast armies of Orientals who have used it for many centuries. Technically the arrow is placed on the right side of the bow, the thumb is usually protected by a ring of metal, jade, ivory or bone, (I have a typical one of jade which is one and one-eighth inches long, one-eighth inch thick and big enough to fit a thumb of moderate size snugly), and the tip of the thumb is tucked under the knuckle of the

first finger for support. The fingers do not touch either the arrow or the cord. I do not know of any modifications of this draw, which Morse called the Mongolian Release.

The Finger Draw is the method which is used by all Europeans and by many aboriginal tribes the world over. In it the thumb is usually not employed. In fact the only exception I know of is the powerful Sioux draw which is used by some of our modern American archers of the Pacific slope.

The arrow is placed on the left of the bow and two, three, or four fingers are hooked on the string, with the tip of the arrow lightly held, like a cigarette, between the first two. Both the finger draw and the thumb draw can be used only with arrows having deep nocks which will not easily fall off the string.

Dr. Morse called this the Mediterranean Release, because it seemed to him that it was used principally by races living around that great sea. In fact the chief object of his paper was to suggest that ethnic kinship might be indicated by a resemblance in the manner of using a bow. To a limited extent this is true, but careful investigation has clearly indicated that it cannot be carried very far. The best argument on his side is afforded by the wide-spread use of the thumb draw in Asia. It does not, however, imply any blood relationship, because it is used, for example, by such widely different racial stocks as the Persians and Chinese. It seems to me that just as one great individual in a country, for instance Ford in England, may be imitated by thousands of other archers, so a nation like the ancient Parthians, who excelled all the rest of the known world in the use of the bow and who carried their arms into many parts of Asia, might set a style which would be copied by other peoples as easily as the great Asiatic religious beliefs have travelled over that vast continent.

It is true that the pinch draw is used by some very primitive races, such as the Pygmies of Africa, but it is equally true that the Igorrotes of the Philippines, who are of about the same rank in the social scale, use the three-fingered draw as we do

ourselves. When it was pointed out that the Esquimaux used the three-fingered draw some scholars even hazarded an opinion that it might be taken as a link in the evidence of the residence of Norsemen in Greenland, a fact which the records of the Roman Catholic Church are said to have proven beyond dispute.

It is very easy to let the imagination play on such subjects as this. Pope has discovered that the splendid Wakuma archers below Nairobi use the two-fingered draw, and can shoot 247 yards with it. So did some of the archers of ancient Egypt. I have seen it suggested elsewhere that the features of negroes in that general portion of Africa were like those of the ancient Egyptians, and so one might go on to deduce evidence of consanguinity or similarity of previous environment which might be more fascinating than true.

A Hunter, from "*Horæ Beatissime Virginis*," Paris, T. Kerver, 1522.

One thing which may be affirmed with certainty is that the finger draw is as universal in Europe as the thumb draw is in Asia, in fact more so, because Europe no longer contains any tribes of savages who might use variations of the pinch. Even the carvings in stone of Roman mercenaries who used composite bows, or the later paintings by mediæval artists of archers who also used them show only the finger draw.

In the oldest European pictures, even to the end of the sixteenth century in England, it is far more usual to see the two-fingered than the three-fingered draw. The four-fingered is never shown, unless in drawings that are so poorly executed as to be discreditable. At the present time nearly everyone uses

three fingers, but there are a few prominent exceptions, such as Champion C. E. Nesham, of England, who used four fingers, and Championess Armitage, who uses only two.

Let us now consider the origin of our own weapon, the English longbow.

If the ancient Britons used a bow its exact nature can only be inferred, as none is now in existence and Cæsar does not mention it as being among the arms of the Britons. Ascham quotes an ancient anonymous chronicle which said, "The Saxons subdewed the Britons wyth nothynge so much as with their bowe and shafte, whiche wepon beynge straunge, and not sene here before, was wonderful terrible unto them."

The spirit of modern scientific investigation will not accept an unsubstantiated statement like that as final, and would probably lead us to investigate the nature of the bow which was used in later times by the unchanged remnant of the British race, the Welsh and the Irish.

The only known description of the ancient Welsh bow is contained in the "Itinerary of Wales," written by Gerald de Barry, whose name is given in Latin as Giraldus Cambrensis, or Welsh Gerald. He was born at Pembroke, in the extreme southwest corner of Wales which juts out into the sea, in 1146, and he died in 1220.

"The bows of the Welsh," he observes, "are not made of horn, or white wood, or yew, but of wych elm plants; they appear neither handsome nor polished, but, on the contrary, rude and misshapen. Yet they are stiff and strong; not so well calculated to cast far as to give a weighty blow in a close fight."

When I was searching out the philological side of archery I visited Dr. Austin O'Malley, of Philadelphia, a famous Gaelic scholar who was formerly professor of comparative philology at Notre Dame University, Indiana. Among many things which he jotted down for me was the following interesting note:

"The old and mediæval name of the Irish was *Scot.* The Scotch Highlanders are an Irish colony. *Scot* as a race name died out in Ireland but remained in Scotland. The root of the name Scot is *sciot,* a bowman; allied to Scythian; old English *skytte.* A Scotch man is a bowman. Compare German, *scutten,* archer."

Within historical times the Irish used the dart more than the arrow, but various references prove that they possessed bows and it is always stated that they were short and used short arrows. Edmund Spenser, the poet, speaks of them in his "View of the State of Ireland," which he wrote in 1594, after fourteen years of government service in that country. Nearly eighty years before that time a statute of the English government had advised that the King's subjects in Ireland should be taken bowstaves, because "in default of longbows divers of them apply themselves to Irish archery, as using Irish bows, which induceth to Irish disposition." Most of us need not be told that this could mean nothing but short and quick.

A drawing by Albrecht Duerer, reproduced in *Badminton,* shows an Irish archer carrying just such weapons, a powerful stick of a bow, not more than five feet long, and four thick, heavy arrows of perhaps two feet. Two of the shafts have armor-piercing heads, one is a broad head and the fourth head is forked.

Now, I think that this old Irish bow was the very kind that Giraldus referred to as being used by the Welsh. It fits his description exactly and, in particular, that forked arrow was "not so well calculated to carry far, as to give a weighty blow in a close fight" that would rip the very gizzard out of a man.

I should like to call attention, in passing, to the fact that Giraldus spoke of bows of horn, although it is as certain as anything in the history of archery that the bows of the English were always made of wood. Where, then, had he heard of horn bows? I suspect from the returned Crusaders and, to my mind, this sentence of Giraldus is very strong evidence that

enough of those captured Asiatic bows were sent home among the spoils of war to make them fairly well known in the British Isles. I do not mean that they ever came into general use, but they were there, just as our museum specimens are with us to-day.

Irish Archer, 1521.—From "*Drawings by A. Duerer*," Lippman.

If we agree that the original British bow was a short one, then we must acknowledge that the six-foot longbow was introduced by one of the invading races. It has usually been stated that it was first used by the Normans at the Battle of Hastings, but I think that it had been used for centuries before that time by both the Saxon and Scandinavian conquerors of England.

All the writers on archery of former years have claimed that

the bow used by the Saxons was short, but I cannot agree with this view, although perhaps it was weaker than the powerful Norman and English bows of later centuries. To me the difference was more of degree than of kind.

Fortunately an archæologic discovery of recent times has removed all doubt as to the exact form of the Saxon bow by supplying us with great numbers of the bows themselves, looking almost as though they might be picked up and shot. Such a perfect description of them is given in the *Archers' Register* for 1912 that I will take the liberty of transcribing it.

"In 1863 there were found in Nydam, Sleswig, three very ancient galleys, one of them preserved to the very slightest detail. It would be of the greatest interest to speak of these boats, but this not being the proper place for doing so, I will confine myself to their contents, which consisted mostly of the weapons of the inhabitants of Sleswig and Holsatia in A. D. 400 to 450. Hengist and Horsa set out from these countries in 449 and must have had exactly the same weapons which were found in the Nydam galleys.

"Nydam is a moor near the Alsensund, opposite the town of Sonderburg, and was once a fjord of the Holsatian sea. Since 1590, however, it has been cut off from the sea by a dyke, and is now meadowland, and it is here that these boats were found. Only small pieces have been left of one, another was burnt by Prussian soldiers in the war of 1864 for cooking their coffee, and the third is the celebrated 'Nydam boat,' preserved in the Kiel museum. Among hundreds of ancient items found in these boats were about 40 bows, over 100 arrows, a wooden quiver and the bronze mountings of another.

"With respect to the bows, they are mostly in very fine preservation, some looking new. They are from 170 to 187 cm. long (about 5 ft. 7 in. to 6 ft.); their diameter is from 2.8 to 3 cm., tapering toward each end, the real yew bows being somewhat thinner than those of fir. The transverse section is either round or of the same form as to-day, but the

flat side is the belly, not the back, of the bow. The material is the wood of conifer trees, most of them of pine but a few of yew, easily recognizable by its many knots and pins. The bows are mostly worked even, without lifting the knots, but some of those in the yew bows are lifted. They are all cut out of saplings, I have not seen one cut out of the stem of a tree, therefore in none is the back sap and the belly heart. It may be from this reason that not a few of the bows are broken and mended in the same way as in these days by wrapping with thread.

"All the bows follow the string a great deal, a token that they were kept strung, a point also otherwise proved. The bows have had no horns, and have no nock fit for taking up the loop or eye of the string. There are small flat notches on the ends of the limbs, not always on the same side—sometimes they are on the belly side and sometimes on the back—but they are not deep enough to take up the eye, and the string must have been permanently tied on the bow in the same manner as can now be seen on all African, and most savage, bows. These notches would prevent the string from slipping down the bow, but there are also other contrivances for the same purpose, some of the bows having shouldered ends, some a hole and others a bronze button near the end.

"The string cannot have been of flax or hemp, but must have been of some animal substance, such as wool, gut or sinew, for in this moor vegetable matter is preserved, while animal perishes, and no bowstring has been found. This supposition is borne out by the fact that the strings, as shown by the nocks of the arrows, must have been very thick, and, in order to be serviceable, strings made of animal substances must be thicker than if they were made of vegetable matter. In my opinion the bows were not very strong, at the outside 50 pounds weight, and even this may be too high an estimate.

"The arrows were of some coniferous wood, the grain being very straight. They were 73 to 90 cm. long (29 to 37

inches), of barrelled shape, 9 mm. thick in the middle and knobbed at the end for the wide, 5 mm. nock.

"Each arrow had four feathers, whose location is clearly visible, from 10 to 13 cm. long. To fasten the feathers a groove 1 mm. was cut, the quill imbedded in it in resin and the whole fastened with a spiral winding of thread.

"Almost all the arrows bear an arrow-mark, some being fancy work and some Runic characters.

"The heads are made of bone or iron and have the same shapes in either material. They are mostly of the leaf or awl type and some are barbed. The heaviest head weighs 15 grm. and the whole arrow weighs about 45 to 50 grm. or 8 shillings. This would be a heavy arrow for a 50 pound bow and could hardly be used beyond 150 yards. The quiver would hold about a dozen arrows."

Saxon Defending His House. Eighth Century Whalebone Casket in British Museum.

Those writers who believe that the Saxon bow was short base their opinion on the appearance of the bow in a few ancient carvings but I contend that where the art is so crude that the string is made as thick as the bow it is not safe to assume that the length of the weapon is proportionately correct.

From the time of Hengist and Horsa, when the Nydam bows were made, to that of William the Conqueror was six hundred years, or longer than the time from William to the settlement of New England.

Whatever bow the Normans brought to England must have been the kind they had previously used in Normandy. The Norsemen were ceded Normandy in 911. They came there from the Scandinavian peninsula, and they came by sea, directly.

It is therefore reasonable to expect that if any evidence from grave-findings or from the sagas concerning the bow can be discovered it will show that the six foot bow was the one the Vikings used and, therefore, the one that was also used by William.

If we accept the authority of Du Chaillu's "Viking Age," the question is already settled for us, as his words are: "The bow (bogi) and the arrow (or) were among the most important weapons for war. The bows discovered are generally about six feet long."

Corroborative evidence may be obtained by considering the strength with which the bows shot and the kinds of arrows that were used. Fortunately many, or even most, of the statements made in the sagas have a peculiar directness which carries the conviction of truth. They mirror the hard verities of the daily struggle with man and nature that was the daily task of the Norsemen. Here is a pen-picture which tells of an arrow driven the whole length of a man's trunk:

"King Harald warmed himself at the fire, and came with his back close to it. He was on his knees and stooped forward so low that the hind part of his thighs stood out. Palnatoki laid an arrow on his string and shot at the king, and the arrow hit the king straight between the thighs and came out of his mouth. The king fell dead, as was to be expected."

All who have read Dr. Pope's accounts of the penetration of an arrow delivered from a strong bow will realize at once that his experience with animals corresponds very well with this incident, making clear the fact that the bow must have been a very heavy one.

Most of the arrow-heads which are found in the tumuli are

fitted with shanks, to be inserted in the stele, but some have sockets which show the diameter of the arrow. The largest heads are as much as nine inches long and were set on shafts three-eighths of an inch thick. Every archer knows that such tremendous heads as these must have had very long shafts to give a well balanced flight.

Furthermore the Norsemen, as a race, were physically built to draw a long arrow, which would mean a longbow, for the average length of the skeletons found in ancient burial places in Scandinavia is over six feet. Taking all the facts together I feel that we are justified in carrying the English bow back to a remote Nordic origin. Whether a short bow preceeded the long one, as it did in almost every country, is a question. There is an ancient rock carving in Sweden, vastly older than the sagas and even than most of the graves which clearly shows a man shooting a bow. If we were to accept the proportions as being literally exact we would have to compute the length of the bow as being about three feet. Yet in the same set of carvings is a man ploughing with a pair of beasts that look more like Scotch terriers than anything else.

Prehistoric Rock Carvings, Sweden.

When Charlemagne tried to extend his conquests into the peninsula of Denmark he stirred up a hornets' nest that was destined to change the history of the world. Up to that time the Norsemen had spent their fighting instincts in petty civil

wars, but when they turned against a foreign invader and felt their power when united they rapidly developed into the Vikings, the greatest race of fighters the world has ever known. They were seafarers, with the only navy in the world. They would sweep down on a coast, raid it before the local militia could be gathered and be off to sea. The first of their attacks on England was about the year 800, or a little earlier. The initial successes led to others and as the prizes to be won became greater their character changed from the incursions of pirates to the fleet manœuvres of kings. From reasons of patriotism, or allegiance to the English name, or to lack of proper historical ratiocination, or to what else I know not, the almost complete subjugation of England by the Norsemen has never been fully acknowledged in the school history books until recently. Few of us realize that for the century from about 850 to 950 more of England belonged to the Norsemen, and was settled and ruled over by them, than belonged to the English. They owned everything northward from the Thames and even south of the river their influence was very great. When King Alfred began to make a little headway against them he was cooped up in the southwest corner, in Devonshire and Cornwall. Now who dares to say that this vast army was without bows and arrows?

Yes, I believe that the longbow was in England for centuries before William came, but it was brought by the same generic stock of people and received its great importance after his time because he used it to advantage at the Battle of Hastings.

However, he might not have won that battle if Harold of England had not had to fight as hard a one against Harold of Norway the month before. It was called the battle of Stamford Bridge and was near York. That the bow was freely and effectively used is shown by the following quotations from a saga. Note that the English shot as well as did the Norsemen, and that the cavalry used the bow.

"The English horsemen rode around the array but, as soon as they came near, the archers of the Norsemen shot at them as fast as they were able. The English saw that they could effect nothing and rode back. The Norsemen thought they were going to flee, and followed in pursuit; but as soon as the English saw that they had broken their shield-burgh they rode at them from all sides, shooting arrows and spears at them.

"Then, as the English almost fled, Harald Sigurdarson was hit with an arrow in the throat, so that a stream of blood gushed from his mouth; this was his death wound."

Two-thirds of the army with which William conquered England were foreign adventurers, most of whom came from the neighboring parts of France and the Low Countries but some from as far away as the Norman duchy of Apulia on the Adriatic coast of Italy. It has always been said that the portion of the troops who were archers were Normans and I see no reason to doubt it.

Just how much they contributed to the victory at the Battle of Hastings has long been disputed, but at least it must be conceded that they played a very important rôle at the finish. At the beginning the English were posted at the top of a hill, with a long slope in front and a forest at their backs. Their shields were locked in front of them, making a wall, or shield-burgh, and some writers claim, on rather uncertain grounds, that they added to their defense by sticking sharp poles in the earth before them to impede the cavalry of the enemy.

When the Normans began their attack, the archers were ordered to shoot directly at the English, but their arrows were caught on the shield-wall and made no impression. The footmen were then ordered to charge but they were hurled back. The final thrust was by the heavy cavalry but they, too, failed, lopped to pieces by the long Danish axes used by the English.

After these discomfitures the Bretons on William's left flank broke and fled, thus, paradoxically, turning the advantage to his side, because the English made the same mistake as had

the Norsemen at Stamford Bridge, and broke their shield-wall to run after them. Immediately the Norman cavalry wheeled about, pursued the pursuers and cut them down. This suggested to William that he do the same thing again and, by making a false retreat, draw the English out. It was a successful ruse and, as a result, the group on the hill became much smaller.

At this point the archers so changed their tactics as to decide the fate of the day, for they aimed their shafts high in the air and let them drop inside the wall of shields, thus piercing the English defense and inflicting slaughter that could not be endured. By a whim of fate King Harold was shot in the eye as the other King Harold had been shot in the neck the month before.

For English speaking people the source of knowledge to which they instinctively turn is the Encyclopedia Britannica but, unfortunately, the article on Archery is from the pen of one who either never drew a bow at all, or, at least, was not an expert archer. In this opinion I am strongly sustained by the criticisms of his work appearing in the *Archers' Register.* I make much of it because extracts from the article, which is compiled from sources which are easily recognizable to the student of the literature of archery, are continually being quoted in the press. Among his worst errors are the positive statements that the short bow was used at Hastings and that the longbow was developed in Wales, both of which are exactly contrary to the facts. Unfortunately, the backing of encyclopedic prestige gives his opinions enormous weight.

Just what part the bow played in the internal subjugation of England after the Conquest can only be conjectured but it seems to me to be likely that the need of suppressing sporadic uprisings in different places led to the development of a sort of light cavalry, armed with the bow. It is true that the archers at Hastings were foot-soldiers, and so were the majority in all future wars, but when the Norman kings of Eng-

land had become so firmly set on their insular throne that they were able to send troops back across the channel to fight in France many of them were mounted. It has been said that the short composite bow of the East had its origin in necessity from the fact that the semi-nomadic tribes of Asia were horsemen and that on horseback a longbow of wood could not be used. This is not true, as recorded history conclusively shows.

Mounted Archer, 1544 —*Badminton.*

In speculating on the probable strength of the English longbow of this period nearly every writer repeats an anecdote from Giraldus Cambrensis, overlooking the fact that the real weapon under discussion was the short, powerful bow of the Welsh. In brief:

"During the siege of Abergavenny castle, a party of Welsh archers perceived two Norman soldiers running toward a tower, situated some distance off; they were immediately assailed by a storm of arrows, some of which penetrated the oak doors of a gateway, four fingers in thickness. The heads

were subsequently driven out and preserved, to perpetuate the memory of such extraordinary force in shooting the bow."

I do not believe that four inches of sound, seasoned oak could be penetrated by an arrow, even if it had the narrow head designed for piercing armor. Of an absolute certainty a broad-head could not do it. To my mind it resolves itself into a question of the condition of the wood and to some extent of its species. I have some timbers from an old barn, built in colonial times, which are so hard that I can hardly cut them with an axe, but in freshly cut oak from the same grove of trees from which they were taken I can bury an axe for several inches. During my life I have also done a good deal of wood-carving, nearly all in oak, which has taught me that some kinds are much harder than others.

Abergavenny castle was built by the Normans after the Conquest and the date of its capture by the Welsh was 1175, therefore none of the wood could have been as old as those barn timbers. Besides, those old castles were not built in a day, usually the keep being erected first and the rest constructed at leisure.

This doorway was probably a little one, such as I have often seen in the outer walls of castles, used for small sorties and necessary errands. If the door had been put in lately it is quite likely that in that period of unprecedented building activity, which rivalled the similar post bellum conditions which we are experiencing to-day, the builders used the wood in a green state, just as ours are doing now and with the additional excuse that no mechanical process of rapid seasoning had as yet been invented.

Gerald was twenty-nine years old when the castle fell and lived in the neighborhood, so that he probably knew what he was talking about and I am inclined to give him the credit of the doubt.

In a mountainous country like Wales the bow was a very valuable weapon with which to repel invaders because the na-

tive bowmen could get up on the mountainsides and shoot down at the troops in the passes. Many years ago I rode a bicycle down that old boundary line between England and Wales, and I was astounded by the number and strength of the castles which had been required to hold back the Welsh. In their own lands they never were conquered and I think it is reasonable to give part of the credit for their successful struggle for independence to their skillful and wide-spread use of the bow.

The next thing that arrests us in this perambulation through the past is not of warfare at all. It is a single figure, one which is as much a part of archery as Santa Claus is of Christmas: ROBIN HOOD.

Does there live a person of English blood who has not heard that name? I seriously doubt if there be any other in the whole history of Great Britain that is so widely known. Thousands might use it in their daily speech who never heard of the monarchs he defied. There must be something more at the bottom of this unrivalled universality of fame than appears on the surface and I will put before you the results of my speculations, after which you can naturally form your own opinions.

The regular tale, as worked up from the old ballads and legends and told in modern lives of Robin Hood, is that he was an outlaw living from the reign of Henry II, which ended in 1189, through the twenty-seven years of Richard the Lion Hearted and John Lackland, till his death in 1247 during the reign of Henry III.

He dwelt chiefly in Sherwood Forest, was particularly hunted by the sheriff of Nottingham, was taken sick and went for treatment to Kirklees Priory of which his cousin, Elizabeth de Stainton, was prioress. She treacherously bled him to death, but just before he died he blew a feeble blast on his horn, Little John broke in and at Robin's request handed him his bow and an arrow. Robin shot

through the open window and they buried him where the shaft fell.

The priory still exists and the window is shown to visitors, so is the room where he died, which contains a few pieces of ancient furniture said to have been there at the time. An enormous tree, called "Major Oak," is still standing in Sherwood Forest, under which his band is said to have gathered.

His tomb is there and the inscription reads:

HEAR UNDERNEAD DIS LATIL STEAN
LIES ROBERT EARL OF HUNTINGTON
NEA ARCIR VER AZ HIE SA GEUD
AN PIPL KAULD IM ROBIN HEUD
SICK UTLAWZ AZ HI AN IZ MEN
VIL ENGLAND NIVR SI AGEN
Obit 24 Kal. Dekembris 1247.

Of his aiding the poor by robbing the rich and of his superhuman powers of markmanship so much is known that I need not dilate upon it here.

Now let us consider the evidence of early English literature. The oldest mention of his name occurs in the second edition of "Piers the Plowman," the date of which is about 1377. The character called Sloth says:

"I can noughte perfitly my pater-noster, as the prest it syngeth:
But I can rymes of Robin Hood and Randolf Erle of Chestre."

This Earl Randle, or Randolf, was a real man who lived during the reigns of Richard, John and Henry III.

The next mention is by Andrew of Wyntoun, about 1420:

"Lytel Jhon and Robyne Hude
Waythmen ware commendyd gude;
In Yngilwode and Barnysdale
Thai oysyd all this time (about 1283) thare trawale."

This man sets the time of his activities as being thirty-six

years after the date of death as given on the tombstone, but that is not to be wondered at as he wrote so long afterward.

About 1450 Walter Bower wrote in Latin that in 1266 that most famous outlaw Robert Hood and Little John appeared, about whom the common people love to sing and make plays.

Of the ballads themselves the oldest one does not go beyond the early part of the fourteenth century and most of them are a hundred years or more later than that. Undoubtedly there were a great many popular songs and stories of him all through England and the Lowlands of Scotland, some of which were gathered together in later poems.

Such a man may really have lived but, if he did, I believe that the name was a soubriquet bestowed on him from some earlier figure whom he was popularly supposed to resemble. If we search our old rhymes critically we can see that the tendency to personify things and events is both ancient and universal. The Greeks did it continuously, for example the excavations in Crete have shown that the story of Minos, the bull-headed monster of that island who devoured the maidens of Greece, arose from the fact that the Cretan pirates stole Greek girls to be trained for bull fighting. Just so Jack and Jill are almost exactly the ancient Scandinavian names for the tides, bringing their pails of water and breaking their crowns. The rhyme is all that is left of some old nature worship. Punch and Judy are said by some to be the attenuated remains of Pontius Pilate and Judea, from former misterie plays. There are innumerable examples of this sort of thing.

Robin is an old Teutonic name associated with elves, sprites, spirits of mischief and the like. The English form which has come down to our time is Robin Goodfellow. In the prologue to " Piers Plowman " it was *Roberdes Knaues,* or Robert the Knave. In German it is *Knecht Ruprecht.* It can therefore be easily seen that some frolicsome sprite of the woods, playing harmless pranks on everybody, might be called Robin.

The second name couples to it a similar idea in more solemn

form. *Hood* and *wood* were interchangeable forms of the same word in some parts of England, both meaning wood. Hood is also the same as the older form of Odo, which in modern German is the familiar name Otto, and Odo is merely another way of saying Woden, the great god of the North whose name is perpetuated in our Wednesday. In old mythology, as a specialization from the omnipotence of Woden and as a derivative of his name, a god of the wind was named Hod.

As we see about us to-day the concepts of religion are easily confused in the minds of the vulgar. Even before the Conquest all reverence for the old deities of the North had been wiped out of the Saxon by Christianity and with the introduction of the Latinized religion of the Norman they would be despised by the upper classes.

From this basis arose the concept of a Robin Hood, supreme in the forests hidden from the conqueror's eye, helping the poor who were of his race and robbing the wealthy foreigners. As unsurpassed in the use of weapons as was his godly prototype and yet as full of mischief as an elf. If some bold fellow broke loose from legal restraint, took to the forest and lived that life would he not be given that name? I think he would, and I venture to say still further that if it were possible for someone to live that life in the midst of our civilization he would get the same name to-day.

For some evidently good reason, which I do not know, the British antiquaries attach no importance to the tombstone. It must have been put there much later than the time it mentions. At any rate there is no genuine suggestion that Robin was a nobleman until the definite date of 1615, when he was made so for the dramatic purposes of a London pageant.

I am one of those who believe that Shakespeare was unable to sign his own name, as he was never known to do so when required by law, but in speaking of the plays popularly ascribed to him it is at least convenient to give him the credit of author-

ship whether one really believe it or not. It is much the same with Robin Hood. Even though we know that Friar Tuck and Maid Marion and the rest of the characters appear at various later times like actors coming on the stage, taking their places as the stories grew, and though we even question his corporal existence, his character is so unique and fascinating and time has woven the fabric of his exploits into so firm a tissue that we are tempted to illuminate with the lantern of proof his reputed feats of skill. That he shot a mile is rot, though the companion story that his horn might be heard at that distance could easily be true in proper atmospheric conditions. Almost equally absurd is the belief that he could shoot an arrow into a target at one hundred yards and split it with another, although this feat has been done accidentally by many a man. On the other hand his splitting a wand at the same distance is duplicated at many of our National Tournaments at the present time. The only error of the ballads is in making the assertion that Robin could do it every time, without fail.

Perhaps I was guilty of a slight chronological error in bringing him into our story so soon, because other things that might have been mentioned had taken place in the archers' world before his time, but they are few in number and of such a martial character that they readily fall in line when we now return to a discussion of military affairs.

It is evident that archery maintained a strong position after the Conquest, for though its use in England is not mentioned, yet we do know from the chronicles of the first crusade that considerable numbers of English archers were on that expedition in the pay of Robert of Normandy, specifically mentioned as Angliæ. That was thirty-one years after the Conquest. It was during the time of this crusade that Sir Walter Tyrrell shot King William Rufus while he was hunting.

The first battle with a foreign country in which bows and arrows are mentioned was called the Battle of the Standard,

HITTING THE WAND AT 100 YARDS

National Tournament at Rome, 1925

CURTIS, LAKE MANG

JUDGE BALL WALKER, NEILD, BRUSH, CURTIS, LAKE

getting its name from the English banner, though for what special reason I cannot say. It was against the Scots, under King David, in 1138, at North Allerton in Yorkshire. Measuring on the map I find that this is seventy-five miles from the nearest point on the Scottish border, showing that England was deeply invaded. The English army was led by the Archbishop of York. Roger de Hoveden was the chronicler who has left us the best account of it, writing about as much later in time as we are now from our Civil War. He said that the English archers, by their thick clouds of arrows, contributed in a large degree to the success of their side.

A book like this, written by one whose mind is as biassed in favor of archery as mine is, can easily be made misleading by mentioning nothing but the successes of the bowmen of history and omitting their defeats. The bow was by no means an omnipotent weapon. Think how the Crusaders won battle after battle against thousands of skillful archers armed with the best bows in the world! Even in the battles of the Hundred Years' War only two of the three great victories of which the English have justifiably bragged for half a millennium were won by the archers acting only as bowmen.

So it was in the Scotch wars of the fourteenth century and just before, where archers were employed on both sides. At Falkirk, in 1298, the English cavalry rode the Scottish archers down, and at Bannockburn, sixteen years later, the English archers were taken in the flank and routed. Yet on the other hand at Falkirk the English archers broke up the close Scottish formations and allowed the cavalry to act. As in all wars the utility of the army depended mostly on generalship.

The hey-day, or high-day, of the English archer was the period of the series of conflicts with France, interspersed with truces of a few years at a time, which began in 1340 and, because it dwindled out about a century later, was called the Hundred Years' War. It was an attempt of the Plantagenet

kings to retain their continental possessions and in those days of poor means of communication and inadequate resources of men and money it was more difficult for England to hold together a scattered empire than it is now.

The three great victories in which the archers figured preeminently were Crecy, Poitiers and Agincourt. Every historian agrees that if the bow won any battles for England it did it there and this unanimity of opinion tempts one to an analysis of just what its services were.

The first of these engagements was at Crecy, a little village about fifteen miles from the British Channel. The English had gone into camp and had the advantage of consolidation while the French were marching on them in more or less disorder from Abbeville, twelve miles south. It was therefore a case, as were the other two battles, of the English having the choice of position and being able to use all of their men while the French had to get to them through natural obstacles with comparatively small numbers at any given moment.

Just as Victor Hugo begins his classic description of the Battle of Waterloo by telling us to think of the letter A so the easiest way to remember the formation of the English troops at Crecy is to think of the letter $\underline{W}$, with a dash under it. The English were on the forward slope of a hillside. Each of the four long legs of the W was composed of archers, of whom there were eleven thousand altogether, and at the two apices, which should be thicker and heavier than the letter suggests, were solid bodies of dismounted knights and men-at-arms. The whole English force was twenty thousand and the whole French army was sixty thousand, outnumbering our boys three to one. The — below the W represents some reserves held farther up the hill.

It is evident that the French morale was bad from the start. King Philip ordered the army to close up and camp for the night about a mile in front of the English but they would not obey him and he was forced to order an assault even though

the day was late and nearly all of his troops were still on the road. Like the good patriot he was he sent the foreigners in first, six thousand Italian crossbowmen from Genoa. At this juncture Providence sent down a severe thunder-storm to wet the thick gut strings of the crossbows so that they would not shoot so well. When the rain stopped, during which the English had doubtless kept some dry strings in their pouches, the two species of arcate artillery let fly at each other and the crossbowmen were quickly driven from the field.

The love of brothers did not exist between the Genoese and the French and when the arblasters turned and sped down the hillside it so enraged the first line of Gallic nobility, who were waiting on horseback to see them die on the field for the glory of the lilies of France, that they lost their temper, charged on the fleeing fugitives as though they were the enemy and in a few moments converted the first two lines of battle into a seething and disordered mob. Think what a target that was for a ninety-pound bow and an eight-shilling arrow!

The loss of this battle was partly due to the psychology of the French chivalry. In the first place they gave the battle a hopelessly bad start by charging the Genoese and then as each rank, or rather body of knights, came up they would charge the masses of men-at-arms and knights of their own social station, who had the most flags and nearly all the insignia of heraldry, and in so doing run between the lines of archers and be shot to death. Altogether the French made sixteen charges and the fighting continued till nearly midnight, by which time the French were almost annihilated. After the battle King Edward's heralds counted 1,542 men of gentle blood; the rest were not worth bothering with. The English lost only fifty.

This was *par eminence* a victory of archers and nearly all of the fighting was done by them.

Crecy was 1346 and Poitiers was just ten years later, 1356. The Black Prince had landed at Bordeaux, like so many of our

American troops in the World War, and had gone far up into central France collecting booty.

On the way back the French King John caught him at Poitiers and forced him to either fight or leave his wagon trains of spoils and flee. Of course he chose the former alternative although he had sixty-five hundred men and John had sixteen thousand.

The Prince showed his good judgment by selecting a strong position and letting the French have the handicap of attacking in the open. This is where the value of archery came in. If an army fought with swords, maces and spears it had to get out in unimpeded ground to do it but archers could get among the trees and shoot out. He therefore formed his lines in the edge of a wood, with a hollow in front.

The French generalship was rotten. For the first charge John sent a mixed body of mounted men and crossbowmen. The result was that as soon as the riders became excited they sped up their beasts and got ahead of the arblasters so that the latter could not shoot without hitting them in the back. At the very outskirt of the wood was a hedge behind which the archers were concealed and through which they shot. When the mounted men came within good range, which I imagine in this case was nearer than usual, they were brought to a standstill by such a volley of arrows as those seasoned veterans knew how to deliver. In the meantime a file of archers had drawn out to the left where they could sweep the hollow and poured a cross-flight into the enemy's flank.

Although this first assault was routed, the second line immediately came up. For some reason the King had ordered all the rest of his cavalry to dismount and fight on foot, thus losing the speed and force of a mounted charge. These men were therefore infantry and though they moved more slowly they were of vast numbers. Again the hedge was held as the volleys of death sped out of it but the fighting became hand to hand in places and before the Prince had rolled back the

attacking forces he had used all but four hundred of his men.

If the third line of French had been under a Napoleon and had come up at that psychological moment, fresh and brave, *Nike* would have hung her garland on their banner, but the Duke of Orleans, who commanded it, was so stricken with fear at the rout ahead of him that he led his whole division off the field without striking a blow. There was still the fourth and last corps, commanded by the King himself. On it came, the flower of the chivalry of France, threatening to overwhelm the hard fighting band which still held the hedge. Here it was that the Black Prince carried through one of those thrusts which are inspired only by the genius of the born fighter. Weakened as his forces were he detached a band of fifty knights, badly as he needed them at the front, to circle about to the King's rear and divert him from behind, knowing from his years of fighting with the French that in confusion their discipline would be lost. The stratagem was successful and in the end the force was killed or captured to a man and the rest of the demoralized and dispersed army was pursued by the victors till nightfall.

This battle also was won largely by the archers but at the same time the other branches of the service did all the fighting that human beings could be called on to do.

Agincourt was the last of the big battles which are popularly supposed to have been won by archers. It was fifty-eight years after Poitiers and the personnel had entirely changed. Altogether there were ten kings on the two thrones during the Hundred Years' War.

This name is a familiar one to me because, to the great amusement of the countryside, a wealthy liquor man near my home gave it to his estate. The real French village is very near the position of the British front in the World War.

The battle took place in a deep defile between two forests. Henry V, of England, had only one thousand men-at-arms,

six thousand archers and a few thousands of other footmen. The French had more than four times as many. As in the other battles the English awaited the attack and the archers fixed the pointed stakes, which they carried at this period, into the ground to ward off cavalry charges. As at Crecy a heavy rain fell and added much to the advantage of the English as it not only wet the crossbows again but, which was much more important, turned the bottom of the valley into a slough of mud through which the footmen had to labor with great difficulty and which prevented the bringing up of the cannon which had begun to be used in warfare.

As the French showed no disposition to begin hostilities the English archers moved up close enough to get within range of the French cavalry and throw a few flights of arrows into them. This was more than they could bear in stolidity and they charged up the ravine, but the archers feathered into them from both sides and they were turned back in confusion. The great mass of the unmounted men then came lumbering up through the defile, sucking their feet out of the clinging clay, and again the archers pinned them through and through. However their numbers were so great that they finally engaged Henry's men-at-arms and were certainly defeating them, while the archers could not shoot because of the impossibility of aiming away from their comrades. At this juncture they seized their leaden mauls and other hand weapons, ran into the mêlée and, because they were free of weight while the French were sunk deep by their armor they dodged about, striking blows that turned victory to the English. It is hard to understand how it was that when the two sides were engaged in hand-to-hand struggles, as here and at Poitiers, the disparity in casualties was so great. According to the Britannica the French lost five thousand men of noble birth while the English lost only thirteen. According to Shakespeare, who got his information from Hollinshed, the losses were greater. In *King Henry V* the lines are:

"This note doth tell me of ten thousand French,
That in the field lie slain:
Where is the number of our English dead?
Edward the Duke of York, the Earl of Suffolk.
Sir Richard Kelty, Davy Gam, esquire;
None else of name; and, of all other men,
But five and twenty."

Probably the best picture of English military archery which exists in fictional writing is found in *Sir Nigel* and *The White Company,* by A. Conan Doyle, M. D., books in which the spirit of the days of the Black Prince lives again. Conveyed in language so masterful as to win him a knighthood his scenes take on the value of reality and doubtless serve many imitators. It is therefore justifiable to examine them with a critical and practical eye.

Sir Conan was not an archer but tells us that his technical knowledge of shooting was gleaned from Hastings' *British Archer,* 1831, Hargrove's *Archery,* 1791, and Strutt's *Sports and Pastimes of the English People.* That he chanced on these inferior books and missed Ascham's *Toxophilus* and Roberts' *English Bowman* is unfortunate.

Most of the things he says about bows and arrows are correct, as it is only natural that with a man of earnest purpose truth should preponderate. When he says, "May I never twirl a shaft over my thumb-nail if ——" he is speaking the true language of archery and gives evidence of the pains taken to prepare himself. On the other hand a sentence like this, which he has constructed with care, contains several errors, "How now, youngster? Over-bowed? Put your bow in the tiller. It draws at sixty pounds. If your bow be not stiff, how can you hope for a twenty score flight?" A tiller does not weigh a bow but holds it drawn while the bowyer looks at its curvature, and a sixty-pound bow would not only be very light in war but would hardly cast a war-arrow half of four hundred yards. That two archers could successfully fight a

duel at the full distance of their cast, while watching each other's arrows, that a bow which might be drawn by hand would cast farther if drawn on the feet, and that great accuracy is obtainable over two hundred yards are instances of the impossible. It is regrettable that Sir Conan did not submit his manuscript to an experienced archer who might have culled out such little flaws.

The Hundred Years' War ended officially in 1453 but for some time it had been dying out and bands of armed mercenaries had been sent home to England. Probably in the earlier years of this long conflict, as protracted as our American Revolutionary and Civil Wars and all the time between, the best of the English youth had gone forth under the inspiration of true motives of patriotism but long before the final truce was signed the English forces had degenerated in large part into professional soldiers of brutal habits and low moral tone. When these men were thrown back into England they were distinctly out of a job and in a frame of mind where they were willing to fight for anyone who could pay them and for any cause.

At the same time the feudal power of some of the English lords had become so great, while the armies of the King were in France, that they were able to hire the returned veterans and engage in civil war in the rôle of king-makers. Out of such private ambitions arose the Wars of the Roses, beginning in 1455, or two years after the end of the continental campaigns, and lasting just thirty years. It was a time of misery, when the common people were ignored by the nobility and their rights were forgotten.

From our standpoint these wars sealed the doom of the bow. Military science had reached a stage in its evolution where regimental and technical organization of armies was approaching modern forms. The continental nations had never been good archers and when the powerful English longbow was withdrawn from their battle-fields they ignored its exist-

ence and proceeded in their plans with hand weapons and the very poor and ineffective firearms which then existed.

In England the mercenary soldier became so hated that a national professional army practically ceased to exist and for at least a century and a half the kingdom's forces consisted of an aggregation of county levies. It is true that many of these were armed with bows but the army as a whole was so inferior to the forces of France that when the inevitable reorganization occurred the continental standards were adopted and bows were entirely discarded in favor of gunpowder and muskets, which by that time were much improved in construction and efficiency.

Do not get the impression, however, that bows were not the chief arm of the footmen of the Wars of the Roses, because they certainly were. There is a contemporary picture of the battle of Tewkesbury, reproduced in *Badminton,* which shows none on either side but archers and knights, and, as this was the last big conflict of the war, in 1471, it proves that the bow still held its own.

I cannot refrain from interpolating personal reminiscences in this chapter, even though they may be common experiences to thousands of other people. For example I spoke of having been in so many of those castles on the Wye, or the old border line between England and Wales. In that same little trip I stopped one night at a small inn, which was not so ancient in its external appearance, but on going up-stairs I was astonished to see a large room panelled with oak and adorned with heraldic carvings. The host told me that was the only remaining part of an old manor house which had stood there and that in it the battle of Tewkesbury had been planned.

During the reign of Henry VIII the bow still played an important rôle on English soil. In 1513 the bloody battle of Flodden Field, won by the English against the Scotch, was decided partly by archers, because it was by pouring great flights of arrows into the Scottish ranks that the English

threw them into sufficient disorder to permit of their being charged by cavalry.

In this battle James IV received an arrow wound, though it was not fatal, which made the fifth king to be shot with an arrow in England. The others were Harold of Norway, Harold of England, William Rufus and Henry IV, who was wounded in the face at the Battle of Shrewsbury in 1403. I cannot recall that any monarch, either native or foreign, has ever been shot with firearms in England.

An event of tremendous importance to archery occurred in the latter part of this reign, something which forever drew aside the veil which hid its mysteries. It was the publication of that masterly book, *Toxophilus, or the Schole of Shootynge,* by Roger Ascham.

Why some people are in doubt as to the pronunciation of this man's name I cannot see, unless it be that the great number of Germans in the United States whose names contain "sch" have led to the confusion. In English place-names "ham" is like its congener *home*. To hear a man say Ash-am grates on the nerves as much as to hear a Yankee meticulously say Wal-tham. The town of Askham, not far from his early home, undoubtedly was the source of his patronymic and clearly shows how it should be sounded.

He was born in 1515 at Kirby Wiske, a little village in the North Riding of Yorkshire, near North Allerton, where the Scotch and Norman–English fought nearly four centuries before. His education was received at the private home of a gentleman who was speaker of the House of Commons and, fortunately, we can quote Ascham's own account of those days:

"This maketh me to remember the right worshipfull and my singuler good mayster, Sir Humphrey Wingfelde. Thys worshypfull man hath ever loved and used to have many children brought up in learnynge in his house amonges whome I my selfe was one. For whom at terme tymes he woulde

bryng downe from London bothe bowe and shaftes. And when they shuld playe he woulde go with them him selfe in to the fyelde, and se them shoote, and he that shot fayrest, shulde have the best bowe and shaftes, and he that shot ilfavouredlye, shulde be mocked of his felowes, til he shot better."

Sir Humphrey did not actually teach the boys their lessons, but this routine was done by a tutor named Bond. The instruction must have been of a sort to produce the best fruit, for Ascham became a man of such great learning that he held important positions at St. John's College, Cambridge, and elsewhere in the world of letters. He was even tutor to the Princess Elizabeth, who afterward became his queen.

We are apt to picture in our minds these erudite men of olden days as venerable personages with long gray beards and clothed in flowing raiment of velvet and satin, an impression strengthened by their style of speech, which seems to us so quaint. Yet, when Ascham wrote *Toxophilus,* he was a young man of twenty-seven, living in the days when the bow was still used on the battle-field and, though he was never a soldier, probably able to shoot in as strong a bow as the average skillful archer.

The date of publication of *Toxophilus* is given as 1545, but the year before he told Sir William Paget that it was in the press, and the actual writing was done in 1542 and 1543. I am so particular about these dates because they disclose the probable reason for his having written it at all. From his passing over from one year into the next we may surmise that he began his composition in the last few months of the year. If that be so it fits in exactly with the fact that Parliament had just passed an act in September of the same year, which made such a book as his extremely opportune.

This was "an acte for mayntenaunce of Artyllarie and debarringe of unlawful games," requiring everyone in good health, the clergy, judges, etc., excepted, "to use shootinge in the long bowe," and fixing the price at which bows were

to be sold. That this furnished his inspiration is made almost certain by the fact that he presented the book to Henry VIII at Greenwich, while the king was in a complacent mood following the capture of Boulogne, and promptly received the grant of a pension of ten pounds a year, which was equivalent to probably thirty times that much to-day.

From the literary point of view the work is a masterpiece. It was one of the first books to be printed in England in the vulgar tongue, instead of the universal Latin of the learned, and it has been reprinted again and again for its intrinsic merit, quite aside from the special instruction in archery which it affords. I would strongly advise all of my readers to buy one of the copies which retain the original orthography and so enjoy the quaint charm, which is lost when the words are reduced to their present forms.

It is written in the mode of a dialogue between Philologus, a lover of truth, and Toxophilus, a lover of the bow. Of course it is the latter who does all the real talking, Philologus merely being like the interlocutor in a minstrel show whose remarks draw forth the witticisms of the end-men. Sometimes it makes me think of the Westminster Shorter Catechism, on which I was brought up, as when it says:

> " Phi. What is the chief poynte in shootynge?
> Tox. To hyt the marke."

When I began to write this book I vowed that I would avoid at least one temptation to which nearly every writer has given way: the quoting of Ascham for line after line. Yet now I find it very hard to keep my resolution. Every page, from cover to cover, is so pregnant with ideas that one is sorely constrained to give them new birth. The book is a complete treatise on every aspect of archery as it was practiced in the sixteenth century and no archer can feel educated in his art until he has read and studied it from beginning to end.

Undoubtedly most of what he said had been part of the

BUTT SHOOTING IN MEDIÆVAL ENGLAND

common knowledge of archery for centuries before but no man had written it down in systematic form and for our purposes we may treat it as the child of his own brain. For example, it may well be that Sir Humphrye or Tutor Bond taught him that standynge, nockynge, drawynge, howldynge and lowsynge were the main steps in correct shooting on which nearly all details could be arranged but for all of us who have followed him they are known as Ascham's Five Points, and no man has ever been able to make a better classification.

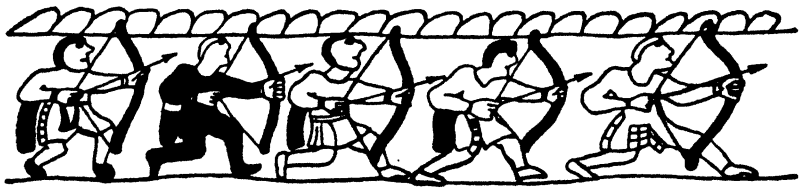
Before we leave this general period of military archery let us inquire into their methods, availing ourselves of the descriptions and of the ocular evidence of old pictures.

The only points that we can cover by this cross-fire of investigation are standing and drawing, but all archers will agree with me that if we know the general nature of these two the others can be guessed pretty accurately. Ascham says of the former, " one fote must not stande to far from the other, leste he stoupe to muche, nor yet to nere together, leste he stande to streyght up, for so a man shall neyther use hys strength well, nor yet stand stedfastlye." Whether the archer should stand with his heels in a line to the target, as we do now, or whether the left foot should be thrust out well in front he does not say, but evidence from pictures leaves no doubt at all. Whether it be the Bayeaux tapestry or anything else down to that little sixteenth century French prayer book whose archer of the Scotch guards I carved on my consolatory wooden spoon, every bowman without exception is standing with his toes toward the mark and one foot advanced beyond the other.

Of drawing there would not be so much difference of opinion as there is if it were not for that annoying phrase, which everyone seems to have heard, of " drawing to the ear." There is no doubt that archers sometimes drew to the breast, in order to get elevation easily, but in all the writings from Ascham to Ford it is directed that if one do not pull to the breast he should do so to the ear. Ascham quotes the Greek Procopius as giv-

ing opinions with which he agrees and says, "The oulde fashyon (of Homer) in drawing to ye pap was nought of no pithe, and therfore is Artylarrye dispraysed in Homer whych calleth it weake and able to do no good. Drawyng to the eare he prayseth greatly whereby men shoot bothe stronger and longer: drawnge therfore to the eare is better than to drawe at the breste."

In this case the interpretation of the pictures is not so easy. The first record of this sort that has come down to us is the Bayeaux tapestry. I have spoken of this before without thinking that there might possibly be some reader who does not know what it is. I have a good idea of it myself because I saw a duplicate of it at the Chicago World's Fair, which I think was embroidered by the women who were then living in modern Bayeux, although of course for such details as I am speaking of now I have to look at photographs. The original is a band of linen 231 feet long and twenty inches wide, on which are embroidered seventy-two scenes of the Norman Conquest of England. It was worked by women who lived at the time and is our best authority for the appearance of the invaders. It was preserved in Bayeux cathedral.

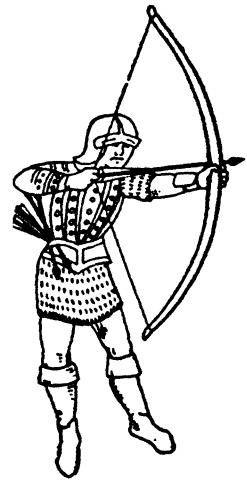


Norman Archers from the Bayeux Tapestry.

In this venerable relic the knights are in the main field, but running along the lower side is a narrow border which shows in one place a long procession of archers with drawn bows. These men have both light hair and black, they are stepping along at a quick pace, as is shown by the bending of the knees, their bows are nearly, or quite, as long as themselves, they

are shooting broad-head arrows, they use the two-fingered release and the shafts are drawn to the right pap. This might seem conclusive enough if we were to ignore the limitations of primitive art but just as the Egyptians carved their bas-reliefs of men with two arms and one leg, because they were not skillful enough to show the two, so the Norman ladies may have represented the arm in a low position because if the forearm were in front of the arm, as in a high draw, they could not represent it graphically.

In a contemporary picture of the battle of Shrewsbury, about three and a half centuries later, the archers are drawing to the level of the neck just as we do to-day, except that the fletchmond is under the ear rather than under the chin. These Shrewsbury archers and all others of whom I have seen pictures, wore helmets that covered their ears entirely so that they could not have drawn to them, nor to their general position, without considerable difficulty.



Archer at Battle of Shrewsbury.—*Cotton MS. Julius E.*

In actual practice a draw to the ear is very uncomfortable and strained, at least to me, and throws both arms so much out of line with each other that it is difficult to get one's whole strength into it. I believe that "to the ear" really meant in the direction of the ear as distinguished from the breast, and that if the back of the hand were brushed by the lobe of the ear it was near enough.

Of the myriads of old English bows only five are now known to exist. One is the Flodden Bow, described on page 101. Another is Little John's Bow. This is a single piece yew, six feet seven inches long and about five inches in girth at the grip, which is without arming. It is estimated to weigh

from ninety to one hundred pounds for a twenty-eight-inch arrow. It is at Cannon's Hall, near Barnsley, and has been in the Stanhope and Spencer families for at least three centuries. Tradition says that Little John was buried in Hathersage Church, on whose wall this bow used to hang, and on opening the grave ascribed to him a thigh bone twenty-nine and one-half inches long was unearthed. That some local giant who was nicknamed Little John was buried there I have no doubt and this may well have been his bow. It certainly could shoot a thirty-six-inch arrow. It is reflexed, possibly by heat, has a round belly and nearly flat back and is correctly proportioned for sap and heart wood.

The other three bows were recovered in 1841 from the wreck of the *Mary Rose,* which was sunk in the Thames in 1545, two years before the death of Henry VIII. One is at the Royal Service Institution and the other two at the Tower. The best one, at the Tower, is six feet four and three-fourths inches long and about four and one-half inches at its greatest circumference. One who has seen both says that it is a distinctly weaker weapon than the Little John Bow.

A few years ago Dr. Pope made an imitation of it which was found to weigh sixty-five pounds at twenty-eight inches and seventy-six at thirty-six and to throw flight arrows 225 and 256 yards at the two draws. Bows of these great lengths suggest very strongly that arrows a standard yard in length were actually in use.

The forty-one years from Henry's death to the invasion of the Spanish Armada, in 1588, saw the disappearance of the bow as a weapon of the first importance and its place taken by firearms. In the early years of Elizabeth's reign a company of one hundred men contained only twenty archers, the rest being equal numbers of pikemen and arquebusiers.

In 1572, by act of Parliament, a return was made of the number of yew bowstaves which were imported and the places where they came from. It is astonishing to find that the total

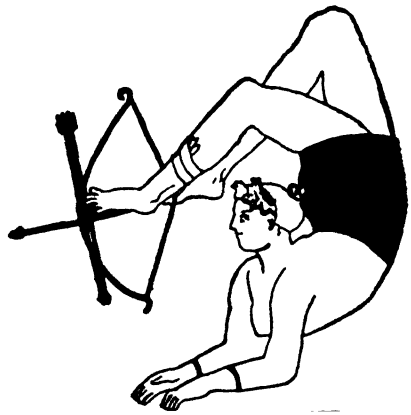
was ten thousand, and this in a period of decline. It tempts one's imagination to think how great was the number a century earlier. As the staves came from the northern ports of Emden, Dordrecht, Sonderburg, Hamburg, Denmark and Cologne they indicate the free growth of the wood in those high latitudes and show how naturally the Nordic races whom we suspect of having used the yew longbow in the first millennium came by their supply of suitable wood. However, it cannot be successfully maintained that a plentiful supply of yew is enough to make the inhabitants of a region a race of archers, as the best in Europe grows in the mountains of Spain and Italy where a love of the bow has not existed within historic times.

The danger to England from the Armada was so great that every force was mustered, very much as in the general draft of the World War, and an accurate survey of her man-power was thus made available. It appears that out of ten thousand men supplied by London only eight hundred were archers and even these were wholly from the untrained forces. Four counties had no bows, most of them showed archers in a great minority and only in Oxfordshire and Buckinghamshire did they still predominate.

Three years before this crisis in the temporal and spiritual world, in 1858, the Honorable Artillery Company was formed. The citizens of London had been called out so often to musters that they became wearied and to reduce things to a more systematic basis a number of men who had been in the army volunteered to instruct others and thus form "Train-bands." Although its fortunes were sometimes at a low ebb the company has never ceased to exist and it is at present the earliest representative of the English standing army. Their first grounds were near Bishopsgate, which Artillery Street and Artillery Lane now identify, but in 1640 they moved to a new field which is still, in the heart of modern London, known as the Artillery Ground. In the beginning the organization had

included an Archers' Division and it is very likely, indeed almost certain, that into this branch archers who had previously been known as the Fraternity of St. George were absorbed.

So far as is known the last two appearances of the bow in warfare in the British Isles were both in Scotland, the first in 1644, when the Royalists used it against the Covenanters, and in 1688, at a great clan battle between those representatives of the Irish and Scandinavian strains, the MacDonalds and the MacIntoshes.



A Roman Acrobat.

II

ARCHERY AS A SPORT IN BRITAIN

So long as the bow was one of the chief weapons of the English armies its use was naturally encouraged to the greatest extent by the reigning monarchs and their officers of state. Very much as the framers of our constitution of the United States expressly provided that no citizen should be denied the right to bear arms, so, in every age, the men of England were permitted to shoot with the bow and arrow, it being thought that proficiency in times of peace meant similar readiness and skill in time of war. During those many centuries the bow was in every man's house and archery was by far the most widely diffused and popular sport in the kingdom. After firearms became the sole weapons for long distance offensive and the bow was no longer a national necessity, archery, pursued solely as a sport, naturally fell tremendously from its position of eminence. Sometimes, in this more recent state, it has almost died out and at other times it has enjoyed flood tides of popularity, even carrying Royalty on its crest.

The outstanding details of these eras are not only interesting to students of toxophily of the present time but in any work of this kind should be brought up to date as a basis for writers of the future. I will therefore try to arrange in readable form as many of the facts, which I have picked from various sources, as seem to me to be worthy of preservation.

In the earliest times of the Anglo-Saxons and Scandinavians every evidence goes to prove that there were no legal restrictions on the use of the bow and arrow in private life. The sagas tell of numerous feats of skill that were performed in

private competition, and a few pictures, or carvings, both in Scandinavia, which at that time was closely related to England so far as such customs were concerned, and in England itself, show the householder with his weapons in his own home. Where else in fact could they be?

There were no public arsenals in those days. Every man who was subject to the universal military draft, which prevailed in those times, necessarily kept his weapons of all kinds at home and carried them with him when he was called to the service of his lord. That he should acquire skill in their use by private practice and competition is a simple and certain deduction.

When William conquered England there was a general disarmament of the population but the use of the bow was permitted again within a very short time.

That hunting with the bow in those early days was done by noblemen is proven by the fact that Sir Walter Tyrrell shot King William Rufus while chasing deer, yet in general not much is recorded of it and not much need be said. In peace times the pursuit of game was almost the only recreation of the illiterate nobility and laws against poaching were horribly severe. Some of those old statutes were in force even up to the time of at least one old man whom I knew personally and offenses were punished by mutilation, deportation and even death. A common man could hunt only illegally, as Robin Hood did, or if he had a position of special privilege such as gamekeeper.

In all periods of English history archery has not only been tolerated by the authorities but it was often given strong legal encouragement. In various reigns statutes were passed to either assure an adequate supply of equipment or to enforce its use. The following is a list of the important ones:

Edward I—

1275. Statute of Winton.

Edward III—

1341. Orders to provide bows and arrows.
1346. Order that archery should be practiced.
1363. Archery to be practiced, other games made unlawful.

Richard II —

1382. Sheriffs to provide bows and arrows.
1389. Servants to use bows and arrows.
1392. King's servants to practice archery.

Henry IV—

1416. Arrow-heads to be better made.

Henry V—

1416. Sheriffs of Kent and elsewhere to provide feathers.
1418. Sheriffs of 14 counties to provide 40,000 feathers.

Edward IV—

1465. Pattens not to be made of aspe that is fit for arrows.
1466. Irish archery.
1473. Bowstaves to be imported with merchandise.
1474. Bows and arrows shall be made.
1478. Against unlawful games, bows to be used.
1483. Regulating price of bows.

Richard III—

1483. Bowstaves to be imported with every butt of wine.

Henry VII—

1488. Regulating price of longbows.
1504. Good bowstaves free of duty.
1504. Against the use of crossbows.

Henry VIII—

1512. Everyone under 60 to shoot with the bow.
1546. Against shooting with a crossbow.
1546. Encouraging archery.

Mary—

1557. Repeals statute of Winton and reënacts.

Elizabeth—

1566. Relating to bowyers and fixing price of bows.
1571. Concerning importation of bowstaves.

James I—

1603. Continues act of 1566.
1606. To repair the shooting fields around London.

Charles I—

1628. Continues same act.
1629. Commission to enforce archery.
1632. To replace Finsbury Fields.
1633. To use pike and bow together.

Charles II—

1672. Bowstaves duty fixed at 4 pounds per 120.

That bare outline may perhaps stand being filled out with a few more facts without becoming too burdensome to read.

The Statute of Winton, or Winchester, of 1275, compelled all males under a certain rank to shoot from the age of seven, obliged merchants trading with countries from which bowstaves were imported to bring into England with every ton of merchandise four, and with each tun of Malmsey or Tyre wine ten bowstaves of sound wood. Bowstaves of six feet six inches length were free of duty. Butts were ordered kept up in suitable places. This was one of the most important of all the acts and remained enforced to a greater or less extent for centuries.

The act of 1346 ordered the sheriffs of several counties to supply 500 white bows and sheaves of arrows. White bows were without paint. The next year 500 painted bows were ordered from Gloucestershire. Painted bows are quite often mentioned in the old acts, but I know of nothing to indicate whether they were colored by various pigments or whether the terms were synonymous with varnished, or oiled.

The act of 1466 was for the Irish within the Pale. It provided that butts should be erected and everyone between sixteen and sixty should shoot on holy days from the beginning of March till the end of July. This was not so big an order as it sounds because at this time the English power in Ireland was in such straits that the Pale, or distinctly English portion, was only thirty miles long and twenty wide. At nearly this same time a law forbade all Englishmen within the Pale to wear moustaches, lest they be mistaken for Irishmen.

The act of 1363, which was reënacted in 1512, commanded everyone between seven and sixty to shoot on Sundays and holy days.

In 1483 the price of bows of yew was not to be more than 3s. 4d. This remained the standard price till the beginning of the seventeenth century.

Just how many of the British kings were archers is hard to say. Inasmuch as skill in the use of arms of all kinds has always been an important part of the education of boys of royal birth it seems probable that most of them were taught something about it. Whether they continued to shoot in manhood for the pleasure it afforded would be a matter of personal taste.

James I, of Scotland, was an archer, but I believe it was because he was brought up in England. When James was only twelve years old he was captured by some English sailors while on the way to France and was thereafter kept a prisoner in England for eighteen years. He was short, stout, well-proportioned and very strong. During the years of his adolescence he was allowed complete freedom, except that he could not go away, and history says that he particularly excelled in all manly sports, especially those which required suppleness of limb and quickness of eye. As this was during the time of the Hundred Years' War, it is only natural that archery should have been one of his studies.

In 1424, the first year of his return to Scotland, he

caused a law to be passed which was evidently inspired by the English statutes, of whose value he had had good opportunity to judge. In its quaint Scotch it is very interesting to me, and I hope will be to others:

"That all men might bush them to be Archares fra tha be 12 yeres of age, and that at ilk tenne punds worth of land there be made bow markes, and speciallie near paroche kirks, quhair upon halie dayis men may cum and at the leist schute thryse about, and have usage of Archarie; and whasa usis not Archarie, the Laird of the Land sall raise of him a wedder; and giff the Laird raisis not the said pane, the King's Shireff or his Ministers shall raise it to the King."

Wedder is Scotch for wether, a kind of ram.

King James was a poet of real merit, sometimes almost as good as Chaucer, but this little quotation from a humorous poem called "Christ's Kirk on the Green" is introduced here only because of its reference to archery:

"With that a friend of his cry'd,—'Fy,'
And up an arrow drew;
He forgit it sae furiously
The bow in flenderis flew."

Henry VII was an archer, and in a poem celebrating his wedding, the fact that he took part in the contests with the bow is thus alluded to:

"Look where he shooteth at the buttes,
And with him lords three;
He weareth a gown of velvet black,
And 't is coted above the knee."

When Francis I, of France, invited Henry VIII to visit him at the Field of the Cloth of Gold, hoping to ally England against Charles V of Spain and the Holy Roman Empire, all three of them were young men in the prime of athletic strength. Henry was 28, Francis 26 and Charles was only 20.

The political race of Europe was off to a good start. Each side at this magnificent meeting tried to put on the most impressive front. Henry had so many followers that they ate 2,200 sheep in a week. Twenty days were given over to feasts and athletic sports and archery played no small part in the English side of the exhibition. Henry shot in person, clad in the costume of a forester. The marks were 240 yards apart, but Henry was a fine athlete, over six feet tall, and, in spite of the exaggerated praise of the chroniclers, it is reasonable to believe that he shot well. Some crossbowmen of the French king's body-guard did not come so near the mark, but it would have been a courageous man indeed who would have dared to beat the visiting monarch on that occasion.

The second of his six wives, Anne Boleyn, shot too, probably with him, as in May, 1530, there is an entry in the expense account of the privy purse of 23 shillings 4 pence paid to Scawesby for "Bowys, Arrowys, shafts, brode hedds, bracer, and shooting glove for my Lady Anne." The mention of broad-heads is interesting, as it seems a reasonable inference therefrom that the Queen hunted with the bow. This was not unknown amongst English women of the gentle classes as in a letter to the Earl of Shrewsbury, in 1605, is mentioned "a verie greatte and fatte stagge, being stricken by yo right honorable Ladies handes." By the way the occasional spelling of such words as *more* and *your* as *mo* and *yo*, would seem to indicate that such a pronunciation of them, which we Americans are accustomed to hear from the members of the F. F. V.'s (First Families of Virginia), is inherited from the best circles of English society at the time of the original settlements of the Virginia plantations.

Sometimes mention is made of the payment of wagers lost by the king while shooting with his courtiers. One of them to Lord Rocheford is forty-eight pounds, a very large sum of money in those days.

Edward VI, that gentle soul, kept a diary in his youth which

is in the British Museum. It contains many allusions to archery matches in which he took part, both with and without success.

As Roger Ascham was tutor to Elizabeth in her childhood it is likely that Edward and his sister received their love for shooting and such skill as they had from him.

Queen Elizabeth was said to be "so good an archer that her side was not the weaker at the butts."

In her reign a great match took place at York in which the Earls of Cumberland and Essex participated. A poem on the occasion begins:

"God save our Queene, and keepe our peace,
That our good shooting maie increase;
And, praying to God, let us not cease,
As well at Yorke as at London.

"That all our countrie round about,
May have archers good, to hit the clout,
Which England should not be without,
No more than Yorke, or London."

Henry VII had been the first monarch to establish a life-guard, forming it of fifty tall archers. Queen Elizabeth, who liked to have handsome men about her, increased the number to one hundred. John Taylor, a plain sort of fellow who was called the "Water Poet" because he was a waterman by vocation, was a collector of wine duties at the Tower of London for a time and evidently he saw this body-guard in its prime. When Elizabeth died he was twenty-three years old.

In his "Prayer of the Grey Goose Wing" he says:

"Within these few yeeres, I to mind doe call
The yeoman of the guard were archers all.
A hundred at a time I oft have seen,
With bowes and arrowes ride before the Queen.
Their bowes in hand, their quivers on their shoulders,
Was a most stately shew to the beholders."

On my desk before me as I write is a copy of that rare little work, *The Bowman's Glory,* published in 1682, the year in which William Penn founded Philadelphia. The preface contains this sentence, which suggests that his Majesty Charles II had practiced archery:

"But I fear that I am unmannerly, your Majesty knows better than anybody else, both the Usefulness and the Pleasure of the Bow; and we were unjust to distrust your Countenancing it."

Certainly his public acts, or proclamations, quoted above, prove that he was very favorably disposed toward archery.

Charles II was a larger man than most people imagine. He was over six feet tall and well proportioned. When he was twenty-six years old he lived in exile at Bruges, and while there he became a member of the Guild of St. Sebastian and shot with them. He also presented to them a mace, which is still in their possession. On his return to England he witnessed, with apparent pleasure, several parades of archers but he is not known ever to have shot a bow in his own realm. From my knowledge of the psychology of archery I think he was of too treacherous a disposition to find real pleasure in that honest pastime.

After him came a line of monarchs who did not shoot, and archery suffered from a lack of royal patronage. If it be true that the love of archery lies chiefly in English blood one can see why it languished. Cromwell, to be sure, was more genuinely English than any monarch who ever sat on the British throne but his sombre Puritans would hardly countenance what, by that time, had become no more than a game. James II apparently cared nothing for shooting.

William of Orange and the first three Georges were German speaking Germans for whom archery had no tradition, but George IV, be the reason what it may, loved the game and by his royal participation in actual shooting made archery the most fashionable pastime in England.

He was born in 1762, thus coming of age in 1783. On June 18th, 1787, he accepted the position of Patron of the Toxophilite Society, then six years old, and thus gave it the privilege of affixing "Royal" to its name. In the same manner he became Patron to the Kentish Bowmen, three years later, and they similarly enriched their title.

Within one year after the Prince of Wales, as he was then, had joined the Kentish Bowmen, their numbers had increased so much that they laid off and graded a new field and built a new clubhouse. It was for the convivial gatherings here, graced at times by the presence of the Prince, that Dodd composed his ballads of archery. Thirty years later they were gathered into a small volume, set to very good music, which can still be found occasionally in old book stalls. From a copy in my little archer's library I take such pretty verses as these:

"In Summer time with hand-bows strong,
How gay the roving down the glade;
What sport while yet the leaves are long
At butts beneath the green-wood shade."

"A Bowman's life's the life to court,
There's nought can charm so dearly
As roving, butting, all in sport,
To the sound of the bugle cheerly.
When morning smiles on hill and dale,
Away he wends,
His bow he bends:
His shafts will seldom fail;
Full thirteen score,
And something more,
To steadily hold their flight:
Anon at the butt
With a delicate cut,
He pops them in the white."

The Prince occasionally shot with the other archers at both of these societies and to both of them presented prizes. The

Royal Kentish Bowmen vanished from off the face of the earth in 1802, but the Royal Toxophilite Society has continued to the present time, as we shall see more fully later, and by an act of his in that society Prince George profoundly influenced the whole subsequent course of archery.

In 1792, and for ten years afterward, he presented a prize of a silver bugle, to be shot for according to regulations prescribed by himself. Before that the usual distances were sixteen, twelve, eight and four roods, which, interpreted into our more comprehensible unit of the yard, would be: 120, 90, 60 and 30 yards. The stipulation of the Prince was 100, 80 and 60. It is for this reason that these distances are still called The Prince's Lengths. The count of the target rings he fixed at nine, seven, five, three and one, and these received the name of The Prince's Reckoning. An end of arrows had until then been four, or two at each target, but the Prince changed this to an end of six or three at each target. One might expect this arrangement to be called The Prince's Ends, but if it ever were I can find no mention thereof.

These innovations, for taken as a whole, they may be considered as such, met with popular favor and ever since then have been in use all over the English speaking world except in Scotland and with the Woodmen of Arden. Regarding the number of arrows to be shot and the size of the targets so much cannot be said. Instead of using only one four-foot target for all distances, as we do, they used that size only at 100 yards, while at 80 the diameter was three feet, and at 60 it was two. As is stated in the chapter on Tackle, this change of size had its origin in the days when the face was not marked in rings and the whole thing was a sort of bull's-eye, indicating the circumference within which a very good archer should set his arrows at the respective distances.

King William IV was not an archer, but he also consented to act as Patron to the Royal Toxophilites. The exact date of his acceptance I cannot find, as during that time the records

are very scanty, but as he began to reign in 1830 and a silver cup which he gave as a prize was first shot for on June 20th, 1834, it must have been in those years and most likely just before the donation of the trophy.

Queen Victoria ascended the throne three years later, a beautiful young girl of eighteen. When she was a child of fifteen her mother, the Duchess of Kent, must have taken her to the seashore near Hastings in the summer, for in that year both she and the Duchess became patronesses of the St. Leonard's Archers of that place, which enabled them to join with the Kentish Bowmen and Toxophilites in calling themselves Royal. Their Royal Highnesses also presented several perpetual prizes to be competed for annually. On Her Majesty's accession she continued her interest and desired that the society should be known henceforth as the Queen's St. Leonard's Archers. In 1840, the year of their marriage, the Prince Consort ordered his name to be inserted as a Patron in conjunction with that of Her Majesty. There is something peculiarly charming about this, something so natural and ringing so true. The kindly little princess on her holidays loving the graceful outdoor game, giving her affectionate interest to it and later on, amid the cares of a vast empire, looking back to the happy days with tender remembrances which she shared with her husband. It is curious that she should have taken up the bow on the very spot where her predecessors conquered and were conquered by it.

Queen Victoria was also Patroness to the Royal British Bowmen of Flintshire, a county that would send most Americans to their maps to locate. It is in the northeast corner of Wales, bordering the broad estuary of the sea which is called the River Dee. For years Her Majesty gave fifty pounds a year to be divided into two equal cash prizes for the ladies and gentlemen.

In 1844, the Queen became a member of the Guild of St. Sebastian at Bruges, the society to which Charles II belonged,

and in 1893 presented a prize to them on completing the fiftieth year of her membership.

The Royal Toxophilite Society sought to have the Queen become their Patroness but she would not do it. The Prince Consort, however, granted the favor, and after his death Albert Edward, Prince of Wales, who afterward became Edward VII, consented to fill the position, as has his son, King George.

Since the days of Queen Victoria's girlhood no member of the British royal family, so far as I know, has been an archer.

Excepting the queens, Victoria and Elizabeth, I know of no other royal lady who shot in the bow except Mary, Queen of Scots. *Badminton* says that she was very fond of it, that she had butts in her gardens both at Holyrood and Saint Andrews, and that in one of the inventories of her effects mention is made of a velvet glove which she used when shooting. After the murder of Darnley, in 1567, she and Bothwell won a dinner from the Earl of Huntly and Lord Seton in a match at Seton Castle.

Archery is often alluded to by its partizans as the Sport of Kings. Perhaps from this list, where the facts are marshalled in order, it might appear to be so and yet the soubriquet seems to me to be born more of the wish than the fact. What if a few kings and three queens did occasionally shoot a few arrows? Did they not also enjoy riding, hunting, horse-racing, tennis, hawking, yachting and nearly all other sports that were prompted by the customs of their times? We archers may think our hobby the King of Sports, but we must at least concede that if we call it the Sport of Kings we must share the title with many others.

While archery was often greatly assisted by the interest of the king or queen, as all things which have a prominent social side are bound to be, it was too essentially in its origin a function of the people to be entirely dependent on Royalty for its existence.

When Roger Ascham wrote, in 1545, he said, "That no man hitherto hath written anye booke of shootinge, the faulte is not to be layed in the thinge which was worthy to be written upon, but of men which were negligente in doinge it, and this was the cause thereof as I suppose. Menne that used shootinge most and knewe it best, were not learned: men that were learned used little shootinge, and were ignoraunt in the nature of the thinge, and so fewe men have bene that hitherto were able to write upon it."

Those lines describe archery as we know from history it really was, occasionally indulged in by a person of rank but against a few such were hundreds, or even thousands, of the plain men who composed the mass of the populace.

The most ancient societies indicate by the nature of their shooting that they originated in games of the people. For example, as they were not permitted to shoot at real birds, except within strict limitations, they set up an effigy called a popinjay, or in Scotland a papingo. What is, or was, undoubtedly the oldest archery meeting in Great Britain is the annual Papingo Shooting at Kilwinning, a little town in Scotland about three or four miles from the Firth of Clyde. My uncertainty as to whether to use the present or past tense in describing it is due to the fact that I am afraid, but not certain, that it has not been resumed since the Great War.

According to good tradition, which was credited by the Lyon King of Arms, it dated from 1482, near the end of the Wars of the Roses, the next to last year of the reign of Edward IV. This is getting pretty far back, for a society which still exists. It is ten years before Columbus sailed the ocean blue.

Kilwinning is the traditional birthplace of Scottish freemasonry, the lodge there, which is regarded as the mother lodge in Scotland, having been founded by foreign architects and masons who came about 1140 to build a Benedictine Abbey. This abbey was once among the finest in Scotland, but it was partly destroyed in 1561. However, the northwest

tower, which is 105 feet high, still remains and it is to the top of this that the small wooden papingo is affixed, stuck on a spike in the end of a projecting beam. The shooting was for a specified time and each archer was obliged to touch the base of the tower with one foot while having his turn.

There was a charming old-world fascination in this annual event which brought archers from far away, a pleasing savor of antiquity. The chief prize was a benn, or sash of pink silk with a gold stripe, and after the match was over the archers paraded through the town and stopped at the door of each alehouse for a drink. It was deservedly popular.

The first royal patent which established a definite archery society, for purposes of sport in part and not only as a company of soldiers, was that issued in 1538 by Henry VIII. It is given in its full text, printed in the mediæval black-letter type which was still used in records of law, in *The Bowman's Glory*. After personally naming four gentlemen, it gives them power "to gadre, knytte and establyshe a certeyn perpetuall Fraternitye of Saynt George," to "be Ouerseers of the Scyence of Arttyllary, that ys, to wyt, for Long-bowes, Crosbowes and Hand-gonnes" and "for theyr dysporte and pastyme to exercise shotyng at Almaner Markys and Buttys and at the Game of the Popymaye."

A provision which interests us because of its proof of the antiquity of a word which is still in common use, says that "when any shall openly speke thys usuall worde Faste, then yf yt happen any parson passyng betweene any suche shoter and the Marke be kylled or hurt, then any such Mayster, Ruler and Brother shall not be arrested, ymprysoned or otherwyse ynonytted."

Most writers have believed that this was the original patent of the Honorable Artillery Company, but some, with whom I agree, think it was exactly what it says, the foundation of a society of archers and small-arms men called the Fraternity of St. George.

Those who belonged to it used to shoot in Spital-fields, and as that was where the "train-bands" who later on formed the Honorable Artillery Company also drilled and shot, almost thirty years later, it is natural that they should have become amalgamated. The question may seem a matter of splitting hairs, but inasmuch as the two organizations are mentioned separately in various places I hardly think that they should be classed as identical.

If human nature were the same then as it is now, which I think we are all willing to grant, the new firearms, which were undergoing continual improvement, would be much more interesting to young men of the age to which military training would appeal than would the bow, which they would regard as an antiquated heirloom rapidly sinking into obsolescence. The minority who clung to what at that time was still a really superior weapon, would naturally drift together to make their numbers as impressive as might be and to give each other moral support.

In some such way as this I believe the Finsbury Archers to have arisen. The Guild of St. George ceased to be mentioned, the H. A. C. dropped, for a time, its division of archers, and yet the Finsbury Fields continued to be shot over for another century. It seems as though they took their name from their shooting range. Perhaps Finsbury Archers was at first more generic than specific a term, though later the organization became more solidified and records still exist which show the captains and lieutenants, or, as we should express it, the winners and runners-up, of their tournaments at Easter from 1654 to 1757, and on Whitsunday, which we Presbyterians may have to be told is the seventh Sunday after Easter, from 1692 to 1761. They also held a third meeting called The Eleven Score Target and in 1676, the only one I know about, it was shot on the Artillery Ground on the 24th of July.

The fact that the Finsbury Archers was less a close corpora-

tion than a sort of general body like our National Archery Association is suggested by the form of the invitation to this meeting in 1676, which *Badminton* prints in full. It calls not on its members by special designation, but announces that "All Gentlemen Lovers of the noble Society of Archery are desired to meet at Drapers' Hall."

The registration fee was two shillings and sixpence and the target fee was a pound, which was chiefly spent in buying spoons for prizes.

The actual conduct of this tournament is, so far as my knowledge goes, the first of which we have a full description. As it evidently followed well-established customs, some of which persist in different English societies at the present time, it is interesting to give the chief facts.

The first procedure was for all the archers except the captain and lieutenant to draw lots for the order of their shooting. This was very important because the prizes were given for the first hits in the various colors. To our minds that is such an unfair arrangement that one wonders how it existed so long. The shooting was of the sort still practiced on the continent, each man, beginning with the captain and lieutenant, shooting one arrow and then passing on to the left.

There were five circles in the target, as there are now, and everyone hitting a circle got one of the spoons belonging to that circle as long as there were any left. If but some of a lower value remained, he got one of those. When the prizes were all won the game was said to be "shotten down" and the shooting was over. Under any such system as this it is obvious that the target must be pretty hard to hit. I have never read of a straw target that was more than four feet in diameter. At 220 yards the number of spoons would not have to be very great. However, while the shooting began at that distance the captain could order an advance of ten yards after every few rounds if he thought it necessary. The officers for the next match were selected automatically, the first man to

hit the gold being captain and the first in the next circle being lieutenant. The exact colors of these two circles is in doubt, as the directions say that the centre should be either " redd or gilded." The other three rings were the inner and outer white and the black.

The treasurer of this meeting was William Wood, the same who published *The Bowman's Glory.* He was evidently a hustler, of the type without which no archery society seems able to thrive. In the same year he went about among the archers with a subscription list for donations of a guinea apiece to buy a badge for him, as he had been elected " Marshall to the Queen's Majesty's Regiment of Archers." The petition was authorized by the " Officers and others of the Society of Archers within the cities of London and Westminster," so it would indicate still further that the combinations of bowmen were rather loosely formed and more or less interlocking.

The badge is now in the possession of the Royal Toxophilite Society. It is a large emblem, big enough to nearly cover the chest, showing two bearded men in tight-fitting garments that look like modern one-piece bathing suits, supporting a central oval on which is an archer with full drawn bow, dressed in short trousers gathered above the knees. The inscription on it is, " Reginæ Catharinæ Sagittarii," which means the archers of Queen Catherine. Queen Catherine of Braganza was the wife of Charles II and it is sometimes stated in books that she presented this shield, which is not so.

Wood died in 1691 and the shield was kept in turn by succeeding marshalls until it reached the last one, Mr. P. Constable. When the Toxophilite Society was formed he joined it as a friend of one of the founders, Mr. Waring, with whom he sometimes shot, and thus brought the shield and some records of the Finsbury Archers into the permanent keeping of that society.

There was a most extraordinary pageant of archers held

in London on the 17th of September, 1583, which has been spoken of in so many books and which in itself was so different from anything else that I have come across in the history of archery that I am tempted to write of it fairly fully. It is called "A Remembrance of the Worthy Show and Shooting by the Duke of Shoreditch and his Associates, the Worshipful Citizens of London."

As a preamble it is stated that one day Henry VIII was at Mile-end when Prince Arthur and his Knights were there shooting and that he did commend the game. This does not refer to Prince Arthur his elder brother, who died in 1502, seven years before Henry VIII ascended the throne, but to a group of archers who are known to have existed then and who, in the spirit of sport, named themselves after Arthur of the Round Table and his Knights.

Quoting verbatim, "This noble King at another time keeping a Princely Court at Windsor, caused sundry matches to be made concerning shooting in the Longbow: and to which came many principal Archers, who being in Game and the upshoot given, as all men thought, there was one *Barlo* yet remaining to shoot, being one of the King's Guard; to whom the King very graciously said, Win them all and thou shalt be Duke over all Archers. This *Barlo* drew his Bow, and shooting won the best. Whereat the King greatly rejoiced, commending him for his good Archery; and for that this *Barlo* did dwell in Shoreditch, the King named him Duke of Shoreditch. (A sign of a Princely mind to the encouragement of his poor subject.)"

This pseudo-title was evidently handed down, no doubt as a sign of exceptional proficiency, a sort of championship as it were, and in time it became a custom to surround him with a kind of mock court. Thus in 1583, "at the great cost of sundry chief citizens," "The worthy Shoreditch Duke, as Successor to the former Dukes, his Predecessors, gave warning to all his Marquesses, Earls and Barons, with all their train

of Archers whatsoever, in and about the City of London, to be in readiness to accompany him into the Field, every one with a long-bowe and four Shafts."

From the long and involved description of the parade I make out that there were at least fifty-two sections. Among them, for example, were Multitudes of good Archers with green Ribbons and Scarves, certain Knights of great worship, Swattrutters of stern countenance, a Troop of Barons in Chains of Gold with Pages in green Jackets, a Consort of broken Musick playing to the delight of all hearers and, last of all, an hundred Shot, very ready and nimble to discharge.

Every section was beautiful and elaborate and I think the whole has a deep significance. Does it not show why the land of our forefathers was called "Merrie England," and what other evidence could we find that would prove so conclusively the hold that archery had on the hearts of the people?

The whole number of marchers was about forty-one hundred and when they reached the shooting fields three thousand men shot at a new butt set up at one hundred and forty-eight yards. At the end of the match, on the next day, five young men had come to a tie and were carried home in state by hundreds of their neighbors.

During this same year several "Stakes" were set up by various people, each one accompanied by great processions of archers and other worthy citizens and serving as centers for much merrymaking and shooting. The stakes seem to have been very costly affairs, handsomely decorated posts, I suppose, which were set up by someone who wished to court popularity by giving everybody a treat.

Although the times of the Tudor dynasty, when these scenes occurred, seem very remote to most of us, the vista is sensibly shortened if we dwell on the story of an ancient institution which has filled much of the intervening period. Almost a century after the pageant of the Duke of Shoreditch, that is on May 14th, 1673, at least ten archers met together

at Scorton and established an annual contest for what, in their own words, is called "a silver arrow." I have a copy of the original constitution before me and unfortunately it says no more than that as a preamble. Many think, probably correctly, that this meeting was for the purpose of codifying traditional practice and that the contest had been in existence for an unknown period. This is suggested by entries in the early records which mention the *gold* arrow, as though the silver one replaced an older one of gold which had been lost but of which the tradition and name remained.

The organization has always had more of the nature of a meeting than of a club, as all archers were eligible to compete. At first the contest had to take place within six miles of Eriholme, a small village twenty miles south of Durham, but in 1823 the distance was extended to twenty miles and in 1869 to include the whole county of York, by far the largest in England.

Originally the shooting began at one hundred and sixty yards, with a ten-yard advance after each three ends of two arrows, until all the prizes were won, but for the last century the distance has been at one hundred yards only and lasts four hours.

The only American who has competed in this match is Dr. Henry B. Richardson, now of New York. At that time "Harry" was a strongly built lad of nineteen, in England for a summer's holiday of shooting. To us doctors it is interesting to know that he is the son of the nationally known Dr. Maurice Richardson of Boston, Professor of Surgery at Harvard.

On July 29th, 1908, he took part in the two hundred and thirty-fifth annual competition and of his shooting *The Field* said: "Mr. Richardson shot in great form and made the highest in hits and score that has ever been recorded." On this occasion one hundred and seventy-eight arrows were shot, the first four men making:

H. B. Richardson.....162 hits 452 score 9 golds
C. H. Coates..... 61 hits 269 score 5 golds
T. T. S. Metcalfe.....50 hits 198 score 4 golds
C. Pownall .....54 hits 188 score 3 golds

An ancient custom is preserved whereby the maker of a gold receives a shilling from each archer, each of the other colors paying sixpence.

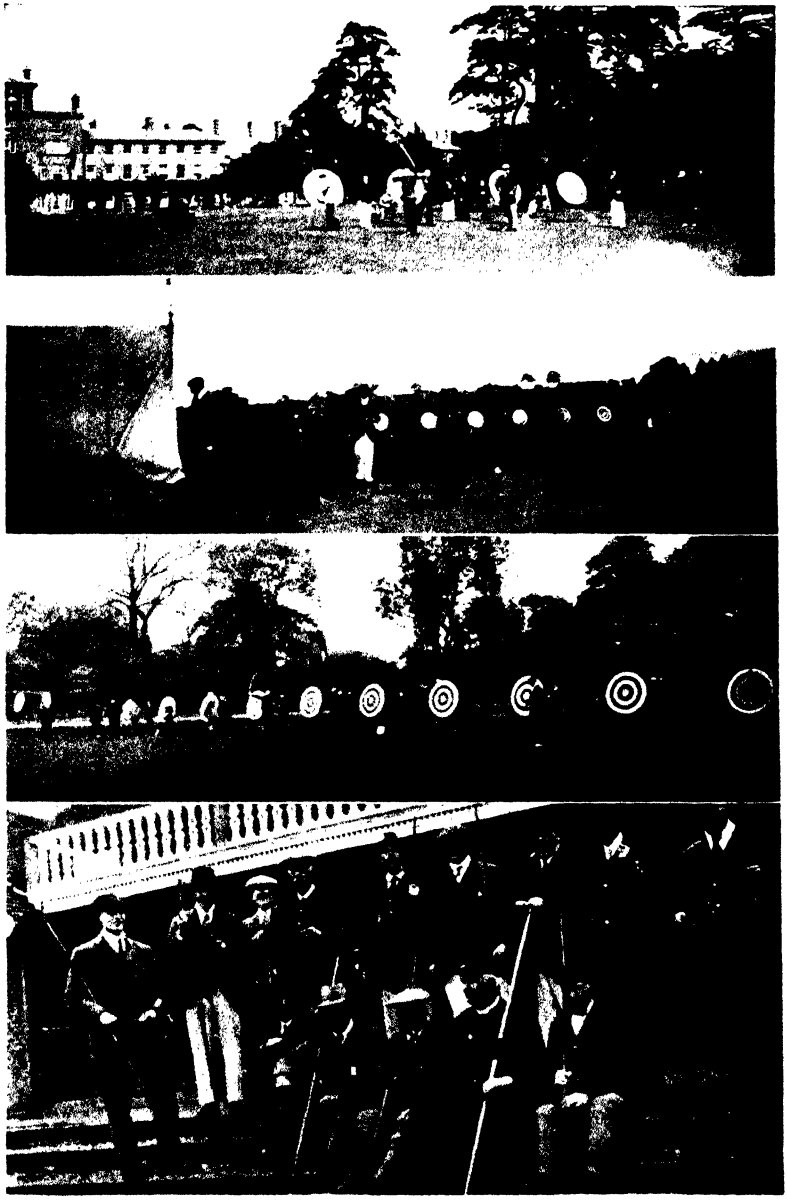
Other prizes for the Scorton shooting have accumulated from time to time but the only one of general interest is an ancient horn-spoon, supposed to be contemporary with the arrow, which is given to the archer who last hits the white. It is an impressive sight to look at the list of winners of this ancient fixture in sport, occupying, as it does, nearly four pages of fine print. I should not wonder if it were the oldest athletic event in the world.

Let us now take an accounting for a definite date, say the beginning of the eighteenth century, to see what the condition of archery was at that period and thus set the stage for newer scenes.

In England we know but little definitely, except that the contest for the Scorton arrow, which never attracted many competitors, was thirty years old, and a modest number of enthusiasts shot at the butts and over the Finsbury Fields. Of military bodies there were none who had not discarded the bow for firearms.

In Scotland the Royal Company of Archers existed in strength and the popinjay was shot for at Kilwinning and possibly also at the neighboring town of Irvine. At Musselburgh there was an annual match for a silver arrow which at present belongs to the Royal Company and has a medal attached to it dated 1603. At Peebles there were contests for an arrow and at St. Andrew's University St. Salvator's and St. Leonard's Colleges competed annually.

In Ireland there was no archery worth speaking of, nor do we know of any in Wales.



ENGLISH ARCHERY

On an English lawn
The Scorton Arrow, 1912
The gentlemens targets a

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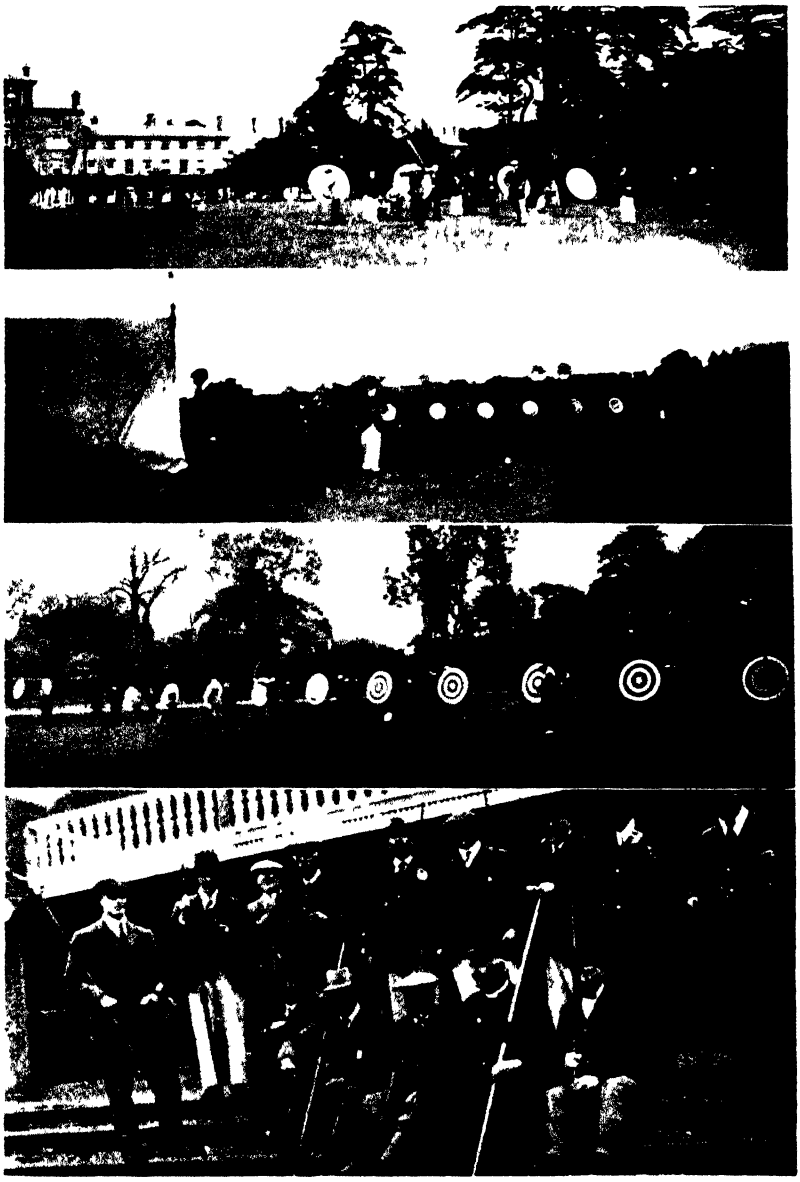


ENGLISH ARCHERY

On an English lawn
The Scorton Arrow, 1912
The gentlemens targets at a typical meeting
Some gentlemen at the Grand National, 1922

This is all I can say of organized archery. Undoubtedly there were a great many archers scattered over Britain from one end to the other who were of the kind described by Ascham as being better at shooting than at writing about it, but there

Finsbury Archer's Ticket.—*Badminton.*

is no way of judging their number nor their influence in keeping alive the sport. One thing we do know is that enough bows were sold to keep a few bowyers and fletchers in existence; for example we know definitely that the Kelsals, of Manchester, had followed these trades for several centuries and continued to do so for about a century after the time of which we are speaking.

On the whole, however, the decline of archery from this date was precipitous. Not only were no new contests inau-

gurated nor societies formed but, what seems to me to be most significant of all, the thousands of bows which must have been in England disappeared from the face of the earth. As I have said before it is an astounding fact that of all those myriads of bows and bowstaves that were either brought into England, or manufactured there, for century after century, only two have remained above ground.

It must have been during the first three-quarters of the eighteenth century that this universal vandalism was perpetrated for in the last quarter, when archery was revived, the new Toxophilites found that the old weapons had vanished. Some government records mention bundles of rotten bowstaves, some are known to have been used to kindle fires, and I suppose the rest were used for any purpose that would require a straight stick. Somehow it is less painful to me to think of a sword being beaten into a ploughshare than of a yew bow serving as a bean-pole.

Julius Cæsar attributed the manly qualities of the Belgians to the facts that "merchants least often resorted to them and they were farthest removed from those things which tend to effeminate the mind." Perhaps it was for similar reasons that archery seemed to keep a firmer foothold in the north of England than in the south, or you may say that the Scandinavian blood was thicker there or ascribe what cause you will. Yet it is true that there were enough interested archers in Richmond, Yorkshire, near the scene of the Scorton arrow contests, which by the way have been held only three or four times at Scorton itself, to form a Society, called the Richmond Archers, on May 13th, 1755. Probably it was a rebirth of an older gathering, as so many clubs have been, as in 1782 it is spoken of as an ancient society, which would hardly be justified by twenty-seven years of existence. The next year the Scorton contest was held in Richmond, though it had often been there before, and twelve men shot in it. I cannot refrain from speaking again of this curious old institution, which seems to

lead a charmed life. I have before me the complete lists from 1683 to 1877, printed in the *Archers' Register* of the latter year, and in all that time the largest number of contestants was thirty, in 1845, the year after the first Grand National, when enthusiasm ran high. Most of the time the average is about fourteen though in some very lean years after 1864 the attendance ran from only four to eight. Personally I would rather shoot for that old arrow than for anything else in England.

Real modern archery may be said to begin with Sir Ashton Lever. I believe that no archery society has ever been known to thrive unless some enthusiast were there to foster it and Sir Ashton was a man of exactly that temperament. He was essentially a faddist. First he had a wonderful aviary of birds, one of the best in the world, then he suddenly tired of that, got rid of it in a hurry, and collected enormous quantities of seashells, fossils, stuffed animals and similar objects and formed a museum which was known throughout the country. Up to this time he had lived near Manchester but when his collection became so famous he took it to London and set it up for public inspection in Leicester House. He had brought with him as curator a Thomas Waring, who had worked under one of the Kelsals. Waring contracted some pulmonary trouble in the dusty museum, just as poor old Ishi did at the museum of the University of California in our own land and time, and he took to shooting in the gardens of Leicester House to cure himself. This was in our year of Independence, 1776. His recovery was so rapid and complete that Sir Ashton became interested in the bow with all the enthusiastic energy that he gave toward any new hobby.

To make a success of any social organization in England, at least in those days, nothing counted more than rank, and therefore to have archery taken up again by one of the lesser nobility, after it had been in the hands of common people for so long, brought it into immediate prominence. Shortly after

he began to shoot, in 1777, he gathered together a band of the neighboring gentry in the vicinity of his home near Middleton, a suburb of Manchester, and organized the Middleton Archers, a modern club such as we are accustomed to at the present time.

At London he did the same thing, gathering such friends as cared to shoot, together with P. Constable and any other Finsbury Archers who still existed, and forming them into the Toxophilite Society.

From that day to this the Tox. has been the most influential society of England, rivalled only by the R. C. A. of Scotland. In 1784 the museum was disposed of by lottery and the Toxophilites were obliged to seek a new range. On May 26th of that year they therefore sent a letter, signed by twenty-four men, headed by the Earl of Effingham, to the Honorable Artillery Company requesting leave to shoot in the Artillery Ground.

Negotiations were satisfactorily concluded with the result that for the first time since the very earliest days of the H. A. C. it once more possessed an Archers' Division. Indeed there are those who say that this was the first and only Archers' Division that the H. A. C. ever had and assert that the original one was a myth. I do not agree with this for if so why would the H. A. C. have the right to tear down obstructions in the Finsbury Fields, specifically to assist the fortunes of Archery? The Archers' Division accompanied the H. A. C. in the last of these peregrinations and one of the archers stood on a wall and shot an arrow from that perch to prove their rights and show that they could have torn the wall down if they had not been so tender hearted. This affiliation lasted for twenty years and was then discontinued.

When Prince George became Patron the society boomed. Its members increased to one hundred and sixty-eight and they rented and levelled a range of their own. Other societies began to form in different parts of the kingdom in imitation of it.

The first general meeting of these clubs, in what we now call a tournament, was on May 17th, 1789, at Blackheath, an open common five miles southeast of St. Paul's Cathedral, London. In fact five meetings in successive years were held there. In 1791 thirteen societies were represented. Of these the Honorable Artillery Company were present in sufficient numbers to be grouped in two divisions and so were the Toxophilites. That would look to me as though the two societies were both very flourishing and the Archers' Division of the H. A. C. were perhaps not so dependent on the Tox. as has been supposed. In 1792 there were ten societies and in 1793 nine, from which I judge that 1791 was the peak of the popularity of archery in that period.

It was an age of hard drinking, as all readers know. Every man was expected to get as drunk as he chose; apparently the more soaked he became the more admiration he received. It was the time when gentlemen were rated as two-bottle men or three-bottle men according to their powers of resistance to alcoholic intoxication. There were celebrated wits whose genius would not sparkle at its brightest until they were paralyzed from the hips down. It is therefore not to be wondered at that more attention was paid to the preparations for conviviality at the fashionable archery gatherings, when the banquets were even graced by the presence of the high living Prince of Wales, than to the shooting. To be sure they did shoot from twelve to three and from half-past three to six. I imagine it took many of them till noon to get freshened up after the night before.

There is no way of telling much about the shooting. The size of the targets is uncertain, though it was sometimes surely four feet, the number of arrows varied greatly and prizes were won, as children naturally play to-day, by an occasional hit in the gold even though most of the other arrows might miss the target.

They certainly must have had a good time, though. Each

company had its marquee where there were refreshments to sustain life during the intermissions between the more formal feasting, bands were present which played stirring marches when the archers advanced to the other line of targets at each end, and according to Roberts there were " tens of thousands " of spectators.

A Mr. Anderson, who won the meetings in 1792 and 1795, was a Fleming and shot with a Flemish bow. So far as I know he was the only foreigner except our own Richardson who was ever victorious in England.

In 1794 and 1795 general meetings were held at Dulwich but I have no details of them except the names of the winners.

Two years before, in 1793, war had been declared on England by France, which was in the horrors of the French Revolution. The times immediately became exceedingly restless, not only from military manœuvres but because the tremendous convulsions in the life of the French could not fail to spread more or less into all other countries. In this book of archery perhaps it should be recorded that a conspiracy was discovered, or at least suspected, whose object was to murder King George by means of a poisoned arrow. Maybe we might try to find a little excuse for the plotters if it were not that they intended to shoot it from an air-gun.

In national crises like these, archery has to go just as surely as it did in the World War. The French Revolution ran into the Napoleonic Wars and it was not till well after Waterloo, in 1815, that English life could begin to quiet down sufficiently for the people to pay attention once more to sport.

As in the previous century the first move was seen in Richmond, near the Scorton Arrow, so now the first sign of renewed interest was the formation of the Irvine Archers, about four miles from the Kilwinning Papingo. I suppose that one of the reasons why the Arrow and Papingo have persisted through every time of stress is that the matches are so easy. Anyone might take a day off to shoot at a wooden parrot or

to lose a few shillings to his friends who could not spare the time to go through the arduous practice necessary for making a decent showing at a great formal match.

The convivial Prince of Wales became George IV in 1820 and in that same year enough archers were in existence for some one of them to make an unsuccessful proposal for a general meeting. The next year a circular to similar effect was sent round but nothing came of it. Then one by one new societies began to form, the Thirsk Bowmen, in Yorkshire, in 1824, New College, at Oxford University, in 1825, the South Saxon Archers, of Sussex, in 1827, and so on until about 1830 enthusiasm burst out again, as it seems to do periodically, and societies were formed all over the kingdom in the succeeding five years. In the meantime some of the old societies had become revitalized. The Royal British Bowmen started shooting again in 1818, and John o'Gaunt's Bowmen, of Lancaster, followed in 1820. The Royal Toxophilites and the Woodmen of Arden had never wholly stopped shooting, although in the case of the former it was probably kept alive by a very few members as the records are either wholly lacking or in an incomplete state.

From 1835 to 1844 archery grew stronger and stronger until in the latter year it was decided to once more establish an open contest for all the clubs of England.

This so-called Grand National Meeting was held on the race course known as the Knavesmire, at York, on August 1st, 1844. It was agreed that the Prince's Lengths and Prince's Reckonings should be used and that the number of arrows at each distance should be such as would give approximately equal scores, which, in the judgment of the committee, was six dozen at one hundred, four dozen at eighty and two dozen at sixty. The winner was chosen on the basis of highest gross score, and his prize was a vase worth fifty-five pounds.

This is the tournament that gave the York Round its name and made it the standard round for every national tournament

in England and America from that time to this. The Rev. J. Higginson won it with a Single York of 53–221. No ladies competed.

Since this first meeting the tournament has been held every year except during the World War. I will try to pick out from the records some of the interesting facts but I see no use in detailing every match.

In 1849 the National Round for ladies was invented and shot for the first time, consisting, as it does now, of four dozen at sixty yards and two dozen at fifty.

It was at this meeting, at Derby, in 1849, that the abominable system of "points" was invented. I lay special stress on this fact because many archers who have not given serious study to the matter are under the impression that the point system is of great antiquity. This is distinctly a mistake as before then winners had always been chosen either by score alone, as in previous Grand National Meetings, by first hits in the gold, as in many other meetings, or by various other figurings of hits and score but never by points.

In the point system the archer is not credited with the score he really makes, nor with the exact number of hits, but his standing is based entirely on comparison between his own marks and those of the other archers. A man may get just as many points if he win with a miserable score over a company of what Ford calls "muffs," as though he obtained a victory over the best in the world. It is worked in this way:

2 points for highest gross score.
2 points for most hits.
1 point for highest score at each distance.
1 point for most hits at each distance.

Thus it will be seen at once that there are ten points given in the York Round and eight in the National.

Even in this first match the essential unfairness of the system was manifested. Capt. A. Penistone Moore made a

score of 173–747 and Horace A. Ford made 176–703. Everybody with sense above the level of an ape's can see that Moore was the real winner, yet by this rotten method of confusing results his well-earned victory was stolen from him and given to Ford. I have not at hand all the details of this score but we can see that Moore got two points for gross score and Ford two for gross hits. Of the other six Ford got three but Moore only got two because a man named Attwood, who did not figure in the real result at all, snatched one point. In these cases it is most often a man who performs the comparatively easy feat of getting twenty-four hits at sixty, when a leading archer has dropped one arrow, who deprives the real winner of the just fruits of his toil.

I will give a list of those who have been cheated out of their rightful title, as in my mind they are the real victors:

Year	*Name*	*Score*	*So-called Winner*	*Score*
1849	A. P. Moore.....	173–747	H. A. Ford.....	176–702
1879	Mr. Rimington.....	165–799	R. Walters.....	187–729
1880	Mrs. Piers Legh.....	124–600	Mrs. Horniblow.....	133–593
1884	Major C. H. Fisher.....	191–941	C. E. Nesham.....	208–902
1889	Rev. C. J. Perry Keene...	177–859	Mr. Gregson.....	198–832
1893	Rev. Perry Keene.....	169–719	Mr. Gregson.....	172–656
1896	Miss B. M. Legh.....	115–587	Miss B. Oakeley.....	123–559
1903	G. Sharpe.....	177–769	R. Brooks King.....	189–767

In 1893 Mr. Gregson was tenth in score and yet he won the championship on points!

In 1869, 1870 and 1871 the championship was awarded for the highest score but in 1872 they returned to the point system. Essentially the point system finds its adherents in those who know they cannot win but who hope, by good luck, to get either a point or a fraction of one. It is a question that for this reason can bring out many adherent votes at a meeting.

The lowest score of which I have any knowledge was made at the first meeting by G. Robinson, who got nothing at all at 100 and 80 and 2 hits 8 score at 60.

In 1848 the greatest archer who ever drew a bow made his

first public appearance. Horace Alford Ford is a figure of such overwhelming importance in the history of archery that I will speak about him now, at length.

He was six feet two inches tall and of slender figure. He was a fine performer on the violoncello and an expert player of billiards. A quiet, refined, English gentleman.

How much practice he had indulged in before his first appearance at the Grand National, or who taught him to shoot I cannot say, but I do know that he laments the fact that his first public score was so surprisingly lower than his practice scores. As a matter of fact his first double York was only 341, a figure which provides perennial consolation for beginners.

Ford not only had the ideal physique for an archer, except that perhaps greater strength would have been an advantage, but he was a deep student. Not at all a student of the literature of archery, for his book shows him to have had a very poor knowledge of that, but of what was far more important, the basic facts which underlie good shooting. He was a pioneer in technique, developing every position and movement to a degree of refinement that has never been equalled and especially emphasizing the Point of Aim as an essential to consistent shooting. Of the details of his methods this is not the place to speak.

From 1849 to 1859 he won the York Round eleven times in succession and in 1867 he won it again, his average score for the twelve victories being 205–947. Four of them were over one thousand, a mark which no other archer has ever reached in the Grand National except C. E. Nesham in 1886.

In 1857, on the grounds of the Ladies' College at Cheltenham, he made the world's record of 245–1251, which has been the despair of archers on both sides of the Atlantic ever since. The other great scores may be seen in the tables elsewhere.

In 1860, after five years of splendid scoring, his health broke down and he was defeated by George Edwards, who was also

an excellent archer, though never in the class with Ford at his best. In 1863 he tried again but after an excellent start of 182 at the one hundred yards on the first day the flexor muscles of his forearm gave out, that is, the muscles which control the fingers, and he was obliged to retire from the field. Major Fisher, who knew him intimately and shot with him time and again, was sure that this strain came from Ford's habit of drawing at the very tips of his fingers in order to get a maximal smoothness of loose.

Four years later, at Brighton, July 24–25, Ford shot again. The weather on both days was perfectly calm and he used a forty-pound bow with light arrows. As his third finger was the weakest one I believe he had learned to reinforce it, or at least take it off the string, by laying it over the back of the second finger. To the satisfaction of everyone it proved to be a genuine "come-back" and he won with the fine score of 215–1037. After this he shot very little or not at all.

Ford was the only man who ever crossed 800 in the Single York Round. He once made 809 and on another occasion came within one point with the noble figure of 799. The proof of these miraculous scores is contained in a personal letter to Major Fisher and in a paragraph from his own book. As many of my readers may never have access to the older literature which contains them I will quote both in full:

"*Cheltenham, Wednesday.*

"Dear Fisher,—I'm vexed you could not come this morning, as it was beautiful for shooting, and because also I should have given you 'an eternal hiding' at golds and reds. I shot the 144 arrows, and made in these colours 548—that's all—getting altogether at 100 yards 69–371; at 80 yards 48–274; at 60 yards 24–154, 141–799. Mettez cela dans votre pipe and smokey le. Come on Tuesday next, if fine. I know nothing to prevent my shooting on that day.—Ever thine, H. A. Ford."

"Under the risk of being considered egotistical, but to oblige the requests of several correspondents, I now give the three following specimens of my private practice—I need hardly say

my best. The first two are the Single York Round of six dozen, four dozen, and two dozen. At the first I made (with an Italian self-yew bow of Mr. Buchanan's and 5s. arrows of Mr. Muir's) 71 hits 335 score (missing the '59' shot), 48 hits 272 score, 24 hits 158 score, giving a total of 144 shots —143 hits, 765 score. At the second (with a yew-backed-yew bow and same arrows), 66 hits 344 score, 47 hits 301 score, 24 hits 164 score; total 144 shots—137 hits 809 score."

The third score which he quotes in this passage is not the York Round mentioned in the letter to Fisher, which seems to have slipped his memory, but is a St. Leonard's Round of seventy-five arrows at sixty yards. The total was 75–555, made up of twenty-eight golds, thirty-seven reds, seven blues and three blacks.

In November, 1851, Ford shot a Double York Round in a friendly tilt with the Rev. John Bramhall and Capt. A. Penistone Moore. The three fine scores were Ford 262–1414, Bramhall 250–1244, Moore 223–1045. At the one hundred yards' range in this Double Round Ford got 127–617, Bramhall 114–504, Moore 100–440.

If it were not that they are placed in comparison with Ford's superlative scores Bramhall's would be considered wonderful. In another private match these two gentlemen shot the following Single York:

Ford 63–319; 46–272; 24–154:: 133–745.
Bramhall 57–243; 46–236; 24–149:: 126–626.

Mr. A. P. Moore, in the *Archers' Register* for 1881, speaks of a remarkable end at one hundred yards made by Ford, Bramhall and himself. Of the nine arrows six were golds and three were reds, Ford had three golds, Bramhall two golds and a red and Moore one gold and two reds. Once when Ford was shooting with Fisher he put in two golds at one hundred yards and then turned to Fisher and offered to bet that he would make a third one. Fisher offered him twenty shillings

to one. Ford shot, made it and pocketed the sovereign, thus, as Fisher says, making four golds with three arrows. At another time he did the same thing with Moore except that the bet was five shillings against the pound. Ford also made three golds at one end at the Grand National of 1854, a feat repeated only once by Colonel Burton in 1891.

As I said before Ford is the only archer who ever passed 800. Four men in America have passed 700, three of whom are living, but no other Englishman has risen above the 600 class. In the list of scores above 500 made on Target Days at the Royal Tox. from 1856 to 1894, as given in *Badminton*, Ford made 623 in 1858 but no one else reached 600 except G. E. S. Fryer, who on August 2, 1872, made 59–289, 44–218, 24–132::127–639, and on June 3, 1873, made 55–235, 47–249, 24–138::126–622.

Bramhall ranks second to Ford in private practice scores, though he always fell off sadly in great meetings. His best Single York was made on November 25, 1851: 61–317, 41–223, 23–135::125–675. Although he is eclipsed by being a contemporary of Ford he was still a superb archer and the following quotation from Fisher's personal account of his shooting should be made a matter of wider record:

1849.	54	rounds	shot.	Average	103–453.
1850.	70	"	"	"	110–502.
1851.	64	"	"	"	117–561.
1852.	52	"	"	"	117–575.
1853.	38	"	"	"	114–567.

At one hundred yards he once made four consecutive golds and often three at one end.

Best score at eighty yards 47–273. Best at sixty, 24–172. Also 409 consecutive hits at sixty and five following golds.

Best Double York, 107–535; 91–497; 48–290::256–1322.

And yet he never reached 800 in a Grand National.

H. C. Mules of the Royal Tox. made a testified score of 115–603 in 1858.

Reverend Rimington in 1872 shooting one hundred and forty-four arrows at sixty yards made 142–840. This is the English record, though it has been beaten several times in America.

It can be easily seen that this was a hey-day of British archery and there can be no doubt that the general excellence and vast increase in scores over all that had been recorded in earlier years were due to the general adoption of the point of aim of Ford and to the inspiration which was the natural consequence of shooting in his company.

The greatest number of competitors ever present at an English Grand National was in 1860 at Bath when there was a total of two hundred and eight, ninety-nine ladies and one hundred and nine gentlemen.

In 1861 the Grand National Archery Society was founded. Up to this time the committee had been self-elected and there was no compulsion of legal status about the meetings. They were held more by a sort of general acquiescence than of necessity. With the formation of a definite society things were put on a stable basis, even to the extent of procuring an endowment fund.

All through the rest of the nineteenth century archery was kept up to a worthy standard. In the list of winners of the Grand National the names that appear most prominently are those of Major Fisher, Mr. Fryer, Mr. Palairet and Mr. C. E. Nesham.

Running parallel with the various courses of archery in England but in a distinctive manner of its own has been another famous society called the Woodmen of Arden. The ancient forest of Arden of "As You Like It" was a great wood which formerly extended through Warwickshire and some of the adjacent country. At Meriden, in 1785, when the infection started by Sir Ashton Lever was spreading through England, a party of gentlemen met at the Bull's Head Inn and organized themselves into a band of archers.

There is no reason whatever to suppose that they represented any genuine continuity with the past but they were men of taste and culture and it suited their whim to pretend to revive the ancient practices of the forest and to shoot in the style of their forefathers rather than to adopt the newer vogue of much shorter ranges. Fortunately for the prestige of the Woodmen their first warden was the fourth Earl of Aylesford. His name was Heneage Finch, but as at least five others of his line bore the same name and as all of them since his time have shown interest in archery and have been good shots themselves one is tempted to treat of them rather generically. On the earl's estate of Packington Hall many of the oaks of the ancient forest are still standing, giving a rarely romantic setting for the picturesque meetings which, in their carefully chosen phraseology, are called wardmotes.

The actual shooting is principally done at enormous distances, as I will describe in the chapter on Clout Shooting, and in spite of the standardization of archery which has occurred everywhere else in England they steadfastly refuse to change their habits.

The only distance used in target shooting is one hundred yards but even here there can be no direct comparison with similar shooting elsewhere as the target face is forty-four and one-fourth inches in diameter, goodness only knows for what reason, and is sewed to a flat straw butt with the lower edge only eighteen inches from the ground. The rings are the same, except that the old inner white is retained and the values are five, four, three, two, one, as in Scotland. Originally the butts were of turf and the present contrivances of straw somewhat resemble them in shape. They also preserve the ancient method of shooting by time and not by the number of arrows so that no one ever knows how many shots there will be in a match nor can the score of one meeting be compared with that of another.

A wardmote must be one of the most delightful things in

English archery. The Woodmen have a lovely old building called the Forest Hall which was built by the fourth earl. Around the walls of the original room are fifty aschams for as many archers, the door of each bearing the owner's crest. The walls are adorned with interesting bows and other relics and an emblazoned parchment roll containing 460 names of members for the first century of the society's existence. In 1845 a ballroom was added.

The wardmote lasts a week and is flavored with both dancing and dining, the ladies who are invited to participate being known as the Lasses of the Forest. The limit of membership is eighty and as the personnel is always kept at the highest social level the society continues to flourish in strength and happiness. Photographs appearing in a recent London paper seemed to me to indicate that it is still as strong as ever.

All other archery societies in Great Britain are outranked by the Royal Company of Archers, of Scotland. They are the King's official body-guard for Scotland and actually act in that capacity on the occasion of great official visits. Their "Gold Stick," or Captain-General, walks just behind the Gold Stick of the Life-guards at a royal coronation. Their membership numbers several hundred and the rules of the company provide very stringent qualifications for admission. The nobility of Scotland belong to it in great force and are present at its social functions, but the number of real archers is not so very large. Duff told me that when he marked for them it was hard to get more than two dozen men on the range.

Their records go back to 1676, three years later than those of the Scorton arrow meetings but of much greater importance. In 1703 they received a charter of incorporation from Queen Anne, which stipulated that as a reddendo, or service to be performed on request, they should present a pair of barbed arrows on Whitsunday.

In many ways they resemble the Woodmen of Arden in their shooting as they do most of their outdoor work at nine and

ten score yards. At one hundred yards they shoot twenty-one ends, two arrows an end, alternately, and score as the Woodmen do, five, four, three, two, one. I think, however, that they use a standard four-foot target.

While in these two events they are almost exactly like the Woodmen, yet in addition they continue one phase of ancient archery which the latter, so far as I know, have never taken up and that is the shooting at the short butts. It is begun early in October and forms a very agreeable form of amusement during the bad weather of the winter. I believe that this is the form of indoor shooting which might be profitably installed in some of our modern athletic clubs. Their butts, for they extend the meaning to include the whole place, is a covered-in range twelve feet wide and twelve feet high, glazed from roof to floor along one whole side. The ends are tightly packed with straw and it is lit with electric lamps in the roof over the targets. The actual shooting length is one hundred feet. On the straw an ordinary four-foot target is placed which is covered with a white face. At four feet from the floor is fixed a four-inch piece of white paper cardboard and no arrow is in the marking if it be more than twelve inches from the pin-centre.

The headquarters of the R. C. A. is Archers' Hall, which Americans travelling in Edinburgh should visit. It contains many interesting relics, among which is the Flodden Bow, the oldest undamaged bow in Great Britain. It had been preserved for centuries in a house near Flodden Field and its strength is estimated at between eighty and ninety pounds. It is a rather rough yew bow with many raisings for knots and without handle or horns.

We can judge pretty clearly of the state of archery in Great Britain at the dawn of this century. Tennis had been popular for a generation and was becoming increasingly so, golf was rapidly getting to be the rage and the first automobiles were beginning to appear. With such powerful rivals archery was

far from enjoying undisputed sway as a pastime of the leisured classes.

Yet sixty-eight active societies were listed, interclub matches were fairly frequent and there were held annually the big public meetings of the Leamington and Midland Counties, Crystal Palace, Grand Western, Grand Northern and Grand National. In all of them the scores for men were very mediocre, in fact no double York Round at the Grand National has reached 900 from 1891 to the present time. The outstanding feature during this period was undoubtedly the splendidly sustained shooting of Miss Legh.

During the years from 1900 to 1915 there was but little change. The matches with, or without, the French took place at Le Touquet, as will be described in the chapter on French archery, and in 1908 fifteen Frenchmen appeared in London to take part in the archery division of the Olympic Games.

Our only American entry in the Olympics was Henry B. Richardson. There were fifteen Englishmen in the competition, which suggests that they and the French may have agreed to that limitation. In the York Round the first three scores were:

Mr. Dod, Welford Park, 70–292, 71–299, 44–224::185–815.
Mr. Brooks-King, West Som., 68–250, 72–300, 44–218::184–768.
Mr. Richardson, U. S. A., 60–248, 67–291, 43–221::170–760.

Two days after the close of the Olympic Games the Grand National was held, an event which particularly interests us Americans because it is the only occasion of that sort in which one of our fellow-countrymen has ever competed. There were ninety-five ladies and fifty-three gentlemen. The first two scores were:

H. B. Richardson, U. S. A., 88–362, 75–335, 38–174::201–871.
R. Brooks-King, W. Som., 77–319, 72–342, 43–209::192–870.

BRITISH CHAMPIONS 1928

MAJOR J. J. B. FARLEY

MISS N. E. WALLACE

The championship was awarded to Mr. Brooks-King, for Richardson, although the acknowledged winner of the meeting, was not eligible for the championship of Great Britain because of Rule 17 of the G. N. S., which limits that honor to those born in Great Britain or to those born abroad of British parents. Insomuch as this rule was not in the constitution as printed the year before some archers have been puzzled over the matter. I have investigated the whole affair thoroughly and it is hardly necessary for me to say that the rule was made before the match and was understood by all competitors.

After this Olympic year not much of importance occurred until the war.

The five great public meetings were held as usual in 1914 and then archery entered its four years' sleep with Mrs. S. Harold Armitage as championess and Hugh P. Nesham as champion, felicitously following in the footsteps of his famous father, Charles E. Nesham.

The last shooting of which I can find any record was by the Archers of St. Augustine's, at Canterbury, on October 7th, 1914. Of the three men who participated one was Major (then Captain) Chapman, who won the championship in 1922, but who, during the war, won the far greater honor of D. S. O.

After the war archery was resumed in 1919 and the Grand National was held on August 1st with seventy-three entries, a number which seemed very small to the English though large to us Americans. The other great public meetings were also revived. The Scorton Arrow was not shot until 1925. It seems to me that it is almost a duty that the English archers owe to the whole fraternity of the bow to continue this old classic.

I think it was about the beginning of the year 1922 that a body blow was levelled at archery in the metropolis, when His Majesty's Commissioners of Woods and Forests ordered their old tenants, the archers of the Royal Toxophilite Society, to surrender their picturesque hall, which they themselves had

built nearly a century ago at a cost of over £4,000, and to give up their shooting ground adjacent to the Regent's Park. The sorry excuse given by the Commissioners was that they wished to convert the grounds into hard tennis courts for the use of the public. As a matter of fact it was an absolutely unwarranted and high-handed procedure in line with the general toadying to the proletariat which has been so abominably evident in England since the best men were killed off and the others got the bit in their teeth. Fortunately the members of the Tox. have had the grit and determination to stick it out and keep the noble old society alive. At present they have succeeded in securing a new range in Hyde Park and a clubhouse at No. 9a Albion Mews East, Hyde Park W.

In general it seems to me that archery in England needs new blood, and if I may express the opinion of a foreigner who has gathered his opinions second-hand, no one realizes this better than the English themselves. The old Victorians who were such staunch bulwarks of the sport are mostly dead and not enough new men are taking their places. In England archery has never numbered many young men among its devotees, at least not for a long time past. If one look at a picture of the competitors in any large meeting he sees few men who are much under forty and most are well beyond that.

I think that a determined effort should be made to interest the boy scouts and college girls in the belief that even if they forget the lure of the bow while they are in their early twenties they will remember it and return to it in the thirties. Yet I do not mean these remarks to apply to the ladies, for they turn out nobly and at all ages.

Ever since the mutual participation of our nations in the war there has been a growing feeling of brotherhood between the archers on either side of the water, and I think everything should be done to foster so pleasant a relationship. Americans are now travelling abroad in unprecedented numbers every summer. Why do not those who can draw a bow, no matter

BRITISH AMERICAN ARCHERS

GENERAL IVOR THORD GRAY
CHAMPION METROPOLITAN A A 1926

MAJOR C A T CHAPMAN
CHAMPION 1933 N W of Canada

with how little skill, make themselves known to their English colleagues? I am sure they would be hospitably received, for when my friend Thomas H. Uzzell visited the Royal Tox. he was not only invited to shoot but received the highest honor they could bestow, membership itself. One of our Wayne Archers visited the Tox. one day and watched the archers shooting, yet he did not say a word to let them know who he was. This is wrong. Archers should be friends everywhere.

Let us never forget the lines which the Committee of the Grand National Archery Meeting, in the first year of their existence, selected as their motto. They occur in a ballad called "The Pindar of Wakefield's Legend," which was written by J. Hughes, of Donnington Priory, a member of the West Berkshire Archers:

> "Stout arm, strong bow, and steady eye,
> Union, true heart, and courtesy."

III

ARCHERY IN AMERICA

Of course archery in the United States, for that is the part of America to which I expect to confine my narrative, should begin with the American Indian. He was the real, aboriginal archer of this continent, using the bow daily in his search for food and in warfare as one of his chief weapons. Every tribe from ocean to ocean depended to a greater or less extent on the bow, according to whether they lived almost entirely on meat, as the Indians of the plains did, or mostly on meat but partly on fish and vegetables, like the savages of the eastern forests and shores, or almost entirely on the products of agriculture like some of the Pueblo Indians of the Southwest.

With the tendency to aggrandizement which is inherent in tradition the skill and prowess of the American Indian as an archer have been greatly exaggerated. I have known a good many men who were in close intercourse with the Indians during their childhood, most of the savages being either in their original state of culture or still very near it, and all agree that while the red man was a marvellously good hunter he was not a good shot with the bow as we judge of proficiency. It is true that he could feast where better archers would starve but it was because his skill enabled him to get so close to his prey that he could shoot at very short range with almost certain effect. Thus Catlin shows the plains Indians crawling up close to a herd of buffalo with the skins of wolves thrown over their backs, or riding mustangs so close to the great beasts that they discharged their shafts from a distance of only two or three feet. So, in the eastern woods an Indian would lie beside the runway to a salt-lick or grazing ground and shoot the deer as they passed by.

It was undoubtedly true that some Indians were much better shots than others. Nothing else could reasonably be expected. A feat which everyone remembers, who has read *The Witchery of Archery* is almost miraculous and, as that wonderful little book, which we shall see later had as much effect on archery as "Uncle Tom's Cabin" had on the Civil War, is now very scarce, I will transcribe the anecdote in Maurice Thompson's inimitable words:

"It was while I lay thus that Tommy gave the finest exhibition of archery one may ever expect to see—the finest perhaps ever seen by anyone. An albino fish-hawk, almost snow-white, came drifting over us, high up in the calm reaches of mellow sunshine. Tommy let fall his paddle on the bottom of the canoe, and seized his bow and an arrow, stringing his weapon almost instantaneously. For a moment he steadied himself, then fixing his keen eyes on the bird, he drew with such power that the huge muscles on his arms writhed into dark knots and kinks, and the tough wood of the bow seemed ready to break. When he let go the arrow fairly screamed through the air. I could not follow its flight, but I saw a ring of white feathers suddenly formed above the great bird, heard the 'chuck' as it whirled over and came tumbling down to the water impaled on the shaft!"

Tommy represented the best of aboriginal archery. I cannot resist the temptation to give the description of his outfit.

"His bow was the stem of a small sapling split in halves, with very little finish; but his arrows were a wonder of exact work and feathered on the true scientific principle. I could not bend his bow in the slightest, and, when he had braced it, it would have taken the balls off my fingers to have drawn an arrow to the head on it, yet his great horny hands used it without trouble, sending an arrow of his make full as far as I could, with my bow, shoot the best Highfield target shaft. My hickory hunting arrows, made at great expense by a cunning carpenter, under my own direct supervision, and

pointed by a smith of approved skill, were appreciably less nicely adjusted than his. You could easily discover the difference, watching their flight through a long shot over open ground. Here was a triumph of savage cunning and skill over enlightened science and art. This fine finish is not common to Indian arrows. Most of the missiles in the quivers of Sioux, Navajos, and Comanches are detestably rough and unreliable things."

A few years ago, at Boston in 1913, I heard Will Thompson say the same thing most emphatically and insist that good shooting by the Indian was very rare.

From *Hunting with the Bow and Arrow*, by Pope, I will quote the best score made by Ishi, the last wild California Indian, who had depended on the bow all his life, was a hunter of unsurpassed skill and made weapons of exquisite accuracy with points as finely finished as jewels.

Shooting the American Round many times with Dr. Pope, while he was a janitor at the museum, his best two scores were:

10–32	13–51
20–92	17–59
19–99	22–95
49–223	52–205

In the second year of the Revolutionary War, when we were in desperate straits to provide the soldiers with weapons, Benjamin Franklin said in a letter to General Lee, "I still wish, with you, that pikes could be introduced and I would add bows and arrows: these were good weapons not wisely laid aside." He added that the accuracy of the bow was as great as the musket, it had no smoke and could easily be procured.

If the suggestion had been carried out the result would have been disastrous. In the hands of men who knew its worth and had been trained to its use from childhood the bow

was a mighty weapon, but for a mob of undisciplined farmers such as our Revolutionary troops still were in 1776 it would have been of no value. The one thing that made the Americans win was their morale. What would have been their feelings if they had been armed only with the weapon of the savage Indian, who was already a memory in this part of America, and had been obliged to meet the advance of the redcoats with an ill-directed shower of arrows in answer to thundering volleys of shot?

The beginning of archery as we know it, modelled after the English game, was made by the United Bowmen of Philadelphia in 1828.

The facts concerning this club I have obtained from two sources; the first, three original books in the library of the Historical Society of Pennsylvania, which have frequently been quoted by others, and the second, a rare paper in the American Turf Register for May, 1830, which was unearthed by Charles E. Alexander, of the Wayne Archers. Four friends who made the first pact were Titian Ramsey Peale and his brother Franklin, Robert E. Griffith, M. D., a famous physician, and his friend Samuel P. Griffitts, a druggist.

Titian R. Peale was born in 1800 and, when nineteen, accompanied the expedition under Major Long which was sent by the United States government to explore the region from the Mississippi to the Rocky Mountains. His official position was that of assistant naturalist and his artistic ability was used in drawing various forms of wild life. From the Indians he is supposed to have learned to love the grace and beauty of the bow. When he returned, after six years, the life of a young gentleman of fashion evidently palled on him and he says of himself that "feeling the want of exercise and disliking billiards and tenpins, a few friends of mine joined in choosing archery before breakfast and a walk in the country."

In the fall of 1827 Dr. Griffith and a friend, probably Griffitts, "discussed, over a bottle of good wine, the estab-

lishing of an archery club and in a few days added to their number the two Mr. Peales," but it was not until September 3rd, 1828, that they formally organized the United Bowmen.

What kind of bow Peale had already used before breakfast I do not know but the early attempts at bow-making by the United Bowmen were most peculiar. The first weapon was a sort of modified wagon-spring of three slender slats, only one-eighth inch thick and six feet or less in length, bound together without glue to allow free play. It was one and three-fourths inches wide in the middle, tapering to one-half inch, and each inner slat was six inches shorter than the one above it. This discouraging effort was followed by a flat bow of red cedar which bulged on the right side and was straight on the left, to allow for the "Archers' Paradox," which is discussed on page 207. They broke twenty-two of these before they learned to stay the havoc by backing them with parchment. Finally they imported a complete set of a bow and arrows from England, paying no less than ninety dollars for it, which would be equivalent to perhaps four times that sum now.

The four charter members soon elected other serious young men of the best social circles and the club started on the longest career that any American archery society has ever known, exactly thirty years of active shooting and fifty more of nominal existence. In 1888 the survivors met in a final meeting, had their photograph taken, reluctantly ended the organization which had added so much to the pleasure of their youth, and deposited their handsome prizes and records with the Historical Society. The limit of membership, which was never quite filled, was set at twenty-five and for all the years the grand total was fifty-seven, a number since made famous by a certain brand of condiments.

When they were two years old they published "The Archers' Manual, or the Art of Shooting with the Longbow as Practiced by the United Bowmen of Philadelphia." While

CHARCOAL SKETCH OF THE UNITED BOWMEN OF PHILADELPHIA 1834

they frankly acknowledged their indebtedness to Ascham and Waring they recorded many original observations; for example, they made their strings of silk, their arrows of white holly, their feathers of the eagle, swan and blue heron and they painted the rings of their four-foot target, in order, gold, red, white, black and light blue. Each archer had a simple mark which was placed on all his property. Titian Peale's was a circle, Franklin's an angle, others a heart, zodiacal signs and so on. I have a great number of bows and arrows which belonged to one of their number, Matthias W. Baldwin, founder of the great Baldwin Locomotive Works, all of which are marked with his sign, a triangle. He joined in later years when the white holly had evidently been discarded for coniferous woods.

The first shooting field was at "Bush Hill," a military parade ground at what is Twentieth and Fairmount, where they had a lodge, with an ascham for each member. The growth of the city forced them to use, successively, the lawns of different members in what is now Fairmount Park, but in 1859 the secretary entered the terse line, "No grounds, no shooting."

The display of their handsome trophies at the Historical Society should be seen by every archer who visits Philadelphia. The chief piece is a superb bowl of Georgian silver, which would awaken envy in the heart of any collector. Each winner was required to embellish the outside with a heavy silver acanthus leaf and to have his name engraved on the inside. Silver cups were given to the second and third men and a short dart, or silver arrow to the *sixth*. Medals for permanent possession were also awarded, two of which have been recovered and are now used by the National Archery Association as emblems of the championships for men and women.

In later years they shot from under a great pavilion, or tent with wings, supported by twenty-five poles, each with the flag of a member flying from it. Once a year they also had a

picnic, where they shot at a popinjay until someone hit it on the head, and afterward at rovers.

When the United Bowmen stopped shooting it marked the end of organized archery in the United States for about twenty years. Just how much the approaching Civil War had to do with it is hard to say. While the reason for quitting was declared to be the lack of a range, it might have been that if the attention of the members had not been distracted by the tumultuous political conditions they would have had enough interest to hunt for a new shooting field.

There were two very young gentlemen from Georgia in the Confederate army whose participation in the great conflict was destined to bring about the popularization of archery in the United States to a degree that would have been thought impossible. They were Maurice and Will Thompson and as I heard Will tell the story, it was about like this:

Maurice was wounded in the chest near the end of the war, and as soon as he was able to walk he and Will started for home on foot. When they got there, after peace had been declared, they found that Sherman, in his march to the sea, had laid the whole plantation waste. They had no money and their old doctor told Maurice that on account of his thoracic lesion he should live in the open air. Firearms were denied them because of their recent belligerency and so they went out into the woods, chiefly of Florida, and lived for the most part on game that they killed with the bow and arrow.

Will Thompson, at the time I heard him, was a prominent attorney in Seattle, Washington, and was possessed of an easy and beautiful eloquence. He told how they scraped the bows down with knives and stones and rubbed them with sand to make them smooth, simple and natural procedures enough, but his peculiar gift of speech seemed to give everything a sort of glamor of pathos and romance. Maurice possessed this gift to an even greater extent than Will. A few years later he wrote a series of short stories on his experiences which

MAURICE THOMPSON

1879

WILL THOMPSON
Wearing Championship Medal

were published in *Harper's Magazine* during 1877 and 1878 and which were afterward collected together in a volume called *The Witchery of Archery*. At that time the only outdoor game was croquet, nearly as bad a state of affairs as in the time of Titian Peale when the only games were tenpins and billiards. Excited and interested by the charm of Thompson's stories people welcomed archery with eager enthusiasm as a real sport, the first to enliven the placidity of mid-Victorian life.

In the intervening years the bow had not absolutely disappeared from private lawns and there may have been a few small clubs. John Preston True, the author, tells me that in 1867 his sister shot the bow while a student at Bradford Academy, Maine, and that in 1875 he organized an archery club at the Gould Academy in his home town of Bethel, in the same state. Doubtless many elderly people harbor similar memories.

In 1878 and 1879 so many archery clubs sprung into existence that some old men say they were to be numbered by the hundred. In looking over magazines and scrap-books of that time I am left in doubt as to whether or not this is an exaggeration. Certainly there were vastly more clubs than there have ever been since but any sort of complete list I have never been able to find. Yet it must not be forgotten that nearly every man of sufficient age will tell you that there was an archery club in his town in 1880.

The idea of organizing an association on the plan of the Grand National Archery Society of England, to connect the activities of all the clubs, was conceived by Henry C. Carver, of Chicago, and was carried out by him. The officers of the Chicago Archery Association in the fall of 1878 were H. C. Carver, President, A. G. Spalding, founder of the great house of athletic outfitters, Vice-President, and Edward L. Brewster, Secretary. Pursuant to a call from them a meeting was held in the office of the mayor of Crawfordsville, Indiana, at 10 A. M., January 23, 1879. Representatives were present from

The Wabash Merry Bowmen, Crawfordsville.
The Chicago Archery Association, Chicago.
The Kokomo Archers, Kokomo, Indiana.
The Highland Park Archery Club, Highland Park, Ill.
The Toxophilites, Des Moines, Iowa.
The Nottingham Archers, Pittsburgh, Pa.
The Buffalo Toxophilites, Buffalo, N. Y.
The Robin Hood Archery Club, De Pere, Wis.

Thus it is apparent that interest was both wide-spread and genuine.

An organization was formed by the name of The National Archery Association of the United States, the first president was Maurice Thompson, the first secretary Henry C. Carver, Esq., who did all the work, and the first tournament was scheduled to take place at Chicago in August, 1879.

That tournament, held in White Stocking Park, Chicago, was a very grand affair. Gotten up, as it was, by a very wealthy young man who stopped at no personal expense and who was filled with the hustling spirit of the expanding West, it was staged on a scale so elaborate that it nearly wrecked the cause it meant to foster. No one else had the courage to assume a responsibility that had been made so great.

The total number of contestants was eighty-nine, a number which has never been equalled since, divided between twenty ladies and sixty-nine gentlemen.

The arrangement of the field showed no end of painstaking originality. As there was no precedent to follow everything had to be either modelled after English patterns or designed on entirely new lines, yet no tournament ever ran more smoothly.

The ground was the baseball field of the Chicago White Sox, or Stockings, as they were called then, and of course the visitors would naturally sit in the grand stand. This immediately led to the abolition of the two-way shooting which still prevails in England. The shooting line was in front of

FIRST TOURNAMENT OF THE NATIONAL ARCHERY ASSOCIATION, CHICAGO 1879
WILL THOMPSON IN CENTRE FOREGROUND

the stand at a distance of twenty feet. There were eight targets for the men and two for the women. The Double York and Double Columbia were the two rounds shot and as the ladies were gallantly considered to be the chief objects of the spectators' interest, their targets were placed in the very centre, with those of the men reaching out on either side. Indeed feminine participation in outdoor events was so unusual at that time that it took some courage on the part of the ladies to exhibit their skill in public.

The kind of target and the values of the rings were exactly as they are at present. Beside each target was a board, four feet wide and six feet high, which was marked for identification with a large letter. Behind it sat a boy in a chair, who had a set of discs about as big as the gold, each mounted on a stick and painted a color of a ring. As each arrow hit the target he lifted the corresponding color above the board and the result was noted on a score pad by the scorer.

After each end the arrows were brought back in baskets by the markers.

While the shooting was in progress the finest band in Chicago played. Society was out in strength and plentiful refreshments were served. Yet where were green lawns and great trees, smart uniforms, as of fifty years before, or sport clothes as of to-day? An unpainted grand stand, the bare ground or worn turf of a poorly kept baseball field and a backfence of huge advertisements! Sometimes realism is disillusioning.

The prizes were more than a thousand dollars in money and so much merchandise that Will Thompson, who won nearly everything, took it away in two large wagon loads.

In spite of the great difficulty of following so elaborate a precedent the presidency was assumed by Frank Sidway, a fine archer of Buffalo. At this second tournament the targets were set in the English style, facing each other, which necessitated ends of three arrows each, and the championships,

like chess, discourages many who lack the persistence necessary to acquire skill.

The second reason is the one which Mr. Taylor thinks was the greatest of all, the extreme difficulty, or almost impossibility, of getting satisfactory equipment at reasonable prices, to which might be added the difficulty of keeping the tackle in repair.

The third was lawn-tennis. While tennis, a game which most people have never seen, had been played for centuries, its cheap and easy derivative lawn-tennis had just been invented at the time of the beginnings of archery. In the United States it was first played at Nahant, Mass., and by 1881 clubs had become numerous enough to bring about the formation of a national society. Lawn-tennis is one of the best games in the world. Probably everyone of us has played it at some period of his life with thorough enjoyment. It provides splendid exercise, requires simple equipment, except the court, and, above all, gives to youth the thrill of face to face conflict. The changing of the "Archery Field" of 1879–1881, to the "Archery and Tennis News" in December of the last year is a good indication of the increase of competition. Remember that just as archery was the novelty after croquet so lawn-tennis was the novelty after archery.

The fourth specific reason was the introduction of the bicycle, which became so popular that the League of American Wheelmen was seriously considered as a powerful factor in the national vote.

The fifth reason was of a more general nature. It was the ever increasing interest in outdoor exercise and the great games such as football, baseball, rowing, and, more recently, golf, which have arisen in rapid succession to cater to the taste of each individual. While archery is the peer of any of them it must take its place in the ranks.

In these five fat years, and in some places for a short time thereafter, clubs and associations of clubs had flourished in

many parts of the land but for the last fifteen years of the nineteenth century there were very few archers except a handful in each of the cities of Washington, Cincinnati, Chicago and Boston.

In the vicinity of Philadelphia the Tamenund Archers, of Montgomery County, flourished with a membership of about thirty in the early '80's but the only public match from the time of the United Bowmen to that of the Wayne Archers was held at Fairmount Park in connection with the bi-centennial celebration of the founding of the city, in 1882. Ten men, from seven cities, competed in a Double American Round which was won by R. V. Bonnell, of Brooklyn, with 164–825. Mrs. A. H. Gibbes, of Newark, was the only lady but she made the very good score of 131–723 in the Double Columbia. Maxson and Flint made the only tie ever recorded in a flight shoot, at 276⅓ yards. The newspaper says, "They took the prize conjointly to their club in Washington, which consisted of a target and stand." (The most unusual club I ever heard of.)

The Potomac Archers, who were influential for many years, were founded in 1878 by Col. John T. Pickett, of the Confederate Army and Andrew Johnson (not the President who died in 1875). In the summer of 1879 Pickett found Captain Bartlett, of the patent office, trying to draw a Sutton rawhide backed bow, which was presented for a patent, with his finger and thumb. When instructed beyond this elemental stage he became an enthusiastic archer and converted his colleague Maxson, who was a man of big physique and a former oarsman at Yale.

In 1903 archery took on a new lease of life because of the World's Fair at St. Louis. A. G. Spalding was at the head of the athletic program and when he was asked to place archery on the list of events he did so with a willingness that was no doubt inspired partly by his memories of twenty-five years before, when he was Vice-President of the Chicago Archery

Club, and possibly in part by the fact that his company supplied all the targets and most of the tackle. It was very hard to find an archer who was willing to devote his energies to rebuilding the sport but finally Dr. Edward B. Weston, of Chicago, agreed to do it. The doctor had been crippled in a street accident some time before and had been obliged to retire from the active practice of the medical profession. His hip was broken and never wholly recovered, so that he walked with difficulty and in shooting relied on his companion to retrieve his arrows. He was a man of lovely character.

As is usual with World's Fairs this one had to be postponed a year. In the meantime Weston was working hard to find recruits and shot in the tournament at Buffalo in 1903. Out of seventy-two arrows at one hundred yards he made 2–8, thus challenging the record of John Wilkinson, who had made 1–9 the year before. Wilkinson had a keen sense of humor. After that match he made a bet with Taylor that he had a higher average per hit at one hundred yards than Taylor, who had almost gotten the championship. He won.

At this meeting Henry B. Richardson shot for the first time. He was "Harry" then, a sturdy boy of fourteen, though he looked much older. Harry was always endowed with the invaluable asset of perfect poise. Earlier in the year he had appeared for the first time at a meeting of the Boston Archers and when asked if he wished to compete in the match he said, "Yes, but I must make a string first." Thereupon he coolly drove two nails into a tree, twisted a string and began to shoot. How many boys could do that among a group of men a generation beyond them?

The men who shot at the tournament of 1904, at the World's Fair, tell me that no one could ever forget it. The meeting was in September, the only time I ever knew that to happen, and was in the Stadium, whose floor was made of clay. Before the shooting began it rained steadily for fifteen hours, the clay held the water and the whole place became a sea of

mud. Great balls of it hung to the archers' feet as they sludged to and from the targets. Planks were given them to stand on and at the end of three days' shooting some were still using them. G. Phillips Bryant appeared at this tournament for the first time and won both the York and American Rounds with the highest scores ever made by an American archer at his first national tournament and I question whether any Englishman at his first Grand National ever bettered a York of 192–820.

This was probably the closest championship in our history. Col. Robert Williams, Jr., was only one point behind Bryant with 191–819 and Will H. Thompson was third with 190–816. One arrow might have decided the issue for all three.

These sporting events, as a whole, were called the Olympic Games, although very few foreign competitors were entered in them and in the archery contest there were no foreigners at all. However, Phil Bryant and others matched their skill against that of some Igorrotes from the Philippines who had used the bow as a necessity all their lives.

They shot at a square target of boards at a distance of about forty yards and while our experts put practically all of their arrows near the centre of the mark, which was about four feet each way, the savages were lucky if they hit it at all.

Owing to the activity of Dr. Weston, Chicago now became the headquarters of archery and the next tournament was held there with an attendance of forty-one, in which were included six men who had shot in 1879. Boston held the tournament in 1906 but only nineteen archers attended and it was then moved back to Chicago for five successive years. At Boston the outstanding surprise was the victory of Harry Richardson. Although only seventeen he won both events with ease over such able veterans as Williams, Taylor, Beach and both Bryants. The next year at Chicago he won the York again, but not the American and in 1908 he was in England. It was in 1910 that Harry made his great score of 231–1111, which

still stands as our American record and which no Englishman has beaten except Ford. The target which he used is kept in the clubhouse of the Chicago Archers as a cherished memento.

There was a fairly strong facing wind blowing most of the time. I am glad to be able to give the record of this noble score by ends:

1st YORK			2nd YORK		
100 yards	*80 yards*	*60 yards*	*100 yards*	*80 yards*	*60 yards*
3- 5	6-28	4-18	4- 6	6-30	6-32
3-13	6-32	6-34	4-14	5-25	6-38
6-28	6-36	6-40	5-15	6-36	6-24
5-27	5-23	6-26	3- 9	6-26	6-44
4-14	6-32		4-20	6-30	
6-18	5-27	22-118	4-14	6-34	24-138
4-16	4-20		4-26	6-28	
3-19	5-19		3-11	5-29	
4-16			4-22		
4-10	43-217		4-24	46-238	
5-25			3-13		
3-19			4-16		
50-210	115-545		46-190	116-566	

From this time on I do not have to rely very much on the word of others as in the fall I became interested in archery myself and since then have been closely associated with it.

It is very difficult for a physician in general practice to get a reasonable amount of exercise and play. He cannot take the time for golf, he dare not make a definite appointment with an opponent for tennis and he must keep in communication with his office. With these familiar restrictions in mind archery suggested itself to me on a hot afternoon in August, 1910.

The next day I visited a sporting goods store and, with the usual luck of a novice, received from them a fair lemonwood bow and some miserable children's toys which they called arrows. On arriving home I shot at a tree just eight yards away and missed it by three feet. My salvation lay in the

fact that I had also bought a copy of the *Blue Book on Archery,* by Dr. Weston, one of the best instruction books ever printed. With my poor equipment I made insignificant scores but soon I plucked up courage to write to the doctor personally and so initiated a friendship which was ended only by his death.

By his advice I bought a dozen arrows of Mr. A. G. Whitman, of Melrose, Mass., an emerited professor who made them to occupy his time and to further the cause of archery, until his skillful hands were incapacitated by rheumatism. In all I had four dozen of his perfect shafts and used them in the National Tournaments of 1911 and 1912.

During that first autumn, when I was receiving written instruction and encouragement from Dr. Weston, and when I had never seen a real archer shoot, I tried to follow his directions with punctilious fidelity and, as a result, I acquired a mechanical sort of technique, particularly regarding the loosing of the bowstring, which has stuck by me with but slight variation to the present day and, although it has never enabled me to break any records, it has given me a confident steadiness that on the whole has been satisfactory.

The best practice score I made during those first few months was thirty hits 222 score, with thirty arrows at fifty yards, and it was not until September 7th, 1917, when I made 224 in an American Round which totalled 89–627 that I was able to beat it. The latter figure is the best I have ever done. I mention this particularly to illustrate the value of the method of shooting by a point of aim. On the first occasion I aimed not at all at the target but sighted my arrow with rigid exactness on a dead leaf which lay considerably to the right of the direct line of the trajectory.

In looking over the scrap-book which I kept in those days I find a newspaper article by Dr. Weston in which he quotes from my first letter, anonymously of course, that my arrows had cost three dollars a dozen and that when weighed on my

apothecary's scales they were found to vary in weight from 266 grains to 516. The first scores of which I kept a record were made with those paragons of exactitude and were shot at the two shorter ranges of the American round. At forty yards, with the regular thirty arrows, I made 16–41 and at fifty, 18–68. It looks as though I must have begun near the target and learned a little about shooting as I moved further back.

By the time the winter had set in I had learned two important lessons that each archer has to find out for himself, no matter whether he has been told by others or not. The first was that the sport in itself, by its very nature, finds its limitations in freezing weather. Then everything suddenly seems to go wrong; the wood of the bow becomes brittle and one's best weapon will unexpectedly fracture in his hand, the arrows will strike the frozen earth and shatter into bits as though they had hit a solid rock, the string causes agonizing pain in the tips of the drawing fingers and even the necessarily heavy clothing is an encumbrance.

The second lesson is that too arduous practice makes one stale. Even before the climatic conditions put a final stop to shooting my scores had become poorer and poorer, no matter how hard I tried to do my best. The last shooting I did, on December 10th, was one end of six arrows at sixty yards and the result of one hit in the white so disgusted me that I resolved to quit until the following spring. I wrote to Harry Richardson about my slump and in his reply he said that he had just shot twenty-four arrows at sixty yards with a score of 10–22. Remember too, that this was shortly after his breaking the record at Chicago.

These are the slumps that come once a season to every archer and experience has taught me that they are his most subtle foe. Let me warn the beginner now to so time his training that the low spot will have come and gone before the day of the crucial test, so that when he steps to the shooting

line he can feel that every day in every way he is getting better and better.

During the winter I had made up my mind to shoot in the next National Tournament at Chicago and so, when April came, I began studiously and with earnestness of purpose to prepare for the unknown conditions of a public match. The range that I use for the American Round is in my own yard and fortunately a splendid school athletic field is right across the street, so I have the best facilities for practice. When I thought that I knew the markings of my own familiar range too well I would carry the target to the school field even for the short distances and each time put it in a different place. When shooting the York I constantly changed the location and direction also in order to get accustomed to shooting with the sun in my eyes and with the wind blowing unpleasantly. Furthermore I encouraged the small boys to annoy me by their presence and remarks so that I would not feel upset by the spectators at a public match. Trivial as it may seem, I think this last point is a most important one for the novice to bear in mind as I have seen many an archer who was used to the quiet of a sequestered range lose much of his control under the petty annoyances of competition.

The first time I shot, in that period of preparation, I made 17–85 at sixty yards. On August 10th, just before leaving for Chicago, I shot a York round of 115–579, which remains my record to the present day, and immediately following it an American of 88–558.

In this year the Pittsburgh Athletic Club had opened its magnificent new club house and on the way to the tournament I stopped there on the invitation of Mr. Postgate, the professional teacher of fencing and archery, to shoot a match with him. The range was in front of the house near some tennis courts and as Postgate drew the bow and loosed the shaft I watched him with great interest for he was the first adult archer whom I had ever seen. This little match bore great

fruit for through it Dr. Hertig, and later his friend Jiles became enthusiastically interested and have been at every national tournament since.

One's first experience in anything is apt to be the most vivid and every detail of that tournament in August, 1911, stands out clearly before me.

At the hotel I met a big gray-haired man coming out of the room next to mine who introduced himself as Burton Payne Gray, of Boston. He too was a protégé of Dr. Weston, in fact the doctor had been present when he first made his squalling advent into this world of sorrow, and during the summer he and I, through the doctor's kind mediation, had engaged in a friendly match by mail, each shooting on his own range and sending the result to our mentor. A firm friendship immediately sprang up between us which continued pleasantly until his untimely death about nine years later.

Two other good and lasting friends I made at that tournament, Homer Taylor and Jim Duff. Mr. Taylor was the best shot among the Chicago archers and was looked on as a sure winner, as his practice scores made shortly before reached as high as 665 for the single York round.

Duff was at his first American tournament, although he had come over from Scotland a few years before and in 1910 had given to the National Archery Association the silver arrow which bears his name. He was born and brought up in Edinburgh and learned the trade of carpenter. One day, while he was working about the front of a building, old Fergie, the great fletcher, came up and asked him if he would like a job at Archers' Hall, making bows and arrows. Jim agreed and worked there for eight years. After that he was with Buchanan in London. He is the only man in America who has learned the trade of bowyer and fletcher through the traditional methods of Great Britain. Personally he has become one of the most popular members of the N. A. A.

A new condition regarding the championship existed that

year and was embodied in the printed rules of the National Archery Association, of which I have a copy before me. From 1879 to 1910 the winner of the York round had been conceded to be the champion archer for the coming year but, in order to give equal credit to the man who preferred the shorter ranges, Dr. Weston had decreed that there should be two champions, one called the York Round Champion and the other the American Round Champion.

His authority for making this change lay in the fact that at the Annual Business Meeting in 1910 he had been empowered to draw up a new constitution which was to govern the next meeting. The words used to cover these cases were:

"Article IX. Archery Championship. This Association shall establish the Archery Championships of the United States of America, which shall be represented by suitable medals, to be contested for at each Annual Target Meeting by members of the Association only and under the following rules:

" The York Round Championship Medal shall be awarded to the individual member making the greatest number of points at the Double York Round.

" The Championship Medal for the American Round shall be awarded to the archer making the greatest number of points at the Double American Round."

The wording for the ladies' rounds was similar.

Personally I think the system is a very bad one and I was much opposed to its more recent adoption by the Eastern Archery Association in 1922. It has no effect at all in increasing the number of archers, as its advocates had presumed, and it makes it impossible to pick one individual to satisfy the popular query as to who is the best archer in the country. Nevertheless that is how the rules read in 1911 and they were not changed till after the tournament of 1914 when the present constitution was adopted and its system of scoring put into effect, for the first time, at the tournament of 1915.

In the first American round Mr. Taylor made the fine score

of 87–547, which a newspaper report says was a new record, although I have not verified this by reference to the official scores, but in the second American Round he experienced very hard luck. On the way to the field he had stopped in at Spalding's to buy some new strings and although they looked all right, they had become so dried out through improper storage that one after the other broke, during his shooting, until the whole half dozen were gone. What he finally finished with I do not know but his score was reduced to 81–393 and the American Round Championship was lost.

In the York Round things were different. Although I thought I had trained for all sorts of emergencies there was one I was not prepared to meet, and since then I have seen many a beginner perish from the same cause. I had bought from old Mr. Barnes, of Portland, Oregon, who has long since gone to rest, a fine yew bow weighing about forty pounds. It was a sweet and accurate weapon, as all of his were, but it was not a low-shooter at one hundred yards and in the school field, at practice, I had usually aimed above the tops of the tall trees and buildings that border it. What then was I to do when I was placed on the edge of a treeless field about two miles in breadth and with nothing but a cloudless sky above? I got only 24–70 at one hundred yards, was discouraged and ended with a total of only 78–324. Hope springs eternal, however, and a good sleep and successful morning gave me a better start in the next afternoon. Then, too, I had changed to an excellent lancewood by Aldred, weighing a little over fifty pounds. At one hundred I did a little better, although I was still aiming high in the sky, but at eighty I could sight on a distant tree which was higher than the rest and made 43–209, which remained my best record until I beat it with 41–227 at the Eastern tournament at Deerfield in 1925. At sixty I made 24–156 which remains my record to the present day. Mr. Taylor got six points out of ten and the York Round Championship.

During the fall of that year archery seemed to boom all over the northern part of our country.

The Wayne Archers were organized on September 30th, 1911, with a charter membership of about ten. The organization has continued to exist till the present time and has had a successful career. Of the ladies who have scored high in club matches but never won national honors Mrs. E. E. Trout is probably the best. I have a record that in September, 1914, she shot a double American round of 86–528 and 89–519, total 175–1049. Mrs. John Dunlap, on whose beautiful lawn we had our club range for several years, on November 29th, 1913, shooting the one hundred-yard distance of the last York in a N. A. A. mail-match made an end of 99773=5-35, which is probably a record for a woman. Cynthia M. Wesson was a member of the Wayne Archers during the time she made her American and World records.

In 1914 the women's team of the Wayne Archers won the National championship with the second highest score so far recorded, the personnel being Mrs. Dunlap, Mrs. Elmer, Mrs. Trout and Miss Wesson. In 1916, at Jersey City, they won the championship again.

Among the men W. H. Palmer, Jr., has been national champion and the men's team won in 1914 and 1922, in the latter year breaking the record. In 1914 the team was composed of Allan C. Hale, of St. Davids, J. Mark Mauser, of Laury's Station, and myself, who were charter members of the club, and T. Truxtun Hare, Esq., who, while at the University of Pennsylvania, had been All-American guard for four years. In 1922 the team was Mauser, Palmer, W. H. Palmer, 3rd and myself. One or two members of the club also shot on the winning teams of the Keystone Archers.

It was in Boston that the greatest interest was aroused because of the magnetic personality and indomitable energy of Mr. Gray. Besides being a very busy attorney in Boston he found time to assume the duties of an alderman in his home

town of Newton Centre and to so exert his influence that a portion of the public playground was set apart as an archery range. This wise and public spirited act has proven its wisdom many times over and I can see no reason why many other cities and smaller communities would not do well to follow a similar plan and lay out a tract of ground which, though long, need not be very wide, along the side of some of the many public playgrounds or in a park to be used as an archery range.

As a whole, the toxophilitic aristocracy of Boston has been superior to that of any other locality. A sketch of them would be like this:

1. Alonzo G. Whitman. Teacher and master-fletcher. Took part in Eastern Archery Association Tournament in 1880.

2. Edward W. Frentz. Editorial staff of *Youth's Companion*. Pupil of Whitman both in school and on the range. Master-bowyer.

3. Wallace Bryant. Renowned artist. Portrait painter. Pupil of Whitman. Champion in 1903. Teacher of many men and of Wellesley girls.

4. George Phillips Bryant. Lawyer. Brother of Wallace. Pupil of Whitman in school and of Wallace Bryant on the range. Champion in 1912 with new American record. High score in York in 1913.

5. Cyrus E. Dallin. World famous sculptor. President of N. A. A. Designer of unequalled trophies.

6. Henry B. Richardson, M. D. Pupil of Wallace Bryant. Thrice champion of United States and winner of Grand National of Great Britain in 1908. York record.

7. Burton Payne Gray. Lawyer. Established first public archery range. Organized Newton Archers. Revived archery.

8. Mrs. Burton Payne Gray. Champion in 1914.

9. Louis C. Smith. Lawyer. Hard and continuous worker for archery. Publishes *Bulletin*. Secretary of N. A. A.

10. Dorothy D. Smith. His daughter. Five times champion.

11. Abner Shepherdson. Artist photographer. Master bowyer and fletcher. Inventor of perfected jointed bow and movable sight.

12. Paul W. Crouch, D. D. S. Teacher in Harvard Dental School. Highest York and American Rounds ever made in practice. Holder of American Round records. Champion 1925.

The archery season of 1912 opened in the East with an invitation match at the Newton Centre range on Patriots Day, April 19th, when Paul Revere and Vice-President Dawes' ancestor are said to have made their famous rides.

All of the old guard were there with many new ones and I remember that Dr. Hertig was present from Pittsburgh, it being his first contest of any kind.

The scores were fairly good but what I remember with the greatest pleasure was seeing Richardson make three golds in succession at one hundred yards, the first and only time I have seen it done.

The National Tournament was held on Soldiers' Field, of Harvard University, and every appointment was so perfect that it definitely fixed the high plane which has been maintained ever since. The outstanding feature was the marvellous shooting of Phil Bryant. So far as I know his first American is the only example of a veteran making the best score of his life at a major tournament, it being 90–618.

If two pieces of the hardest kind of luck had not befallen Phil his marks in the York Round would unquestionably have been much higher. The first was that in the 80-yard range of the first York a swirling storm of wind came roaring up from the bay in great black clouds and made any sort of good shooting absolutely out of the question. Everybody else stopped, but Phil is such a stickler for the fine points of sportsmanship that he kept shooting and simply threw away a whole end of

six arrows, making a dent in the score which is obvious to anyone who compares the result at that distance with what he made at 100 and 60. Furthermore, the wind blew the target over while his six pet arrows, with triangular feathers, were stuck in it and broke them all so that he was obliged to use another set, with balloon feathers, which were not quite so good.

The next season, reckoning from tournament to tournament as archers often do, was full of interesting events. The first was the second mail-match of the Eastern Archery Association, which is treated of in detail in another chapter. *Forest and Stream,* at this time, conducted a flourishing archery department which was filled with articles of a practical and speculative nature which every Toxophilite who can obtain access to them should read. Looking over its pages I find that many club matches were held in Boston, Chicago and Pittsburgh and for the first time the Scottish-American Archers of Jersey City, who were destined to be our hosts four years later, made their appearance.

During the latter part of 1912 Professor E. J. Rendtorff began to shoot. He was a professor of physics at Lake Forest Academy and a big, strong man. I think he had been an athlete at college. Into his study of archery he put the same exactness of method that he was accustomed to use in the laboratory. I speak of him here because he attained to such skill in private practice that his scores were even regarded with scepticism by some archers, although now that both his York and American rounds have been beaten by Dr. Crouch, it is evident that there are possibilities in archery that most of us can scarcely conceive of. In my mind Ford, Rendtorff and Crouch form a triumvirate above all other archers. Unfortunately Rendtorff never competed in a National tournament, though there is no question but that he would have won if he had.

Another archer who began to shoot about the same time was Dr. W. J. Doughty, of Fort Steilacoom, Washington, near

Seattle. He was instructed by old Will Thompson and as he showed unusual proficiency, Mr. Thompson revived his own interest and skill. On April 19th Mr. Thompson reported this score, made by himself in private practice, which I would be willing to wager has never been surpassed by one of his years. Single York round: 50–224, 41–219, 22–110:: 113–553. Doughty's best single York was 123–635.

On July 4th, 1913, the Wayne Archers were hosts at the first open tournament in the vicinity of Philadelphia since the affair of the Bi-Centennial in 1882. It was the third meeting of the E. A. A. and is described under that heading.

On Decoration Day the Scottish-American Archers also held an open meeting, in connection with some Caledonian games, at what was then Schuetzen, but since the war has been called Columbia Park, in Hoboken. It was the first in New Jersey since the E. A. A. of 1882 and in the vicinity of New York since the N. A. A. of the year following.

That God-given combination of thrift with generosity which is inseparably a part of the Scotchman is shown in this bit of the official report:

" Immediately after shooting ended the range was turned over to the general public, and bows and arrows supplied, and in order to keep down the rush a charge of ten cents for six shots was made, and two prizes given, one for the highest score out of one set of six arrows, and the other for the best shot made during the day. That this last competition was highly popular can be seen from the fact that a sum of $25.40 was taken at the range in the short time that was left before darkness set in."

On July 3rd, 4th and 5th an archery contest in connection with a " Pre-Olympic Carnival " was held in Chicago at Grant Park, within a bow-shot of where the first national meeting was held in 1879. The event is noteworthy because it was the only time in which Mr. Rendtorff made a public appearance.

On the first day the temperature was 94°, the sky bright and

cloudless, and the air filled with dust. The ground was bare of grass, very hard, and arrows that missed the target went scudding over the earth for a great distance. Under these conditions his winning scores were:

Single American—29–169, 30–212, 30–218:: 89–599.

Single York—42–146, 45–233, 23–141:: 110–520.

On the 4th the temperature and other conditions were exactly the same. A team round was shot which Rendtorff won with: 24–148, 24–140, 22–130, 24–144:: 94–562.

On the 5th a terrific wind, blowing at least thirty miles an hour, such as they have in the "Windy City," swept across the range, so that the targets had to be tied down very firmly. The program of the first day was repeated, thus forming double rounds. Rendtorff's scores:

	Single		*Double*
American Round	30–160, 30–194, 30–216	90–570	179–1169
York Round.....	37–149, 40–196, 22–124	99–469	209–989

Rendtorff surpassed the records of the N. A. A. in the Double American and Team Rounds but not in the Single American nor York.

For the National Tournament, in August, Will Thompson and Dr. Doughty came on from Seattle together. It was the only time I ever met Will Thompson, and I am very thankful the treat was permitted me. Everybody liked Doughty, born in Maine of the old stock, modest, capable and trustworthy. He had been trained at the York round only, mostly, I suspect, to prove Thompson's pet theory that mastery of the long range of 100 yards automatically included the shorter ones. When Doughty came on the practice field, at Newton Centre, the day before the tournament I saw him shoot the thirty arrows at forty yards for the first time in his life. He made well over 200 and if my recollection be correct about thirteen of the hits were golds.

The tournament was shot on Soldiers' Field, as all those of

recent years in Boston have been, and it was just as successful as the one before.

The two leading scores in the Double York were these:

G. P. Bryant.....	34–140, 37–165, 21–107	92–412		
	31–139, 30–150, 23–131	84–420	176–832	19 golds
Dr. J. W. Doughty,	34–132, 34–130, 23–137	91–399		
	32–150, 32–124, 23–129	87–403	178–802	11 golds

Doughty won by the point system, which was still in use and, because of Thompson's vigorous defense of it at the business meeting, for he was very conservative, it lasted one year more.

The result of the American round did not bear out Thompson's theory. So many little contingencies arise that can be met only through experience that Dr. Doughty took seventh place. The best feature of the tournament was Mrs. Bryant's record-making flight shot of 251 yards and four-tenths foot.

At the business meeting it was voted to hold the next tournament near Wayne, thereby tapping new territory. In order to promote wide-spread competition and continued practice we Wayne Archers almost immediately initiated the very successful series of mail-matches which are given extended notice in another chapter.

The tournament of 1914 was held at the Merion Cricket Club at Haverford on the cricket ground immediately in front of the handsome clubhouse and perhaps as a whole the setting was the most beautiful of any national meeting that I have attended. It was here that the old English titles of Lady Paramount and Captain of the Green were used for the first time in recent years, though the former occasionally appears in reports of early American matches. Dorothy Smith, a little girl of ten, won both rounds in a junior section, which we had experimentally introduced, her double National being 40–162 and her double Columbia 85–395.

After three tournaments in the East it seemed only fair that

the one in 1916 should be in Chicago. This meeting was handicapped by execrable weather. A wet, chilling wind, such as is only too common in Chicago, swept in continually from the lake and on the last day there suddenly descended a deluge as though the flood gates of heaven had burst. In a few minutes the field was ankle deep with water, making it necessary to strike several events from the program.

In spite of the bad conditions Miss Wesson broke the records for the Single and Double Columbia Rounds. She was shooting in such wonderful form that with better weather the records for the National Rounds would probably have been broken too. Miss Wesson also followed the precedent set by Mrs. Howell, years before, of shooting on a men's team. In this connection it is well to remind ourselves that the constitution of the N. A. A. expressly provides that a woman may take part in any of the events for men but that a man may never take part in the events for women.

In archery there is no line between professionals and amateurs, so the members of the N. A. A. were able to express their unanimous choice by electing James Duff to be president for 1916, when the tournament was held in his home town of Jersey City. The Scottish-American Archers and the Clan McLeod took the big event under their canny guidance with a result that was a delight to us all. The range was laid out in Hudson County Park, which is now on the Lincoln Highway. The shooting, throughout, was of a very high grade. For the second time in the history of the N. A. A. three men passed the thousand mark in the Double American Round, for the third time the four figures were obtained in the double York Round and the flight shot was within six inches of the record.

One of the three who crossed the line in the Double American was Duff, but early in the season that minimum of the expert had not been so easy to reach. These lines of his ring very true to the archer's ear.

THE ELUSIVE FIVE HUNDRED

I had been cogitating in my mind, and contemplating,
As I hied me from the target as before,
And I often paused and wondered, if perchance I had not blundered
While adding up the total of my score.
My form seemed good as any, and of golds I had so many,
That five hundred seemed at last to come my way;
But, alas for that conclusion, 'twas another great delusion,
So I'll have to try again another day.

With weather quite perfection, not a breeze to cause deflection,
Though nature seemed in error just the same;
On her mantle, verdant green, not a daisy could be seen,
Nor distinctive blade to mark the point of aim;
Yet with arm as true as steel, and that intuitive feel
That loves to guide the arrow on its way;
I tried to make conclusive that mighty score elusive,
But—I'll have to try again another day.

When I watch with great delight, arrows dropping from the white,
Dame Fortune to my bosom I enfold,
But,—with leaden feet comes stealing quite a different sort of feeling
When I see the arrows bounding from the gold;
Still, imbued with great ambition, like the hero of tradition
Who exclaimed, "Where there's a will there is a way,"
I'll keep the arrows flying, every day will see me trying,
For I mean to have that score another day.

To protect the ladies from the glare of the sun, which in many cases burns their skin to a distressing degree, the park commissioner provided a long awning which reminded one of the pavilion of the United Bowmen of Philadelphia. It added wonderfully to their comfort.

At this tournament Samuel G. McMeen appeared for the first time and won the wooden spoon. He was a native of Crawfordsville, Indiana, and had so often seen the Thompsons shoot there when he was a boy, that he had ever since cher-

ished a wish to become an archer. Starting with that meeting to learn as much as he could he became possessed of the highest skill, at one time making eleven American Rounds of more than six hundred, in succession. He is one of the greatest authorities in the world on the telephone and in pursuit of his new hobby he equipped a private wood-working shop, or laboratory, to find whether, in the making of bows and arrows, the exact methods of modern science could add much to the empirical ways of the past. Most of the ideas for the successful mechanical manufacture of equipment which are used by modern bowyers and fletchers originated with him. He also published *American Archery* at his own expense and turned every cent of the profits over to the treasury of the N. A. A. The occasional magazine *Archery* is his private publication and is sent to the mailing list of the N. A. A. free of charge.

At the closing banquet of this enjoyable tournament about forty braw Scots appeared in full Highland costume, their bows and arrows replaced by dirk and skean-dhu. Good-fellowship reigned supreme until the piper had squeezed the last tune through his chanter and the whole assembly, with arms crossed and hands clasped, had fervently sung "Auld Lang Syne."

In April, 1917, the United States entered the Great War. My wife had foretold the exact month about two years before by the Ouija board. It put a complete stop to organized archery. The tournament for that year was to have been held on Soldiers' Field, in Boston, but that was being used for troops. Most of the archers were busy with some of the activities connected with the war, yet many of them shot from time to time for personal relaxation.

In 1919 it was decided to have a tournament again. A great trouble at first was the complete absence of tackle. None had been imported from Germany, of course, where the toy stuff used to come from, very little, if any, had been sent over from England, and Duff, who was our only good fletcher on this

side of the ocean, had been working hard in a shipyard. A formal request was even sent around to all archers asking them to let the secretary of the N. A. A. have any spare tackle for second-hand sale to those who had none.

It was a good tournament, fully up to pre-war standard, and made especially agreeable by the pleasure of renewing former friendships. It was held on Soldiers' Field, from which all signs of military use had been eradicated.

In 1920 the Wayne Archers were the hosts. We shot on a football field which lay east and west, so that while we could shoot both American Rounds across the field toward the north the York had to be shot in one direction in the morning and the other in the afternoon, involving a change of targets at lunch time. I mention this to show that a small field need not deter anyone from staging a full-sized tournament.

At this meeting a pleasant social feature was introduced for the first time by having a reception following the afternoon's shooting, or rather a tea, to which many guests who were not archers were invited.

In 1921 the familiar field at Boston was once more the range. The contest for first place was so close that a difference of a single arrow would have settled it; 2,160 to 2,158 by the present system of adding together both double rounds. The winner had a rebound from the red, which lost him two points, and the loser had a pass through the red, with the same result. If the latter arrow had stayed where it hit the score would have been a tie, although the championship would have been awarded to the same man, Mr. Jiles, because such a tie is decided by the better score in the York Round.

For the third time, three men passed 1,000 in the Double American.

This meeting owed much to the presence of Dr. Pope, who had come all the way from California to take part in it. In 1915 he had paid a visit to Wayne, when we had a fine visit together.

At Boston he did his "Hiawatha" shooting before the movie camera and easily kept seven arrows in the air at once. While watching him I was convinced that it would be quite possible for him to make it eight. He uses special arrows with wide V-shaped nocks, holds six of them ready in the bow-hand, uses a Sioux Indian draw with the four fingers and thumb on one side of the string and pulls the arrows down rapidly, one after the other.

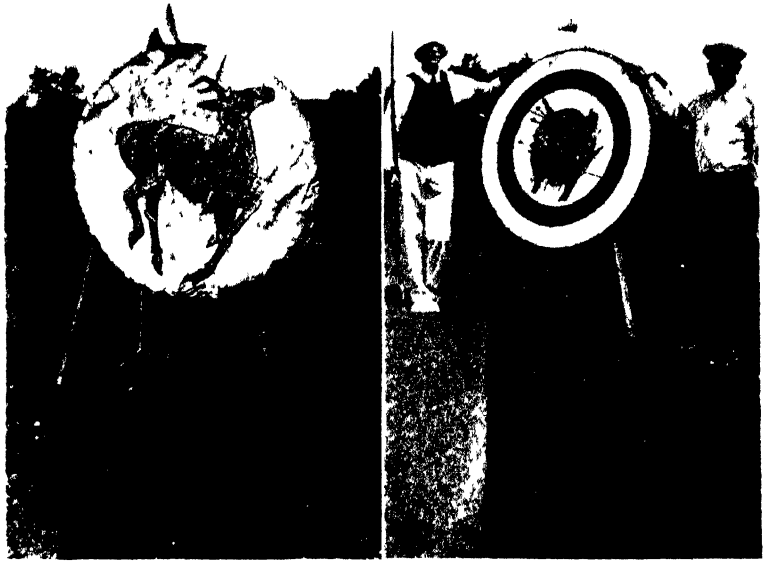
You remember the words of Tennyson:

> "Strong of arm was Hiawatha;
> He could shoot ten arrows upward,
> Shoot them with such strength and swiftness,
> That the tenth had left the bowstring
> Ere the first to earth had fallen."
> (*Hiawatha and Mudjekeewis.* Lines 11–15.)

To show what a difficult feat it is I may quote Will Thompson's words that "No man ever has, ever will, or now can, keep four in the air at one time"; but Thompson never thought of holding the arrows in the bow-hand ready to draw.

At a charming garden party, given by President and Mrs. Shepherdson in their beautiful grounds which slope down to a lake, Pope gave an intensely interesting lecture on Ishi and on his different hunting trips, illustrated by stereopticon pictures reflected on the white side of the house.

The tournament of 1922 stands out in our memories especially vividly because it was held in Cooperstown, New York, where James Fenimore Cooper lived and where the scenes of the Pioneer and the Deerslayer were laid, a beautiful village beside the exquisitely lovely "Glimmerglass," or Otsego Lake. Some of the families who live there are enormously wealthy and we were delightfully entertained socially. I might say as a warning to the aspiring archer that it requires a stronger nerve than most people possess to shoot well enough to win in the day and to do much in a social way in the evening. Per-



NOVELTY TARGETS

IMAGE FOR WILLIAM TELL SHOOT, 1920 "RUDY" AND "JIM"

sonally I am exhausted after the rounds are over and I find it necessary to get all the sleep I can and to eat the simplest food if I hope to do my best.

In this year the Wand Shoot and Clout Shoot were contested for the first time. Douglas Fairbanks had just brought out his magnificent photoplay of Robin Hood, and had given the National Archery Association a handsome vase which we called the Robin Hood Cup and decided to shoot for as Robin shot in Ivanhoe, at a wand at one hundred yards. At that time, and for the next two tournaments, the wand was represented by a two-inch strip of paper glued down the centre of a target but in 1925 it was a real wooden stick, two inches wide and six feet above ground.

Since 1913 the ladies had shot at the wand, at various distances up to sixty yards, but this was the first thing of the sort for the men.

The Clout Shoot, as described on page 350, took the place on the program assigned to a Novelty Shoot. These piquant desserts to the more solid fare started at Jersey City by shooting at a silhouette of a duck. Two or three times we played William Tell with an image of my daughter, made by laying her on a board, cutting out the outline, padding it with old tires and dressing it in her clothes. It carried a distinct suggestion of murder.

In 1923 the tournament was held at Chicago. It was the only one I have been unable to attend since 1911. W. H. Palmer, Jr., won it by an excellent score after a neck and neck contest with that old war-horse Jiles.

The next year we were at Deerfield, truly a Dear-field to most from the happy times there in the Eastern meetings. Calling the tournament of 1922 after Robin Hood, though it might more aptly have been named after Leatherstocking, seemed to have set a precedent, for the Chicago match was called the Marquette Tournament and this one was known as the Mohawk Tournament, because the Mohawk trail runs near. The

Indian side was stressed for the fun of it. Each archer wore a bright feather in his hat, or hair, though Dallin says that Indian women never wore feathers, and some of the Bostonians not only had an Indian tepee pitched on the grounds but were dressed in real Indian costumes.

Speaking of tents my family tried the experiment of making a camping trip of it and found it to be an ideal way of living at a thing of this sort.

Jiles won the championship for the second time, by a decisive score, but the only individual record established was the team round of 585 by Lagai, a truly wonderful figure. Just as he was starting "Rudy" said, "Well, here goes for 600," and he nearly made it.

Both the Rome and Keystone teams broke the previous record in a sensationally close match, the former making 331–1711 and the latter just nosing them out with 333–1727. It was here, too, that all former flight records were broken, as is described in the chapter on that subject.

So much has been said of the men, because of their varied performances from year to year, that one is apt to give too little credit to the extraordinarily steady work of Miss Cynthia M. Wesson and Miss Dorothy D. Smith. Each of these young ladies has won the championship several times and each has beaten the other. No one else but Mrs. M. C. Howell has ever done as well.

To digress for a moment from a strict recital of events I would like to say that nearly every serious-minded archer whom I have known has found it of great assistance, and perhaps inspiration, to be able to compare his scores with *all* of those made at a national tournament. As a rule the books on archery contain only the scores of the winners, or record breakers, and the poor tyro is flabbergasted when he compares his feeble attempts with theirs. On the other hand it is a great comfort to look at the bottom of the list and say, "Why, there is a man who has the nerve to shoot in a great tournament and

DOROTHY SMITH

NOCKING
AIMING

DRAWING
AFTER LOOSING

yet he can do no better than I." To check off one man after another as one's scores improve is as good as beating a personal opponent.

For this reason I should like to give the whole printed score of the 1925 tournament if space were not at such a premium. Dr. Crouch headed the list by making 90–626, 89–581:: 179–1207 in the American, thus breaking the records for both the single and double rounds. The lowest score for a Single American, which should make all beginners feel free to enter a tournament without fear of embarrassment was 0–0, 4–10, 11–49:: 15–59. A fair average for most of the men is usually about 300.

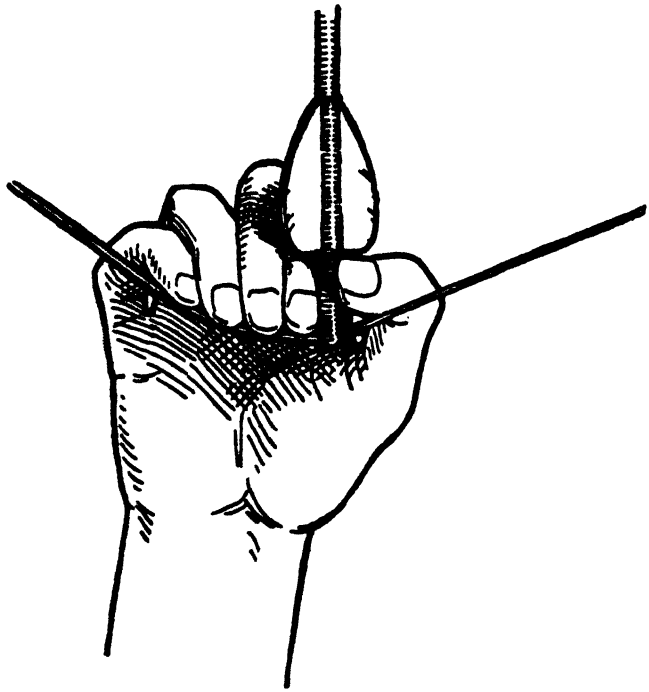
This tournament, the largest since 1883, was held on the grounds of the Teugega Golf Club of Rome, N. Y. Under the remarkable leadership of Mr. Knight it proved to be one of the best.

In the fall of this year an honorary society of archers was formed which was called the Archers' Guild. Modelled after the guilds of mediæval England its membership is divided into three classes, or ranks, known as Masters, Yeomen and Apprentices. Admission to the Master rank is extremely difficult to obtain and is awarded only at the discretion of a committee of veteran archers. The other two ranks are open to all who show reasonable proficiency in shooting. The first Warden, as the chief officer is called, is very fittingly the dean of American archers, Mr. Homer Slate Taylor.

There can be no doubt that in the last few years, or even months, archery has advanced in America to an astounding degree. There are now thousands of archers where in my early days there were scarcely scores.

The hunting exploits of Pope, Young, Compton and others, ably set forth by the pen of Stewart Edward White, have attracted the attention of the whole world. Pope and Young spent the night before they sailed on their epoch making trip to Africa at my house. Much of the time we sat before the

blazing logs and played soft music, they on their little sawed-off violin and mandolin which have become famous, and I on a flute. I can only inadequately express my admiration of these splendid men who, at the risk of life itself, have done so much to elevate the standard of the ethics of hunting by making it once more a man's fight and not the safe and cruel slaughter into which it has been degraded by the modern rifle.



The Sioux Draw as taught by Compton to Pope and Young and used by the latter habitually and by the former in "Hiawatha" shooting.

YOUNG AND POPE WITH PALMER AND ELMER
THE DAY BEFORE THEY SAILED FOR AFRICA, 1925

IV

COLLEGE ARCHERY

A DEVELOPMENT of this century which will have a tremendous influence on the future of archery is the strong hold it has taken in women's colleges. I believe I am speaking conservatively when I say that two thousand girls in both colleges and schools are devoting regularly prescribed hours to its practice.

It is wonderfully adapted for them. As a prominent educator said to me, "Girls have hockey in the fall, as against football for the men, but they have nothing in the spring to equal baseball."

If I may speak from the professional standpoint of a physician I will say that there is no form of exercise better suited to women. It strengthens every muscle of the body without danger of any of the injuries which are only too often accidental to other sports.

If a college introduce archery and expect it to be more than an ephemeral fad it must be given dignified recognition among major sports, done with proper equipment, under rigid discipline and taught by competent instructors, who will also be able and willing to keep the tackle in repair.

If the targets be small, cheap ones that even an expert could not hit, if there be ten times as many archers as bows, if the arrows have no piles, if there be no finger-tips or bracers and the girls merely punctuate a half-hour's conversation with a few random shots, then archery at that school is doomed.

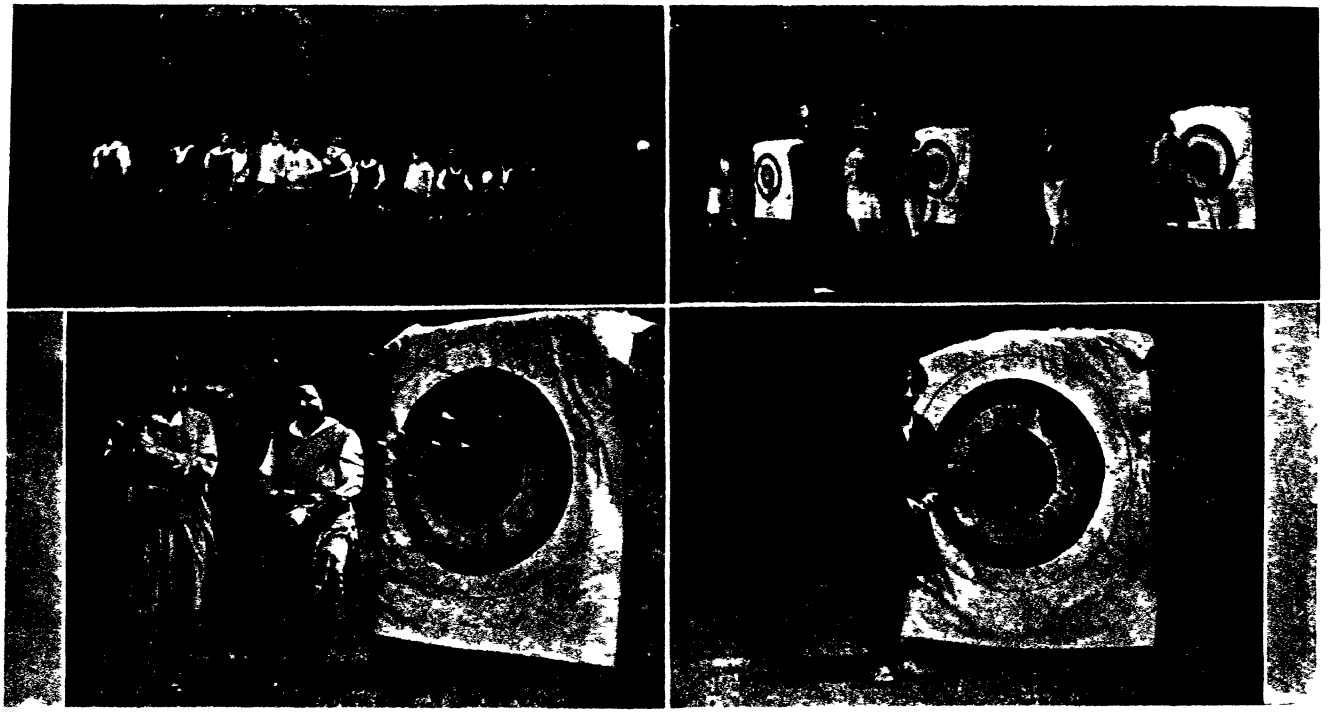
As it is likely that the problems which arise at most colleges are the same, I believe the best way for me to give what little advice I can to those who intend to teach archery is to briefly tell what I learned, as well as taught, during the past season,

when I tried to coöperate with the Directress of Athletics in putting it on a firm basis at Bryn Mawr, which is about four miles from my home.

Miss Cynthia Wesson had been an instructor in athletics at Bryn Mawr before the war, during the time she was making her wonderful world's records. Whether because prophetesses, as well as prophets, are not without honor save in their own country, or whether, as I believe, it was impossible for anyone to do much to interest individuals in archery until a general knowledge of it had been spread through the land, she was not able to make the girls show sufficient interest to force the college authorities to classify it among the major sports. However there were left from those days three fair bows, needing strings and a tip or two, and a very few arrows in various stages of decrepitude. With this wholly inadequate tackle a handful of enthusiastic young ladies, who by the grace of Heaven were naturally endowed with the qualities of leadership, began to shoot on the opening of college in the fall of 1924.

When I was asked to assist them I immediately took up the question of targets, the rock on which most young societies founder. As time and money were both short we decided neither to spend the outrageous price that the extortionate dealers demand for a regular four-foot target, nor to wait till winter for one to be made on order, but to erect a butt, made of three bales of straw, delivered that very afternoon for $3.75 and completed by an old face from the National Tournament of 1920.

We measured off the ranges, from thirty to sixty yards, and marked them by short pieces of iron pipe driven flush with the ground, so that they would not interfere with the lawn mower. In these we stuck small markers, which the gardener could remove at will without putting them back in the wrong place. They were made of wood, 4" x 2" x 1", through which was stuck a long wire spike, and colored bright red, to be seen



BRYN MAWR COLLEGE

GOING TO THE RANGE
GREGSON '28 McELWAIN '28

THREE OF THE BUTTS
MILLICENT FIERCE '26

easily. The range was then all finished and has been in use ever since, with the addition of three more butts, as the archers increased in numbers.

We then began to give serious thought to the problem of equipment. Some of the girls, who were sure they were going to like archery, sent at once for complete sets of a good bow and a dozen arrows and not one ever regretted the step. In fact I advise every instructor to urge the girls who can afford it to buy their own tackle. It always results in greater interest and better scores.

The old bows were put in order, a few more were donated by friends, and I took down a miscellaneous collection of odds and ends of old sets of arrows that served to tide us over till better ones were obtained.

A suggestion that I would like to make, to those who expect to teach, is that they do not buy very good arrows to start with. Beginners always break their first arrows and, as several weeks must be taken up in learning correct form, it does not matter whether the shafts fly perfectly true or not. It is best to save the available funds until the students can use arrows as experts do, then buy the very best that the market affords and the scores will jump upward in a way that will gladden the heart, for with poor arrows no college team can ever hope to win.

The arrow-stands were made of little iron rods, with a loop turned in the end and bent over at right angles. They were painted with the colors of the target rings and looked very pretty, standing about on the lawn.

The group soon numbered eighty-one and became too big for individual instruction, so a leader from each class was elected to teach and command her classmates.

I use this word "command" advisedly. There was no fooling about it.

By this time the authorities had made archery a regular sport which counted as required exercise. I think that each

girl had to shoot for forty minutes three times a week, or two full hours in all.

In teaching the girls, the thing that most impressed me was the exactness with which they did what they were told. Such closeness of attention I had never seen in women before. It was the habit of the classroom transferred to the field. For this reason their progress was much more rapid than that of the average woman who has not learned to control her faculties, and before the fall term was over some of the girls were shooting Columbia Rounds of about 300.

As nothing creates so much interest as competition a match of only twenty-four arrows at thirty yards was staged at as early a date as could be arranged. It gave the girls a definite rating among each other and set in motion friendly rivalries that were very stimulating. We had several such affairs before the cold weather of winter put a stop to the shooting.

With a good foundation thus laid it followed that earnest practice in the spring brought the general marksmanship to a high level. Millicent Pierce, '26, made a Columbia of 407, the best of the year, in an interclass match for the college championship which was won by the Freshmen team under Margaret Gregson, '28.

The climax of the season came at the end of the college year, when a challenge was received from the girls at Cornell to a match by telegraph, each team of four to shoot the Columbia Round on their own range and to exchange the scores. Prior to this a number of such contests had taken place among Ohio State, Northwestern, the University of Wisconsin, Cornell and perhaps others and I think that Cornell had always been victorious. It was therefore very gratifying to Bryn Mawr to win by the decisive score of 1295 to 979.

Archery for Boys and Girls

A few years ago a lady who was writing a book on outdoor games for little children asked me if I would do the

BRYN MAWR COLLEGE

PAMELA KINCAID WINNER OF WREATH SHOOT, 1926
ROBIN HOOD'S MEN, PAGEANT 1922
TEACHING GIRL SCOUTS, 1926

chapter on archery. I told her that if I did it would be composed of the single sentence, "Archery is not fit for children."

We must never forget that the arrow is primarily a weapon and only secondarily a toy. It should always be thought of in the same category with air-guns and darts, in its lightest form, and with firearms in its heaviest development. Children are absolutely reckless of some kinds of danger and often are cruelly heartless in wounding each other. A few months ago a boy near my home was given a powerful air rifle and the first form of amusement he sought was to stand on one side of the street and shoot at some little children playing on the opposite side, wounding two of them so badly that I had to give them professional treatment. A few weeks ago a boy was brought in my office with a steel-pointed dart sticking in his gluteus maximus. As the playmate who had wounded him seemed duly contrite I returned the missile. A couple of hours later another boy came in with the same dart stuck in the infraorbital ridge, or bone just under the eye, which it had missed by less than an eighth of an inch.

In the same spirit of play I have known seven children to be shot in the eye with arrows. One of them was from my own bow. Fortunately it was a small stick tipped with a cartridge shell but I well remember my childish fright when I saw it go straight to the little girl, at whom I certainly aimed it, and hit her in the inner canthus. The daughter of a prominent archer was playing with a little friend when the feather only of an arrow cut across her eye and inflicted a serious wound which resulted in the practical loss of sight on that side.

Nearly everyone thinks of the bow and arrow as toys for small children, but if they are ever put in the hands of a child the parent must be absolutely sure that they are to be used when no companion is about, for the desire to play Indian and to shoot at each other is irresistible.

The proper age to begin archery is twelve, when the boy, or girl, is considered old enough to become a scout. By that

time the primitive impulses of childhood are beginning to be modified and it is possible to awaken an appreciation of competitive sport.

The atavistic call to the bow is dominant in every boy. How could it be otherwise when one considers the close relation it has had to men of all periods? It is absolutely normal for every boy to wish to discharge projectiles at some mark and it is infinitely better that he should do so with a bow than with the far more dangerous gun. There is no comparison in the training afforded by the two in muscular coördination, self-control, poise or physical and mental judgment.

Parents who like to shoot should encourage their children to face the butts beside them and learn to shoot with correct form. If a few of the neighbors' children compete the interest is multiplied. For this purpose the child should be supplied with sharp arrows but for shooting by himself at rovers marks, which is what children will usually do, he should have nothing but blunts.

For summer camps of either boys or girls there is nothing better than archery if it be properly taught and supervised. Yet in illustration of what may happen at either extreme I will tell of the experiences of two little girls, friends of my daughters, who were at camps during the summer just past.

In one the councillor who had athletics in charge knew absolutely nothing about archery and had never held a bow in her hand before. The equipment consisted of one little lath of a bow and a few of the cheapest arrows. The shooting was done with primary loose and every mistake in form that could be imagined. In a few days the feathers came off and most of the points were lost; some of the arrows with which they continued to shoot were broken bits of about half their original length. The target was a single bale of straw, laid on the ground, and was seldom hit by anyone. Yet archery had been featured in the catalogue of this camp, it was expected by the parents and therefore it must be done. The final result was

BOY SCOUTS OF JACKSONVILLE FLORIDA

Shooting at a small portable target

that the children were taken into a field for a few minutes each day, were told to shoot three arrows straight up into the air, so that they could be easily recovered, and then the class was dismissed for swimming, at which the teacher was expert.

In contrast to this the other little girl had been to a camp in Northern Vermont, where archery was in charge of a regular teacher, a young lady who had received her instruction at Bryn Mawr College. There the equipment consisted of two bows, one very weak for the little girls, or minors, and the other of fair strength for the majors. There were two or three dozen arrows of good quality which were kept in careful repair by the instructor. Of course this equipment might have been much increased, with proportionate benefit, but for the first year it was enough to see them through.

There had been an instructor the year before but as she was of the sort I have described above the results of her work were negligible. One heritage from her mismanaged régime was a rotten target, expensive when it was new but ruined by being allowed to stay out in the rain without a cover. This was at once exchanged for a butt of three bales of straw with a four-foot standard face.

About seventy-five girls took archery, out of 150 in the camp, and each one was required to attain a certain proficiency before she could receive a certificate counting toward the coveted letter of the camp, to be worn on the sweater.

For the majors the forty and thirty-yard distances of the Columbia Round were shot and the minimum score for passing was set at one hundred, which I consider very fair. For the minors the distances were set at thirty and twenty-five yards. Unfortunately the instructor did not know of the Junior Round, which would have exactly filled the requirements.

As a result of this reasonable care archery distinctly flourished and is destined to play an even more important part in the camp curriculum next year.

For boys' camps I could cite practically parallel cases, but

the point for all organizers of such summer schools to remember is that the instructor must be competent. With the great number of young people who are now learning the proper technique of archery it should not be impossible to procure the services of skilled councillors.

For the last twelve years there has been more or less attention paid to the bow and arrow among boy scouts but the real father of the great movement for genuine archery among that army of boys is Arthur P. Knight.

In the latter part of 1921 he began to work on the problem of interesting the boys of Rome, New York. Few men would have devoted themselves to the task with the ardor he displayed. Within a few months the boys were making bows, not only at home but under adequate supervision in the manual training departments of the schools. Some of them acquired fair skill in shooting and in 1922 at Cooperstown a team of boy scouts shot for the first time in history in a national tournament. Their rise in skill was miraculous. By the next year Rudolph Lagai was shooting with the best men on the range, at the national tournament at Chicago, and in 1924 he won the Eastern championship, defeating veteran archers who were older than his father.

It is hopeless for a scout-master to attempt to turn out a team of boys, or to expect archery to flourish in his patrol unless he be an archer himself. He must be prepared to give patient instruction, to mend the arrows, bows and strings, which few boys have the capacity to do, and to inspire them with enthusiasm.

I approve of buying the first equipment for boys. It is infinitely easier to make a baseball bat than a bow and yet no one tells the boy that he must carve a bat out of a log of firewood before he can play ball. Let him learn to like the game first by making it as pleasant as you can. Do not create a primary disgust by forcing him to attempt feats of craftsmanship which are far beyond his powers.

RUDOLPH LAGAI 16 YEARS OLD 1925 EAGLE SCOUT E A A CHAMPION ARCHERY TEAM OF PAOLI TROOP No 1 OF WAYNE, 1926

Later, when his interest is genuinely aroused, set him to work making a bow, which is a much more simple operation than making an arrow. Buy a good stave of lemonwood for him; do not send him off on a search through the woods for a piece of timber which will take a year or two to season. By following the directions on bow making in this book the average scout can make a fair weapon on his third or fourth trial.

So far as I know the team of girl scouts from Springfield, Mass., under the leadership of Miss L. Comins, was the only one which has ever competed in a large match. They made a splendid impression at the Eastern A. A. Tournament of 1925 and proved beyond question that archery should be made a major feature in girl-scout training.

Girls should not be expected to work with carpenters' tools and therefore the bows and arrows should be supplied. There are, however, many things which a girl might properly do. She should certainly know how to make a bowstring. To make a shooting glove or set of finger-tips should also come within her province. Ornamented quivers, belts and bow cases are highly suitable.

As a parting word let me insist that all success in archery with boys and girls is proportionate to the enthusiasm of their leader.

V

THE EASTERN ARCHERY ASSOCIATION

In the general enthusiasm of the renaissance of archery, in 1879, nearly every village had its club, and it was but natural that they should gather into large associations for promoting mutual competition. The five important ones were:

The Eastern Archery Association, whose history we will follow in detail.

The Western Archery Association, with headquarters in Chicago.

The Pacific Coast Association, centering in San Francisco.

The Ohio State Archery Association. This was the strongest of all. Until 1906 it held tournaments almost yearly and produced some of the best archers America has ever seen, including W. A. Clark, Col. Robert Williams and the almost peerless Mrs. M. C. Howell.

The Potomac Archers, of Washington, while a club in name, were really a nucleus for all the archery clubs in that vicinity. Maxson was their brightest star. If archery were ever popular south of the Potomac River at that time I have no knowledge of the fact.

In the lean years of archery all of these associations died out, or at least became so enfeebled that they did not hold annual meetings, yet in the early times their tournaments were big affairs and should be treated with respect in considering our American records. To my mind, for example, the Double York of 220–1042 which Colonel Williams made at the Ohio State Tournament in 1883 is entitled to as much credit as the 221–1025 which Palairet, of England, made at the Crystal Palace meeting the year before and which is recorded in all the books. At the same meeting Colonel Williams made a Dou-

ble American of 177–1129, which stood unbeaten until Bryant established a national record in 1912.

The Eastern Archery Association suffered the same lapse of vitality that the rest did but it was resurrected a few years before the World War and since then has constantly increased in importance.

It was born at the Parker House, Boston, in the summer of 1879, as a result of a call to all who were interested in archery and in September, at Beacon Park, the first tournament was held with thirty-six men and eight women present, representing nine clubs.

For convenience I will tabulate the names and scores of the winners elsewhere.

The second and third tournaments were also held in Boston. At the former one of the contestants was Mr. A. G. Whitman, who later became a sort of link between those times and ours, as it was due to his unsurpassed fletchery and to his teaching that archery remained alive in Boston and produced the men who since 1910 have made our records.

The fourth tournament, in October, 1882, was held in Hoboken, N. J., with sixteen men and five women present, all but four of whom were from the vicinity of New York. Reading the minutes of the meeting, one wonders if there had been a sort of reorganization of the society, as a cryptic sentence says: "It was decided that the medals bought from the old E. A. A. should remain the property of the association."

After this there is a hiatus of eight years which seems destined to remain a blank and I personally believe that there were no contests. For definite facts I must begin at 1891, when a tournament was held in Washington under the guidance of Maxson, to whom belongs the honor of keeping alive a feeble spark of life for a dozen years.

As a matter of fact those meetings were nothing more, as a rule, than formal contests of the Potomac Archers, though occasionally a visitor dropped in. The radical change occurred

in 1903, when a double meeting was held in both Washington and Boston, a sort of mail-match which set a precedent for future years. Wallace Bryant, of Boston, was the winner and thereby came into possession of the two gold medals of the association which eight years later formed a basis for the next competition.

In 1911 the opening of a municipal archery range at Newton Centre had rekindled the enthusiasm of all the archers who lived near Boston and they urged Richardson, who was president of the N. A. A., to assume the like office in the Eastern and to issue a call for a mail-match on November 11th in which the two gold medals were to be shot for once more.

At Newton Centre eight men and seven women competed and the only other entries were seven men of the Wayne Archers, who had begun their corporate existence on September 30th and were eager for their first match.

The tournament in 1912 was also a mail-match, showing the results of a year of active toxophilitic propaganda in a much larger entry list.

After these two matches against invisible foemen it was natural that sentiment should demand a real shoulder to shoulder contest and, to open new territory, the site selected was Wayne. Fortunately a great community field day was held on the school athletic field across the street from my home and our comparatively modest show was thus made a part of the big one. You have no idea how much more impressive an archery match seems when there are more than two thousand spectators crowded around the shooters.

In 1914 the tournament was held in Jersey City, on the invitation of that splendid band of men, the Scottish-American Archers. Here the miserable old English point system confused the issue because, while Hertig made only 653 to 722 by Jiles, he had more hits and a slightly better range score at one hundred yards and therefore was the winner.

For the next two years Newton Centre played the host

and then America's entry into the war stopped all formal archery.

In the spring of 1919 shooting was resumed through the medium of a mail-match but it did not meet with popular approval. Many of the archers were of the newer set who knew nothing of the mail-matches of earlier days and they did not feel that it was a sufficiently dignified method of determining the championship. Another cause of discontent, which I am free to acknowledge was quite justifiable because I was to blame for it, was that the ladies were requested to shoot the American round. As one and all refused to do so no championship could be awarded to one of their number.

The next year saw a real tournament once more at Newton Centre at which Homer S. Taylor performed the astonishing feat, for one of his years, of winning with a Double American of over a thousand and a Double York of nearly eight hundred.

The next two tournaments, the former of which was the first one I had ever attended, were held at Deerfield, a lovely colonial village in the Berkshire Hills of Massachusetts, which was the scene of the massacre of 1704. That dark episode was designed by the French to capture Rev. John Williams, to be used in an exchange of military prisoners, and the Indians played the cat's paw. The house that was built for Williams on his return from captivity is now part of the Deerfield Academy where, through the influence of Homer Taylor, we lodged and shot. As archers are mostly recruited from the professional classes and are of varied attainments, the gathering seemed to resolve itself into a wonderful house party. I happen to have before me a beautiful poem by Mr. Frentz, who is an editor of the *Youth's Companion,* which begins like this:

"On velvet smooth celestial fields
I hope some day to stand,
My quiver full of lightning shafts,
A rainbow in my hand.

" Then shall the sun's great golden disc
Slow sinking in the west,
Stir all my old-time archer blood,
And bid me do my best."

To tap new territory an invitation from the Scottish-American Archers of Jersey City was accepted for 1923 and the meeting was held in the Hudson County Park on the Lincoln Highway. No tournament will ever remain more vividly in my memory as I took over a team of four Wayne boy scouts, with a friend and my little Bobby, aged eight, in an open " Suburban " Ford with no top. It was dark when we arrived and a drizzle was falling, but we managed to pitch a tent and we lay in it like sardines in a box, suffering infernal torments from clouds of mosquitoes. In the morning some were almost unrecognizable. Thereafter we slept on the floor of a house that was used by skaters in the winter. It took me back to a time when my years were less than half as many and I thoroughly enjoyed the petty hardships, even when we seemed to sail the very seas through a cloudburst on our way to a party one evening.

But 1924 was very different, a scene of splendor at the great Westchester-Biltmore Club, of Rye, N. Y. We shot on the velvety polo field, surrounded by a lovely panorama of rolling hills and sparkling sea.

In 1925, the last tournament before this book goes to press was held at Deerfield. There is really no other place that is so completely satisfactory as this dear old institution of learning nor one so conveniently situated for most of the members of the association. Next year the match is to be held there again, and I do not doubt that it will be chosen in the future more often than any other place.

The shooting was of a very high order. For the first time in the history of archery four men got scores of over 1000 in the Double American Round.

Several records were broken by individuals. Dr. Paul W.

EASTERN ARCHERY ASSOCIATION
Tournament at Deerfield, 1925

Crouch, of Boston, who had been making unprecedentedly high scores in practice, made good in competition by creating the three new records for the E. A. A. of 213–1031 for the Double York Round, which broke the previous record of 190–912 made by Maxson in 1899, a Single American Round of 90–602, breaking 89–567 by Wallace Bryant in 1903, and a Double American Round of 180–1190, which is better than the N. A. A. record of 177–1153 made by G. P. Bryant in 1912, and which broke the previous E. A. A. record of 174–1098 made by A. R. Clark in 1900. Dr. Crouch also succeeded in making every arrow hit in the Double American, which no one in a tournament of any size has ever done before, even though it is so common in small matches.

In justice to the four gentlemen whose record scores were superseded it should be mentioned that they made those scores by pure archery, using nothing but the simple bow and arrow, without even the advantage of artificial points of aim placed on the ground and in some cases without even being allowed to warm the muscles by practice beforehand.

Dr. Crouch used a delicate peep-sight, invented by Shepherdson, which was adjustable for all distances where the point of aim would be below the target and which, by giving a sight on the gold at each range by allowing direct vision of the target and by eliminating the factor of error from rotation of the line of sight about a point of aim intermediate between the archer and the target, gave him an advantage which the four men of earlier days did not possess.

Dr. Crouch, in my opinion, is one of the greatest archers the world has ever seen and from his work at 100 yards, where the peep-sight cannot be used, it is evident that he could still make new records if he shot in the time-honored way.

Miss Dorothy Smith won the events for ladies in her usual brilliant manner and added to her glories by breaking her own record for the Double Columbia Round, made in 1923, with a new one of 141–851.

The new and interesting form of clout shooting will be treated of more fully elsewhere.

Best records of the Eastern Archery Association:

Single Columbia Round...	Miss Dorothy D. Smith ..	462	1921
Double " " ...	" " " " ...	141- 851	1925
Single National " ...	" " " " ...	63- 343	1923
Double " " ...	" " " " ...	132- 680	1923
Single American " ...	Dr. Paul W. Crouch.....	90- 602	1925
Double " " ...	" " " " .	180-1190	1925
Single York " ...	Dr. Robert P. Elmer	117- 547	1925
Double " " ...	Dr. Paul W. Crouch..... .	213-1031	1925

VI

THE CONDUCT OF TOURNAMENTS AND MATCHES

I WILL not try to examine into the history of matches that were held in England before the days of modern archery because practically all that I have been able to find about them is described in this book under other headings. It seems best to me to tell exactly how modern American tournaments of the first class are conducted and afterward to mention the modifications which may be necessary to meet the conditions of small matches between individuals or clubs.

The Annual Tournament of the National Archery Association is the model on which all others are based and because of nearly half a century's accumulated experience it has become standardized to an extent which assures a satisfactory lay-out of the ground and smoothness in carrying out the program of shooting. Let us begin with the physical side.

Naturally, in looking about for a field that is large enough for an unabbreviated tournament we first recall to mind the events which need the longest range. These are the flight shoot, for both men and women, and the clout shoot. As the flight shoot record is now over 300 yards it is not always easy to find a field that will take it in its entirety. Fortunately, however, this is not at all necessary because no one is likely to compete in such an event who cannot cast, at the very least, 150 yards, and it is therefore quite possible to place the shooting line about that far away from the nearest edge of the field. It does not make very much difference where a flight shooter stands, provided it be on about the same level. For example, the school field opposite my house is 206 yards wide, but I can get a splendid flight range by shooting into it from my own yard across the wide street. At the 1920 tournament of the N. A. A. we shot on the football field of St. Luke's School in

Wayne and were therefore limited to an area of about 150 yards by eighty. For the flight we stood afar off in an adjacent field.

The clout for men needs 208 yards from the shooting line to the outer edge of the forty-eight foot target. Besides this at least twenty yards more should be allowed at the clout end for overshot arrows and a few yards behind the shooting line make it much pleasanter for the archers. If space allow, I think that a range of 240 yards should be measured off for the men's clout shoot, although 228 will do if there be no more ground available. In this event also the archers may stand on another property and shoot over into the tournament field if it be thought advisable to do so.

However, it must never be forgotten that both the flight shoot and clout shoot are extremely dangerous events. If there were no wild arrows there would be no danger, but, unfortunately, it is in these events, where a slight divergence of trajectory is magnified to the utmost by reason of the great distances, that the jerky style of shooting gives rise to the most mistakes in aim. I remember only too vividly that at Wayne, in 1920, one of my shafts stuck in the ground less than a foot from a young lady. At the national tournament of 1924, at Deerfield, a shaft sped by Professor Curtis came sailing over the roof of the academy and shot a boy in the arm before my eyes. At the E. A. A. at the same place, in 1925, the clout shooting was done in the opposite direction but even then if it had not been for the kindly vigilance of Mr. Ives, who had learned from experience what an arrow wound means, there would probably have been two more casualties. In the first instance some spectators were seated on a narrow cement walk, close to the academy building and probably twenty yards from the edge of the target. Mr. Ives advised them to move behind the building and they had not long done so when a shaft struck that very spot and dug a groove in the cement at least a quarter of an inch in depth. Also Mr. Ives

moved back some boys who were lying on the grass at what would ordinarily have been a very safe distance and in a few moments an arrow alighted just where they had been. It may be the very best archers who make these wild shots. The one in the cement was from Crouch himself, who won the event with a large score and who had broken the Double American Round record the day before.

I go into this so fully because it is a temptation to place the clout target, which is marked out on the grass, comparatively near the spectators so that they can see it clearly and note by the paint and feathers of the arrows who is making the best score.

If the limits of the shooting field may be thus artificially stretched for the flight and clout shoot no such thing is permissible for all of the other events, which require ranges of from 30 to 100 yards. Thus, after all, it is the York Round which determines the limits of our field.

If there be ample room, as on a polo or baseball field, a tournament range should be laid out as follows:

First mark off the shooting line as a baseline on which to found all other measurements. Preferably it should face toward the north, so that the sun will not shine in the eyes of the archers nor throw the target faces in shade. Sometimes, however, there may be stronger reasons for shooting the other way, even straight against the sun. For example, the 1914 tournament was held on the grounds of the Merion Cricket Club at Haverford, Pa. Here the long house, with its veranda crowded with spectators, faced the south.

If we had gone out into the cricket field and shot toward the house it would have been terribly dangerous to the spectators and also utterly uninteresting to them, as they would have seen only the backs of the targets. Obviously the only practical plan was to run the line parallel to the front of the house. At Wayne the field ran east and west and we kept the sun out of our eyes by shooting the short ranges across the

field and placing the 100-yard targets at one end or the other according as it were morning or afternoon.

However, we start with the shooting line laid off in the best place, shaded by trees if it be possible. Most of us archers are indoors people and a shooting line so placed that we are always in the sun causes many of us to become painfully sunburned.

Behind the shooting line, at a distance of from ten to fifteen feet, should be stretched a rope to limit the space for spectators. From long suffering experience I have almost decided that nothing less than barbed wire entanglements raked with machine guns will keep visitors from intruding on the space reserved for the archers. For a number of reasons their presence inside the rope is most undesirable. Usually enough chairs or benches are provided for the contestants to sit in, but anyone who has seen a tournament notices immediately that using a chair for its natural purpose is the last thing an archer seems to think of. Every man brings a large box of arrows, and sometimes an additional hand-bag filled with extra strings, gloves, mending materials and other accessories of shooting, and, besides the bow he expects to shoot with, he often has one or two more to use in case of an accident to his favorite. As it has often rained just before the shooting and he does not wish to let his paraphernalia get wet, or perhaps, as it is so dry and hot on the ground that he is afraid his arrows will lose their spine or his bows their cast, he piles all his tackle, with his coat or sweater, in the chair he is expected to sit in. So universally is this true that I have often thought that an ideal arrangement would be to have two rows of furniture, a line of chairs about three yards back of the shooting-line, and, just behind them, a line of benches or tables for the archers' gear.

The shooting-line should be clearly marked out in chalk, slaked lime, marble dust, land-plaster or any other white powder that will not kill the grass.

Until 1919 it was always the custom to mark the distances of the different ranges with parallel lines, on which the targets were set at the proper places, marked by short cross-lines. It was a good way, made the field look attractive and was of great help in finding points of aim, as at that time artificial points of aim were not used. On the other hand it involved a great deal of work and made more lines than were desirable on a field which perhaps immediately after the tournament was to be used for some other game.

In 1919 Shepherdson was master of the green at Boston, and with his customary originality he introduced the method of marking each spot with a peg, thus using only one marked line.

If the field be large, or the archers few, the targets look very well spaced fifteen feet apart, but if it be necessary to get a great number of targets into a limited distance they can be put ten feet apart. Nearer than this they should not be placed, except under strict necessity.

Bearing these facts in mind, the next step in the actual preparation of the field is to measure off distances of ten or fifteen feet on the shooting-line and drive a short peg flush with the surface of the ground at each point. These mark the positions where the archers are expected to stand and are to be directly in front of their targets. However, there is nothing in the constitution to forbid an archer from standing anywhere else in his ten or fifteen feet if he chooses to do so for the purpose of getting a better aim.

Half-way between these pegs are bow-rests, which are very simply made by driving stakes in the ground and nailing cross-pieces on top of them. The stakes are about four or five feet high and the cross-pieces are about a foot long and made of one-inch by four-inch lumber with four indentations or nails in each side to lean the bow against. Sometimes they are nailed together on the ground, but usually they are made up previously and painted green.

With the shooting-line and the region behind it thus completely finished the next step is to find the positions of the two end targets at 100 yards. Sometimes someone happens to have a surveyor's transit, and then it is very easy. You simply set it up over the first peg, swing it around at right angles and measure off 100 yards with a steel tape.

If you have no transit you may find the right angle by remembering the geometrical theorem that the square of the hypothenuse of a right angled triangle equals the sum of the squares of the two other sides. In laying out houses builders use three, four and five, or multiples thereof, as nine plus sixteen equals twenty-five. Let me urge you in all sport measurements to use steel tape rather than the cheaper linen, as the latter is sure to stretch and lead to embarrassing inaccuracy at times. If you buy a new tape for the purpose of laying out a ground get one with swivel joints placed in it at the right places to form this triangle. It is called a contractors' and builders' tape.

Having found your direction and measured off the 100 yards, drive a peg there. This peg is not only a marker of position, like those on the shooting-line, but it also serves the purpose of an anchor for the tie rope of the target. It often happens that during a tournament a sudden gust of wind will come up and blow the targets over if they be not securely pegged down. When Harry Richardson was shooting with Will Thompson at Seattle, before their hunting expedition of 1911 into British Columbia, he used the arrows with which he had made the Double York record the year before. When they were all in the target, at one end, a gust blew the stand over and broke them. Thompson wrote to me about it and said that, sorry as he was, he could hardly help laughing when he heard Harry exclaim, "There go the six best arrows the Lord ever made." My target blew over in the same way, from a sudden wind, at the E. A. A. in 1925, when I was in the middle of my second York. Fortunately I had shot only two

arrows, which were of course broken, and we all took a recess for pegging the legs more securely before the shooting continued.

It used to be that we drove a peg beside each leg and tied the leg to it. There is no better way than this if time and trouble are no object, but Shepherdson devised the much simpler, and sufficiently effective way, of leading a single rope straight down from the apex of the target-stand to the peg. To make it tight the rear leg is moved back a little, thus lowering the top, the string is tied and the leg shoved up again till the string is taut.

The peg should therefore be at least ten inches long, deeply driven into the ground and should have a quarter-inch hole bored through it near the top in which a large wire nail is rather loosely set. You can then secure the rope to this nail and loosen it easily when you want to move the targets by pulling the nail out with the fingers.

When the pegs for the end targets are driven it is an easy matter to stretch a string between them and measure off the appropriate positions for the other pegs on the 100-yard line. Similarly, when these pegs are driven, lines are stretched from them to the pegs on the shooting-line and positions marked off on them for all the other places to which the targets will be moved. This is most easily done by measuring the distances on the end lines and stretching strings across, thus marking and pegging all the intersections.

Marking out the ground for the ladies is exactly the same except that the longest range is sixty yards.

When the targets are put near each other, in a long line, it is very easy for an archer to mistakenly focus on the wrong one and thus lose the value of a hit even if he make one, as the constitution expressly legislates against such carelessness. The danger of this accident is much less when pegs are used instead of lines, as the series of pegs points straight from the archer to the gold. Yet, in order to still further guard against

it, a custom has sprung up of sticking differently colored feathers, or plumes, or little flags or numbered cards in the tops of the targets.

Undoubtedly the careful laying out of the shooting field has a great deal to do with the success of a tournament, yet efficient, prompt, businesslike management is even more important.

The constitution gives practically the whole power over a tournament to one man called the Field-Captain, and suggests that when possible he shall be the president of the association. In practice this is interpreted with considerable latitude and the field-captaincy is often awarded to a man of long experience and tried executive ability even though he may not be one of the elected officers.

The Field-Captain usually appoints an assistant called the Master-of-the-Green, who attends to moving the targets and laying out the grounds, and nominates one of the women to be Lady Paramount.

Before the shooting begins the Field-Captain should see that all the archers are on the grounds and should blow his whistle, or horn, to notify the archers to stop practicing and come to draw for positions at the targets.

Practice before shooting should be spoken of before we proceed farther.

When I began to take part in tournaments in 1911, and for all the previous years, an archer was not allowed any practice shots and was obliged to face the target "cold," or without warming up his muscles. I do not think that this custom was abolished till the first tournament after the World War. Mrs. Howell wrote me that she even adhered rigidly to this rule in private practice and all her great scores were counted from the first arrow shot. So were most, or all, I think, of a run of eight single Americans of over six hundred which I shot in the fall of 1917.

Nowadays practice shots are permitted but they must be at

a special target and never at the one which the archer is to use while in competition. If the time be short the number of arrows is sometimes limited by the Field-Captain, but usually a man may get on the field as early as he likes and shoot till his coördination is working smoothly.

It used to be that an archer could select any target he chose and shoot in the company of selected friends but, as that gave rise to obvious inequalities, it was changed a few years ago to the fairer system of choosing one's target and target mates by chance. The modern practice is to place in a hat three or four numbers for each target, according to the size of the list of competitors and to let each man take one out, sight unseen.

As soon as the numbers are drawn the archers collect their paraphernalia and take it to their proper targets. They should stay there where they belong, and not roam about visiting their friends, until the Field-Captain comes down the line and appoints one to be Target-Captain and another to be Scorer. There should be some thought given to these little elections. A good many questions arise during a day's shooting, and the target-captain should be an experienced veteran who can answer them with promptness and certainty.

Particularly is this true with regard to making close decisions as to which ring an arrow is in if it be very near the edge. Sometimes new men do not realize that the championship may depend on one or two points and in a feeling of good-fellowship give the benefit of the doubt to the archer.

There should not be any benefit of doubt. It must be a question of absolute fact, and if the Target-Captain be not perfectly certain he must call on the Field-Captain for a ruling. The constitution says that if an arrow cut two colors it shall count as having hit the inner one. In most cases the decision is obvious, but there are many arrows that touch by less than the breadth of a hair. In such cases one should not hesitate to summon the Field-Captain, and should remember that generosity to a friend may mean the downfall of an opponent.

The third and fourth men are called "arrow-hounds," and pick up the shafts which have missed the target

At this time the Field-Captain blows his whistle and one archer from each group, according to the order prescribed by the Target-Captain, straddles the shooting-line and speeds his first three arrows. It is only in case of great necessity, such as the approach of a storm, that two men shoot at the same time at one target. In fact, I cannot remember that I ever saw it done in a national tournament. Many men who practice alone are much annoyed by having other archers shooting immediately in front of or behind them and should not be handicapped by having to tolerate it. Besides, it limits an archer's freedom to move about and to find what seems to him the best point of aim.

As soon as the first lot of men have shot their three, they step aside and give place to the second set, and so on for the third and fourth. I might say that it is well never to have more than a quartette at a target as the match becomes too long drawn out. When all have shot, the first man shoots three more, thus completing his end, and the others follow as before.

There are always some archers who shoot more slowly than the others, but it is a strict rule that no one shall advance on the range toward the target until every archer has finished and the field-captain has given the signal. Neither must any archer be unduly hurried, even though time be pressing, unless he show a willful attempt to delay the game.

The march down the range to the targets is one of the pleasantest moments of the tournament. Very few sprinters can better ten seconds for the hundred yards and when several score men walk it at an ordinary pace, stand several minutes at the targets and return to the shooting-line they have spent almost as much time as in the actual shooting. This is the opportunity for conversation, relieved from the perfect stillness which should prevail while shooting is in progress. As

I have said in other places the archers are almost always cultured people of originality and imagination, with whom it is uplifting to associate, and I look back to hundreds of little walks and talks together with a sense of pleasure that few other reminiscences can offer.

When, finally, all the ends of a given range have been shot, the targets are moved to the next shorter range, as all rounds begin with the greatest distance first. This hard job is sometimes performed by hired men, but they are usually so slow and stupid that the archers have to supervise them closely and often they prefer to do it themselves. It is not necessary to take the target off the stand during the moving, and there are several ways of going about it. If one man essay the task he should stand within the three legs of the tripod, lean his back against the target, take the two front legs in his hands, lift it off the ground, hold the third leg clear with his forehead and either walk backward, in which case he will save turning around twice, or else turn slowly about like a turn-table, proceed to his peg, revolve again and lower his load. If there be two men each takes a front leg with one hand and the hind leg with the other and the whole thing is easy.

No doubt you may wonder why the archers do not move toward the targets and avoid all this trouble. In private shooting it is always done that way and, of course, if butts are used it is obligatory, but in tournaments the spectators are considered. If they be in a grand stand the archers would begin in front of them at the hundred-yard range and end up sixty yards away at the forty. Besides, the shooting-line is usually placed in a shady spot, or near one, and moving forward would mean spending the day in the broiling sun.

In England two sets of targets are used, the archers shooting only three arrows at an end in one direction and then three back in the other. It is their ancient custom and they like it, but to us it seems to have the disadvantage of requiring twice as many targets and making it very unpleasant for the spec-

tators, who must either tramp up and down the field, or else view the shooting from a considerable distance to one side.

The arrangement of the program for a national tournament is left to the Executive Committee of the National Archery Association, but, as a rule, the president is given free rein to fix the order of events as he chooses. In the early days the Double York, Double American and Team Rounds were the only events for men to which much importance was attached, and if any time were left it was filled in with handicap matches at various distances. The Flight Shoot was usually held but it seldom attracted many contestants and was looked on as a side show. At the first tournament I attended, in 1911, I do not think it would have been held at all if it had not been for Mr. Homer Bishop, who wished to try some hollow arrows, with which he had won the previous year. To-day it is one of the best events on the program, at least for bringing out original ideas, and is specially prepared for by archers who have pet theories to test.

Little by little other events, like the Wand Shoot, Clout Shoot and Novelty Shoot became added to the program until the championship events had to be crowded into such a short space of time that the match became one more of endurance than of skill. In 1925 the evils attendant on such a state of things were recognized and a revision of the constitution in the direction of simplification was ordered so that the program might be put once more on a pleasant and probably more sensible basis. As the requirements stand now it is probable that as satisfactory a program as any would be like this:

		Men	*Women*
1st Day	A. M.	100 yards of 1st York	1st Columbia
	P. M.	80 and 60 yards of 1st York	1st National
2nd Day	A. M.	100 yards of 2nd York	2nd Columbia
	P. M.	80 and 60 yards of 2nd York	2nd National
3rd Day	A. M.	1st American	Same as men
	P. M.	2nd American	" " "
4th Day	A. M.	Team	Same as men
	P. M.	Clout and Flight	" " "

Of the events for men the Clout, Novelty and Wand Shoots are not required by the constitution and therefore need not be held if the Executive Committee do not choose to have them. If they be put on the program it is well that they be shot according to accepted usage in order that the scores made in different years may be compared.

The same remarks apply to the Wand, Novelty and Clout Shoots for women. Inasmuch as there are annual prizes for at least two of these events, the Wand Shoot for women and the Novelty Shoot for both sexes, it seems that courtesy to the donors would suggest that they be competed for whenever it is convenient to do so. In actual practice it has been found easy to kill two birds with one stone by staging a Clout or Wand Shoot in the guise of the Novelty Shoot for the year.

Every N. A. A. tournament begins on Tuesday and ends on Friday, thus giving a day or two for practice before the match and allowing two days of rest afterward.

The Annual Business Meeting should never be squeezed into a noon recess in the shooting, but should be an affair of a leisured evening. There is always an astonishing amount of business to be transacted and the officers should be selected with the best interests of archery in view.

On the last night there is a banquet at some club or hotel. I have never been to any other feasts exactly like them. After four days in brilliant sunshine the ladies all have faces like red apples and their necks seem to be tattooed in various patterns according to the texture of the garments they have been wearing. The men are the same but more so, and the general impression is of abounding health. Everyone dresses up according to the amount of luggage he has brought and the result is interesting even if not sartorially standardized.

Small matches are not nearly so formal. Nearly always the targets are left in place and the archers move up to the required distances. As time is more limited several archers may shoot at once at the same target and deliver all six shots without

stopping. In fact any small changes which do not alter the fundamental rules of shooting may be agreed on by the contestants.

Mail-matches are a form of contest which has been popular in America since the early '80's. In 1913 a series which was open to all archers was conducted through the courtesy of *Forest and Stream*. Of fifty-one who competed Dr. Hertig won the Single York with the splendid score of 122–596, and his team-mate Holmes led in the Single American with 89–623, thus proving beyond doubt the value of this sort of competition in maintaining high standards. Dorothy Smith, who was then only ten years old, made the remarkable child's record for the Single Columbia of 14–46, 23–117, 23–131:: 60–294.

On October 5th, 1922, Louis C. Smith put the mail-match on a permanent basis by publishing his first *Bulletin*, the little paper which we regard with a sort of affection as it records the weekly strivings of our old and new friends of the range.

Perhaps this chapter should not close without speaking of score-cards. In private shooting it is enough to record each end but in competition that should never be relied on. Too many mistakes are made in such a great number of hasty additions and grave injustices may be done with no chance of correcting them. I do not think I exaggerate when I say that four score-cards out of five at each tournament are found to contain mistakes in arithmetic. The only safe rule is that the scorer should record the value of each hit as the arrow is drawn by the target-captain, so that the figures may be added at leisure and be subjected to subsequent auditing.

Experience has shown that the simplest form of card is also the best. Formerly different ones were printed for each event and ruled for the appropriate number of arrows, but now one card serves for all ranges, whether shot by men or women. It is a piece of cardboard, about eleven inches square, and ruled for four archers. At the top is a space for the name

Target 75

THE NATIONAL ARCHERY ASSOCIATION OF THE UNITED STATES

ANNUAL MEETING

1st American

Date Aug 19, 1925

Crouch, W.	S	Brush, A.	H	S	Mann, G. A.	H	S	H	S
977751	6 36	776693	6 36		977388	6 32			
977793	6 38	755810	5 21		953330	5 25			
977797	6 40	779551	6 36		755300	4 20			
976556	6 40	778551	6 30		755300	4 18			
977751	6 36 30/198	755311	6 20	29	991000	3 19	22	112	
777555	6 36	975333	6 30		755310	5 21			
997755	6 42	755531	6 26		955331	6 26			
999756	6 46	997553	6 38		955531	6 28			
999777	6 48	999751	6 40		753331	6 22			
999995	6 50 30/228	999970	5 43	29	777558	10 5	21	28	118
997755	6 44	977775	6 42		977711	6 32			
997775	6 44	977777	6 44		777550	5 31			
999565	6 42	777755	6 38		975530	5 29			
999777	6 44	777555	6 36		777750	5 33			
777773	6 38 30/218	777755	6 38	30	999775	6 46	22	111	

90-626 88-506

90-626 88-506 77-401

716 594 975

ORIGINAL SCORE-CARD OF THE RECORD AMERICAN ROUND

of the event and the date. Under that is a line for the names of the contestants. Under the name of each archer are six columns for the six arrows of each end, two columns for the hits and scores of each end and two columns for the totals for each distance and for the final score. There are thirty transverse lines, which give plenty of room for any kind of round, but the scorer is left to make any special cross-lines to mark the divisions between the distances.

VII

ARCHERY IN FRANCE AND BELGIUM

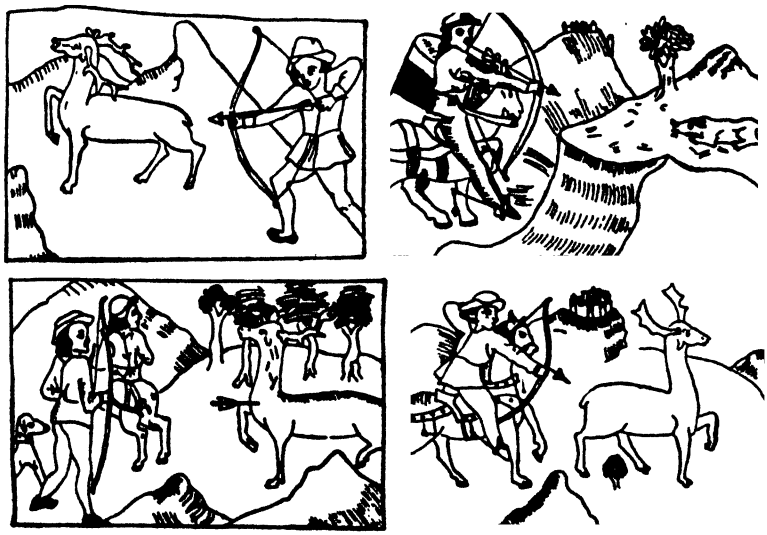
THE American who makes a study of Gallic archery will meet with surprises from the beginning of his investigations until the end. We have derived practically all our traditions of the sport from English sources and have heard so much of the supremacy of the military bowmen of England in the middle ages that we are apt to suppose that archery on the continent was practically non-existent. The first surprise might be, therefore, to learn that before the war put its blighting hand on European sport there were probably twenty thousand archers in France as against an extremely liberal estimate of four thousand in Great Britain.

It would be surprising, also, to the student of the literary side of toxophily to learn that the oldest European book on archery is now in the public libraries of Paris. It is an ancient tome, printed in coarse wooden black letter types of the fourteenth century and is called "The Book of King Modus" (*Le Livre du Roi Modus*). The author is unknown but internal evidence of its date of publication, aside from that given by its dialectic forms and by the state of development of the printers' art is furnished by the following sentence:—"And I saw the King, Charles le Bel, who hunting one day in the forest of Bertelly took twenty-six wild boars, without a single one escaping." Charles le Bel died in 1328.

It thus antedated Ascham's *Toxophilus* by about two centuries but it is quite a different sort of book, though a very valuable one. While it does not enter into the details of archery tackle as Ascham did it does give very fair directions on many important points, among which are the following:

The string be made of silk, rather than hemp.
The finger-draw be used.
The steel pile be not too heavy.
The feathers be cut low and short.
Flat arrow-heads be set parallel with the nock.
An arrow be thirty inches from the nock to the barbs. (Ten handfuls.)
A bow should be five foot six inches from nock to nock. (Twenty-two handfuls.)
(The handful is supposed to be three inches but there is room for doubt.)
A bow should be strung a palm and two fingers deep.
Hold the bow in the left hand and draw with the right.

The rest of the book is a series of interesting and quaint directions on the proper way of hunting stags, boars and hares with the bow.



From *The Book of King Modus.*

Small as this book was it evidently exerted a lasting influence on French archery which was somewhat analogous to that of *Toxophilus* in England, though I imagine to a much less

degree. At any rate it is extensively quoted in a book of extreme rarity, only one complete copy and a mutilated fragment of another being known, that was called *La Fachon de tirer de l'arc a main* (the fashion of shooting with the hand bow) or *l'Art d' Archerie,* which was published at Paris by Michel Noir about 1515, just thirty years before *Toxophilus.* It is quite different from the book of King Modus and has nine short chapters which have been given the following captions:

Concerning the nature of wood for making bows.
Of the make of hand-bows.
Concerning the horns for bows.
Of bowstrings.
Of the shaft used with the bow.
Of the glued arrow.
Of flight arrows.
Of putting a string on a bow.
On the way of shooting with a bow.

Most of it is too common knowledge to need reproduction here but some things are of interest. It says that red Italian yew is better than white Portuguese and recommends examining the grain on the sides to see if it be close.

Bows for butt shooting should be made square because they have a broader back and therefore last longer, because the arrow lies better against their side and because they shoot straighter.

Bows for flight shooting should be only two arrows length and one fist and should have a narrow back. The smaller the horns the better.

Strings should be made either of silk or of fine female hemp, which is finer than male hemp. They should be gummed and not glued.

Butt arrows are made of aspen seasoned two years without heat, flight arrows of birch or cherry. Here is an interesting quotation: "If you would know what is a sheaf arrow, according to the English, every glued (feathers glued on) and

iron-headed shaft, whether big or little, is called a sheaf arrow. Flight arrows may be hollow, or bored from the head to within three fingers' breadth of the feathers. Some fill them with quicksilver which gives a dishonorable advantage."

The directions for loosing are quite new to me and may explain the position in which mediæval archers are always shown, with their feet apart. "Loosing depends on the step, of which there are three kinds. The one-step loose is done in two ways, one by stepping forward with the foot of the bow-hand side, and the other by bringing back the arm, pushing out the bow and arrow, and at the same time stepping back with the other foot; this step straightens the arm but it must be a long and sharp step back. To shoot with two steps a backward step must be taken with the hindermost foot, so that on bringing the front foot down, sufficient impetus is given to effect the loose. For the three-step the front foot is moved forward, then the bow is thrust forward and then the hinder foot is brought back in such a way that when the arrow is loosed one can step forward with the front foot."

Curious old rules these are but they give the mediæval viewpoint and elements of truth seem to struggle for expression in most of them. The stepping about at the time of shooting is something that I believe very few archers have heard of. From the dialectic forms the writer was evidently a Picard.

Besides these two ancient volumes only one other book on archery has ever been published in France and that is a strictly modern work, of delightful readability which was published in 1900 by Hachette et Cie, 79 Boulevard St. Germain, Paris, and is called *Le Tir à l'Arc* (shooting with the bow). It was written by Count de Bertier, one of the very few Frenchmen of high social position who have been interested in archery, and a man who has shot with English archers on many occasions. A great deal of what I have to say is taken from his book.

Returning to the subject of the great number of French

archers I may say that I am inclined to give full credit to Count de Bertier's large estimates, for I have personally counted the names of 540 French towns which, at least before the war, had archery societies and, as many had more than one, the total number of clubs must have been about 600. In Belgium there are, or at least were, 310 societies, of whom 249 shot at the popinjay and sixty-one at targets.

In fact, all over that part of Europe, archery is divided into those two forms and neither of them has much resemblance in detail to the sport as we know it.

Instead of shooting in the open air, as we and the English do, the Frenchman or the Belgian shoots in a *Jardin des Archers,* or Archers' Garden. It is more open than a shooting gallery for rifle practice and is undoubtedly very well adapted to the climatic conditions of Northern Europe but it is different from what we are accustomed to and is therefore interesting to learn about.

In general there are two butts, sometimes called *berceaux,* or cradles, which are made of compressed straw and are placed a little farther apart than the distance to be shot. Over each butt is built a shed, or three-sided house, often of great taste and beauty. Some of the older ranges are lined with rows of trees and some are bordered either with fences of planks or by boards at right angles to the line of shooting and spaced a few feet apart to stop stray arrows. The space above, between the berceaux, is open to the sky. The archers stand either in, or near the shed, each having a bow and one arrow. When one's turn to shoot arrives he stands on a flagstone, or plank, in front of the shed, called *Le pas de tir,* or shooting step, delivers his shaft and files out in order.

The berceau at which the shooting begins, which is nearest the entrance to the garden, is called *la maitresse butte* and the other is called *la butte d'attaque,* words which anyone ought to be able to translate whether he knows French or not.

The archers then file to the other butt, determine who is

nearest to the centre, or in some cases figure a score, and shoot back again at the butt from which they came. The two arrows, or rather the going and returning, are called a *halte.* The usual shoot, or *tir,* is composed of twenty *haltes,* or forty arrows.

If standard targets were used all over France, and if the distance were the same, there could be an interesting comparison of scores, as there is with us, but I cannot find that such has been the case. Most societies shoot either at the very short distances of twenty-five, thirty and thirty-five metres (a metre is about thirty-nine and one-half inches) or at the maximum range of fifty metres. I remember that at the Olympic Games at Antwerp the distances to be shot began with twenty-eight metres and ended with fifty.

The targets are very confusing and have none of the simplicity of ours. The most usual one is a card .75 metres high and .60 metres wide. It is marked with a white bull's-eye of .010 metre, a black ring of .035 metre, a red ring of .15 metre and an outer black of .40 metre. These are, of course, all diameters, not radii, and the whole counting space is therefore less than sixteen inches across with a bull's-eye, or one might better say pinhole, of less than half an inch.

The names of the three rings from outside in are *cordon noir, cordon rouge* and *chapelet;* or black ring, red ring and wreath or rosary. So far as I know these rings have no specified value in ordinary shooting but no arrow outside the cordon noir is counted and the one in or nearest the white centre is the winner.

Sometimes great provincial tournaments are held which attract as many as 1,500 to 2,000 archers, numbers which seem incredible to us, and the usual value of the prizes (1900) was from 8,000 to 12,000 francs. On these occasions a larger target with rings of different colors is used. The card is 1.06m by .76m and the circles are .47m and .125m. These are colored black and gold and the bull's-eye is a black of .04m or about

an inch and a half. The inner circle and bull's-eye are covered for each shooter with a little piece of paper called a *marmot* which is finely divided by circles and radial lines and which is taken off and kept as a record if it be hit.

In 1898 a match for the championship of France was established at Fontainebleau.

The rules governing this match are here given in full in case some American or Englishman in his summer vacation may wish to compete in it.

FIRST PRIZE

1. A scarf embroidered in the national colors with the arms of the Chevaliers of the bow.
2. An object of art.

The classification of the archers admitted to compete for the title of Champion of France will take place in the course of the *Prix General* (general prize) which must be followed by the shooting for the Championship.

The Chevaliers who shall have made at least twenty-five hits in the large gold circle will be entered for the competition for the Championship. This match will take place on the day of the distribution of the prize.

The shoot will be twenty ends or forty arrows.

To avoid a new match between the archers for the Championship and to prevent all disputes, the cards will be graduated so that for an equal number of arrows the Championship is given to him who has the greatest number of points.

The title of Champion exists for one year. The victor must, to preserve his title and to defend his scarf, compete each year in the Compagnie which will have retained the Championship.

These seem very simple rules and as we look on such things, extraordinarily incomplete. No mention is made of distances, fees or many other vital things.

The records of the first two of these meetings is the only evidence I have of the real skill of the French archers at their own game. The *cordon doré*, or gold ring, is forty-seven centimetres, or about eighteen and one-half inches. Fifty

JOSEPH CHRISTOPHE

CHAMPION OF FRANCE, 1925

metres, which presumably was the distance shot, is about the same as our sixty yards and the counting area is equivalent to our gold and red.

In 1898 thirteen contestants had put more than twenty-five arrows out of forty in the gold ring and in the final shoot-off for the championship Chevalier Cutard, of the Compagnie St. Pierre de Montmartre made twenty-seven hits and Chev. Camille Petit of the same company made twenty-two.

In 1899 twenty-three men qualified and Chev. Joseph Bergeron of the Compagnie de Bethisy (Oise) was Champion with twenty-seven hits.

This seems to me to be fully equal to the best shooting that we English-speaking people can show under the stress of major competition.

Another event which gives us an idea of the relative skill of the French and English was at the Olympic Games of 1908, which were held in England. The Frenchmen gallantly essayed the York round, to which they were quite unaccustomed, but made very poor scores, as was to be expected, their best for the Double York being 95–425.

In the special competition of forty arrows at fifty metres, shot in the continental style of one arrow at an end, there were fifteen Frenchmen, nine Englishmen and our own American, Henry B. Richardson. This was in the same month in which Richardson made the highest score at the Grand National of England, so we must concede that he was in good form.

Regulation English targets were used and the leading scores were:

M. Grisot, Cie. de Ulysses à Paris.....	39–263	9 golds
Mr. R. O. Backhouse, H. Y. R.....	40–260	9 "
M. Vernet, Ire Cie. de Compiegne.....	40–256	7 "
M. Cabaret, Cie. de Montmartre à Paris.....	39–255	10 "

Richardson made 33–171 with four golds, being beaten by all but two of the Frenchmen and three of the Englishmen. Back-

house averaged exactly 6.5 per arrow and Grisot slightly more and at sixty yards that is certainly meritorious shooting.

Wallace Bryant told me that he had shot in Paris with French archers and spoke in high terms of their skill.

By culling the pages of the *Archers' Register* from the date of the publication of de Bertier's book until the last volume appeared in 1915, during the War, I find numerous comparisons of the skill of the two races and a few additional facts about the French among themselves. Thus six tournaments were held in France during the summers of 1900 and 1901 in which the shooting was done at movable English targets in the open field. Perhaps these were small affairs from the Gallic point of view but even at that they were in some cases larger than any of our N. A. A. meetings. Here is a summary:

Place	*Date*	*Distance*	*Arrows*	*No. Archers*	*Winner*	*Score*	*Golds*
Bois de Boulogne..	16-6-'00	50m.	20	72	Lebrun....	20-114	3
Pierrefonds.....	15-5-'01	"	16	40	P. Fisseux.	16-84	3
Bois de Boulogne..	23-6-'01	"	20	84	Aubras....	19-123	5
Fontainebleau.....	7-7-'01	"	"	30	.....	20-108	2
Soissons.....	28-7-'01	"	"	95	Salingre...	20-118	2
Coeuvres.....	25-8-'01	"	"	91	Quiqueret..	20-126	6

In this same article it is remarked that the *Bouquets Provinciaux* and *Concours Generaux* usually last six weeks. Whether the archers go home in the meantime and come back when it is their turn to shoot I cannot discover. There must be some sort of arrangement of that kind because 2,000 men could not leave their work for a month and a half and live in one of those little French villages just for a chance to shoot.

Those *Bouquets* are queer things, the origin of which seems lost in the mists of the ages. They are great meetings at which the various companies arrive with flags flying and drums beating and are received in state by the mayor of the town. They then draw for a place in a big parade which is held in great state with the town decorated and often a

triumphal arch built. The unique feature is a large bouquet of flowers, carried by girls dressed in white, which is blessed by the priest. After that ceremony a mass of St. Sebastien is held, either in the open air or in a ruinous church, customs of which I do not know the significance.

In 1903, C. Pownall, a well-known English archer, visited the Company of St. Sebastien in Bruges, of which Charles II and Queen Victoria were members. He found it an agreeable old brick house, consisting principally of two large rooms, which formed one side of a square enclosure, the other sides of which were formed by a brick wall. A plaster bust of Charles II stood over the fireplace and the panelled rooms and heavy furniture were very attractive.

He shot with about a dozen members at the *vogel* (German *bird*) and found that the bows were of only about thirty-eight pounds' weight. There was only one bird on the pole and it was hit only once when there was a sound like the crack of a pistol and the bird flew in pieces. A wire screen was provided but most of the men did not stand under it. Two of the men nearly got hit by the fallen arrows and Pownall felt more comfortable when he sought shelter.

In 1904 was held the first of the international matches at le Touquet on the north shore of France, of which there were destined to be six before the war stopped them. Eleven men and twenty-seven ladies attended from England. They shot the usual English rounds among themselves and the men shot two team matches with the French in which the English were badly beaten.

With thirty arrows the English shooting at sixty yards with ten men and the French at fifty metres (55.5 yards) with nine men the score was 187–827 to 249–1397.

In a regular continental match between forty-one French and Belgians, shooting seventy arrows at fifty metres, the highest score was 67–345 by Quiqueret.

In 1905 no French shot at le Touquet, except a couple of

countesses, and the meeting was remarkable only in that Sir Ralph Payne-Gallwey, using a Turkish bow and flight arrow, shot 367 yards.

At the third meeting in 1906 there were no French and no very good scores.

The next meeting was not until 1912 when, as before, there were none but English present. H. P. Nesham made an eighty-yard score of 45–273 in a Single York of 103–511 but he only got 193–941 in the Double. Ingo Simon, who later made the modern world's record, won the flight shot with 325 yards, two feet, two inches, using a Turkish bow.

Of the fifth meeting I have no record except that Ingo Simon made an amazing flight shot of 459 yards eight inches.

On June 26th, 1914, Ingo Simon made the present world's record of 462 yards nine inches. The wind was light, shifty and variable. In a team match of thirty arrows at twenty-eight metres with five archers on a side the scores were:

French, 435; English ladies, 352; English men, 330.

Those Belgians whom I have seen shoot at Chicago seemed to have no idea of using a point of aim but relied entirely on intuition. They used no gloves nor tips but softened the string by wrapping it thickly above and below the nocking point with common cotton string.

The French target arrows are more often tipped with horn than with metal, the piles being sometimes very similar in shape to ours and sometimes large and bulbous, with curves like the dome of an oriental mosque. The archers draw them high on the cheek, approximating the old draw to the ear that our English forefathers are supposed to have used at the butts or to the chin.

The more energetic style of shooting in the open air at the popinjay is even more popular in both France and Belgium than the quiet, protected archery of the "gardens." I will give de Bertier's description of it, beginning with a literal translation of his words:

"From time out of mind the *Tir a la Perche*, or popinjay shooting, has been one of the forms of archery held in honor in all countries, but, although in most of them it is now practiced only occasionally, in the north of France, and particularly in Flanders, the archers have little by little abandoned themselves almost exclusively to this kind of shooting."

The perche consists of a mast of wood or iron about thirty metres high and thirty or forty centimetres thick at the base. This mast is surmounted by an arrangement made of iron called a *grille*, which much resembles in appearance the cross-bars of a telegraph pole, except that the cross-bars lessen in width toward the top, giving a conical shape to the whole. With the addition of this grille the topmost point, on which is placed the chief popinjay, or *Coq* (cock) as he is always called, is about thirty-five metres from the ground.

In a drawing of such a grille, which is before me, I note that the bar next under the cock holds two birds, the next two birds spaced further apart, the third four birds, the fourth eight, fifth eight, sixth ten, seventh ten and eighth twelve. Thus the whole number of birds on the perche is fifty-seven. The exact number of birds does not seem to be specified by a general rule as some grilles hold only twenty-one and some carry as many as sixty. In general the number of birds is the same as the number of archers. If the number of archers be very great the grille may be reloaded several times or there may be more than one mast.

However, the erection of a mast is neither simple nor cheap. Even in the years before the war the average cost for each was about $500. They are not simply set in the ground like a telegraph pole, in which case only an expert climber could reset the birds, but at about a quarter of the total height from the ground they are set in a hinge, or fulcrum, so that when the lower end is sufficiently weighted to counterbalance it against the upper portion the whole may be swung up and down even by one man.

The objects which are placed on the bars of the grille are called *oiseaux*, or birds, the old word popinjay having become practically obsolete.

The birds on the extremities of the bars are called *grandes poules* or big chickens, if they be on the higher branches and *petites poules* if on the lower ones. All the rest are called, simply, *oiseaux*, or sometimes *guetteurs*, a word which also means a man up in a lookout tower.

Each bird looks exactly like the head of a croquet mallet with the handle pulled out. By the hole it is set so firmly on its rest that only a very strong, full blow will dislodge it. Several plumes are stuck in it to make it look suggestive of a bird, they being large or small according as it be a simple oiseau or one of higher value.

The shooting is all done for cash prizes. In ordinary matches the coq is worth five francs, the big and little poules four and three and the common birds two. In large matches the prizes are sometimes of an astonishing size, for example in 1892 at the little town of Antoing, near Tournai, there were 240 birds representing 50,000 francs, which at that time, when the franc had a normal value, was equivalent to approximately $10,000. The coq was worth 10,000 francs or $2,000, and the smallest birds 300 francs, or $60. Each archer paid fifty francs entrance fee so that there would appear to have been 1,000 contestants if the money were all raised in this manner. I have a newspaper clipping taken in 1912 which gives the number of competitors for the championship in that year as being nearly 1,500, so perhaps these figures approximate the truth.

The bows used in this type of shooting are sometimes enormously strong. I have seen a few among Belgians in America which I could not draw at all. Count de Bertier thinks that the vertical position of the left arm permits the use of a stronger bow but I cannot see why this should make much difference, if any. I think the real explanation is that those

French and Belgian peasants are powerful laboring men of the heavy musculation which seems to be normal to their climate and can pull weights which would be impossible to the English and American archers of less active habits. Furthermore they shoot only one arrow at a time and have a considerable rest before the next shot.

Count de Bertier says that the bows in commonest use weigh from twenty-five to forty kilograms (fifty-five to eighty-eight pounds), but "some vigorous amateurs serve themselves with bows of fifty to fifty-five kilos" (110 to 121 pounds), and "one cites even those who have the power to manage bows of sixty to seventy-five kilos" (132 to 165 pounds). I see no reason to doubt these statements as Earl Powell has been known to shoot a 127-pound bow and I myself have seen Dr. Crouch draw the 150-pound bow with which he won the flight shoot in free style, nearly to the full in the ordinary manner. It is of course wholly a question of unusual strength and it seems to me that among thousands of Belgian glass blowers and iron workers many men might be found who had the necessary power.

As an example of the endurance of a well-muscled man I quote from an account of a match for a wager between a Belgian and a Frenchman at St. Maurice in 1890. From 6 A. M. to 7 P. M., with a half-hour for lunch, using thirty-five kilo bows (seventy-seven pounds), they each shot 1,300 arrows with a total effort of more than 45,000 kilos or 99,000 pounds or almost fifty tons. Those uninformed archers of this and other countries who belittle the French and Belgian archery do so most unjustly.

Iron tips are strictly forbidden in this kind of shooting because of the danger of their striking someone in descending. A special arrow is used which is called a *maquet*. I have one, made by Remi Gyselinck, of Detroit, which is exactly like those shown in the books. It is twenty-eight inches long and tapers from a small nock to a horn tip three-fourths of an inch thick

and flat on the end. It weighs about 600 grains and would therefore strike with a hammer-like blow.

While the shooting is going on the spectators and archers who are not shooting stand in sheds near by or keep at least sixty yards away from the pole.

The fallen arrows are gathered by a man who is protected by a huge hat made of heavy willow basketry.

While speaking of the weight of bows I should have said that in shooting at the butts some of the archers use weapons that weigh as little as thirty pounds.

It is natural to inquire as to the reason for there being so many more archers in France than in any other civilized country and one wonders also why so comparatively little is heard about them. I once asked the late Viscount de Branges de Bourcia, who was a member of the Wayne Archers, if there were any archers in France and he replied that he thought there were none at all. He was a man of polished education who had spent all his life, to the age of about thirty, in France, chiefly in Paris, and had served his term in the army. Yet with thousands of archers in his country he had never heard of one.

I think the reason French archers are not widely known abroad is twofold, first that the French by nature are the poorest advertisers in Christendom and second that in France the saying of Toxophilus applies at the present time very strongly: "Menne that used shootinge most and knewe it best, were not learned."

French and Belgian archery is for the most part in the hands of plain people and in the older countries of Europe the merry villagers can disport themselves as they will without attracting the attention of those higher up.

If the French had won battles of importance by the use of the bow, as the English did, history would automatically have enshrined the weapon in hallowed memory but such was not the case. While it is well proven that there have always been

archers in France they were never given any importance in military manœuvres that was at all comparable to that of the crossbowmen.

Yet it is in the formation of a sort of militia, or companies of local guards, in mediæval times that we find the origin of some of the very companies which exist to-day and which have formed prototypes for the organization of hundreds of others in modern times.

From the most ancient times associations of all the fighting men of a town or village for purposes of mutual defense have existed in France as well as in other parts of Europe. In the case of large cities they were occasionally strong enough to win practical freedom from feudal vassalage but in most places, nearly all in fact, their functions were necessarily restricted to the suppression of brigandage, and to measures toward the preservation of order which would now be done by local police. It is probable that the archers' companies have descended from this ancient and honorable origin.

A company of Soissons claimed to have been established in 471, in the day of the Roman Empire itself. Up to the French Revolution the abbes of St. Medard de Soissons claimed to possess a charter from Charles the Bold (840–877) creating them sovereign judges and grand-masters of the Archers' Companies of the kingdom.

Soissons has always been connected with archery, at least before the World War. Whether the old Belgic tribe of Suessiones, who lived in the neighborhood in Cæsar's time, were bowmen I have not been able to discover. Yet 471 is so far back that one's imagination can easily run loose. In 826 the remains of Saint Sebastian were removed from Rome to Soissons. As he is the patron saint of archery and his name has been given to an immense number of archers' companies it may be well to say why he holds that particular post in the world above.

Sebastian was a captain of the First Cohort under the Em-

peror Diocletian of Rome, and was a devout Christian. When Diocletian persecuted the Christians, about the year 300, his attention was called to Sebastian's proselyting activities. He was called before the emperor and reasoned with but remained steadfast. He was thereupon ordered to be bound to a stake and shot to death. After the archers had left him for dead, a devout woman, named Irene, came by night to take him away for burial but, finding him alive, carried him to her house, where his wounds were dressed. No sooner had he recovered than he showed his courage by confronting the emperor and reproaching him with his impiety. Diocletian ordered him to be instantly carried off and beaten to death with rods. This was done and his body was first thrown into the cloaca, or great sewer, and later buried on the Appian Way, where a church was built over him which was a popular place of pilgrimage in the middle ages. As a young and beautiful soldier he is a favorite subject of sacred art, being represented as severely, though not fatally, wounded by arrows.

Martyrdom of Sebastian Carved on an Eighth Century Ivory Bracer.

That his remains were reburied in Soissons seems to me to imply that archery was strongly intrenched in the people of that locality and also that they were sufficiently important to be influential at Rome. To induce the papal authorities to part with as lucrative a drawing-card as his remains had been must have required strong political pull. Evidently the pos-

session of his body was a factor in the elevation of the abbes to their exalted post among archers a few years later.

In the thirteenth century, and thereafter, royal acts were passed which confirmed certain privileges enjoyed by the members of these societies and encouraged the formation of new organizations, thus proving beyond question that the companies had existed long before that time, especially as they were alluded to as "ancient."

In 1260 St. Louis had his own name placed on the registry of an archers' company at Paris and also published an ordinance requiring everyone to "take the exercise of the noble play of the bow."

In 1369 Charles V gave forth an order which was strictly enforced for several years, prohibiting games of dice and the like and ordering shooting with the bow or arbalest instead.

From the fourteenth century to the Revolution the societies continued to exist with two classes of members, the archers and the crossbowmen, sometimes in harmony and sometimes in discordant struggles for the supremacy of influence for either particular arm. During this time the companies were distinguished by brilliant uniforms, mostly consisting of a scarlet coat with trimmings of other colors, such as a sky-blue lining, black feathers in the hat, gold or yellow waistcoats and so on.

At the Revolution all this was swept away but during the last century the societies were revived or formed anew and their numbers rapidly increased to the great dimensions which I have indicated.

Personally I feel that archery is more strongly intrenched in France than in any other civilized country and the only thing I can think of which I believe would undoubtedly strengthen its position still further would be the adoption of standard targets and ranges and a proper medium for the just comparison of scores and establishment of records of best performances.

As the technical names and words used in archery are hard to find in an ordinary French dictionary I will give a short list of some of the more important ones as a help to anyone who wishes to read or write in that language.

ailé	feathered
un aileron	feather *or* vane
un arc	bow
" " composé *or* oriental	composite bow
" " de main	hand-bow
" " démontable	jointed bow
" " doublé	backed bow
" " primitif *or* simple	self-bow
une archerie (*obsolete*)	archery
armer l'arc	draw the bow the length of an arrow
bander l'arc, tendre l'arc	string the bow
le berceau	covered butt
le bois	arrow-shaft
la branche inférieure	lower limb
" " supérieure	upper limb
le brassard	bracer
le but	mark, target
la butte	butt
la butte d'attaque	further butt
la cible	target
le carquois	quiver
chasser bien	to draw sweetly and well (of bows)
la coche	bow-nock
la compagnie	archery society
la corde	string
la cornette	bow-horn
le corps	body of the bow
le coup	shot
" " de broche	centre- (*or* pinhole-) shot
décocher	to release (an arrow)
détendre	to unstring
le doigtier	finger-tip
le dos	back
échantillonner	measure (an arrow from the broche or pin-hole)
une empenne	feather
empenné	feathered
un empereur	winner of three straight years
une encoche	arrow-nock
encocher	nock an arrow

encorder (*obsolete*)	string the bow
épreuve	round
un étui	bow-case
la face	belly of the bow
la famille (*rare*)	association of archery societies near each other
la flèche	arrow
la force (d'un arc)	weight of a bow (*e. g.* "un arc de 30 kilos")
fouetter	kick (of a bow)
le fût	arrow-shaft; body of arrow
le gantelet	shooting-glove
le guide-flèche	arrow-rest
la halte	"end" of two arrows at two targets
la hampe	arrow-shaft
le jardin (des archers)	French style shooting ground
le jeu de l'arc	archery
la maîtresse butte	butte where the archers stand first
le maquet	blunt shaft for shooting "oiseaux"
un oiseau	popinjay
le papegay	popinjay
la poignée	handle
la pointe armée	point fitted with a pile
" " nue	naked point made by sharpening end of shaft
la reine	championess
le roi	champion *or* winner
la ronde	union of 20 societies
le talon	"heel", part of arrow behind feathers
tendre	string (a bow)
la tête	pile
la tige	shaft or stave
le tir	act, art, or place of shooting
tirer	shoot
le trait	arrow or bolt (more general than "flèche")
la verge	arrow-shaft

VIII

HOW TO SHOOT

THERE are probably as many ways of shooting as archers who shoot, because it is impossible to standardize anything done by human beings so that there are no individual differences. Yet, on the other hand, there is no adequate reason why the act should be so uniform as to resemble the perfect drill of a squad of West Point cadets. To enlarge on this comparison, we all know that while the marching, the manual of arms and such things are done with rigorous exactness by well-drilled soldiers, yet when they actually shoot at a target they are allowed great latitude of action to compensate for personal peculiarities.

However, there must be a general standard to be followed, from which slight deviations may be permitted, or else the crude shooting of a beginner would command as much respect as the finished technique of an expert. Every writer on archery has told how to shoot and all accounts have varied. Infinitely the best of all directions are those given by the great Horace A. Ford, who changed the whole basis of shooting and laid down such excellent rules of procedure that scores were doubled and even trebled over what had previously been considered good marksmanship. Yet even from this master of the bow, speaking with great humility, I am forced to differ in a few minor details, and therefore it seems best to me to voice in this chapter exactly my own opinions, backed by many years of experience, in the certain knowledge that if they are rigorously followed in every detail they will lead to a degree of skill of which no one need be ashamed.

I will first give those straightforward directions which the

beginner should learn and then I will enlarge somewhat on the differences of opinion that prevail amongst experts and give some reasons for and against various things.

When Roger Ascham wrote *Toxophilus* he set the fashion for all future writers on archery by dividing the act of shooting with the longbow into five parts, which he called, in the order of their occurrence, Standing, Nocking, Drawing, Holding and Loosing. As each of these is a step which must be mastered separately before the archer can rise to a plane of merit, I will still follow his classic lead. At the same time I will try to present to the novice such other directions that he may know what to do from the moment he steps to the shooting-line until the arrow is quivered in its mark.

First of all he should conform his shooting to the rules laid down in the Constitution of the N. A. A. which requires that prescribed numbers of arrows at specified distances shall be shot, as may be seen in the definition of the word "Round" in the glossary of this book. He should also shoot them in sets of six, called ends, which in competition may be subdivided into two groups of threes, with a rest between.

The six arrows, to be shot at one end, may be carried on the person, in a quiver or trousers pocket, or they may be stood on the ground in front of the archer in some kind of receptacle. Never lay them on the ground or put them in any place so far away that to get them necessitates a change of position.

To *string the bow,* grasp its handle with the left hand, the back of the bow being uppermost, and place the lower end, just above the tip, against the hollow of the left foot. Place the "heel" of the right hand against the upper end of the bow, below the eye of the string, and take the eye lightly between the thumb and forefinger. Then, holding the left hand steady, push hard with the right, letting it slide toward the nock and carrying the eye up till it falls into its groove. All pressure should be exerted on the bow, not on the string. To unstring

the bow, bend it in the same way and pick the string out, lightly, with the first finger.

The correct *stand* is very important. In archery one does not toe the mark, he straddles it. The heels should be about nine inches apart in the line the arrow is to follow, the archer, therefore, standing with his left side toward the target. The feet may be either in their natural position, as most of us prefer, or, as taught by Dr. Weston, the left foot may be at right angles to the line of the heels and the right foot point about forty-five degrees backward. The weight should be borne evenly by both feet.

The body should be perfectly erect.

The position of the head must vary somewhat with the individual. Classically, it should first be erect, as with a soldier at "Attention," and then turned sharply to the left so that the target is seen over the left shoulder. Yet for some people it is necessary to crane the neck, or tilt the head slightly, in order to provide for two essentials in archery, one that the nock of the arrow be vertically under the right eye, and the other that there be a clear way for the string. Many archers, especially ladies, find that in the orthodox position the string hits the left arm, elbow, shoulder or chest, causing great pain and ruining the shot. Such people must hold the shoulder well down and back and sometimes must even face slightly toward the target, changing the position of the feet accordingly.

To *nock* the arrow, grasp the bow-handle exactly as it will be held in shooting, the hand being even with the top of the handle, and hold the bow horizontal, with the back of the hand up. Take the arrow by the nock, with the thumb and forefinger, and lay it on the bow, just touching the hand. Then fit it to the string, with the cock-feather up, at exactly right angles, remembering that this relation is to the string and not to the bow, which may be crooked. During this operation the arrow may be steadied by the left forefinger, but it is not at all necessary to do so.

To *draw* the bow, hook the first three fingers under the string (the bow still being horizontal), with the arrow between the first and second, so that the string rests on the middle of the pads of the first joints. Then swing the bow, with one hand holding the grip and the other on the string, around to the left side of the body, close to the hip, so that the left arm hangs straight down. From this position of rest raise the left arm stiffly, with elbow locked, straight away from the body, like a pump-handle, till the left hand is level with the chin. In so doing it is necessary either to draw the arrow a few inches or to advance the right shoulder a little as one may prefer.

Regarding the grip on the bow-handle there is a difference of opinion. All other authors say to grasp it with all one's strength, but, personally, I prefer a very loose grip, the arm and wrist, however, being stiff as steel. The reason is derived from the fact, experimentally proven, that when a bow is held in a vise the arrow will fly far to the left. In shooting by hand an arrow goes straight because it pushes the bow an exceedingly small fraction of an inch to the right and, obviously, this can be done more freely when the grip is loose than when it is tight.

After thus elevating the bow the arrow must be aligned exactly with the centre of the gold and in drawing it must be kept in that line during the whole operation. This drawing of the string should be quickly done, so as to save one's strength for the aiming, and should be so complete that the pile rests on the left hand. At every shot, no matter at what distance from the target, the arrow must be drawn to its full length and held there until loosed, without being allowed to creep forward so much as an eighth of an inch.

While drawing, the elbow of the drawing arm must be kept free from the body and fully as high as the hand. This allows the powerful muscles of the shoulder and shoulder-blade to do most of the pulling and makes one feel that he lays his body into the bow, as Bishop Hugh Latimer expressed it. The

hand must follow in the line of the arrow, bending sharply from the forearm at the wrist.

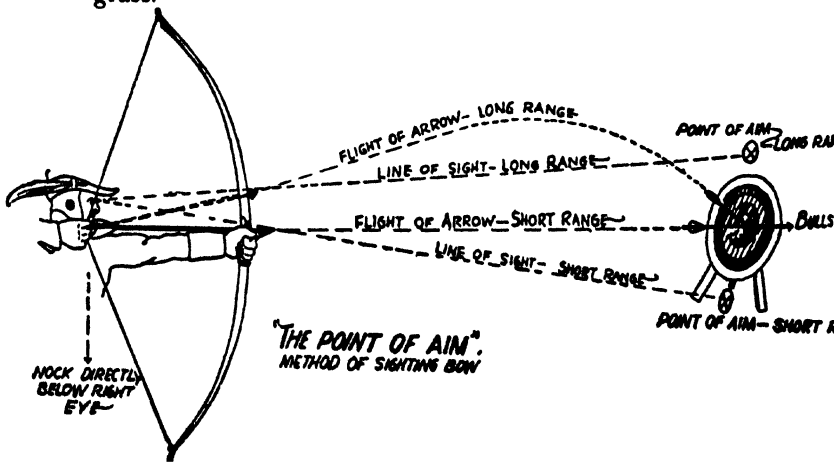
The most difficult thing in aiming and, indeed, in all archery, is the control of the nock end of the arrow. The tip can be seen and its position accurately adjusted, but the rear end, which is just as important, must be controlled entirely by touch. Every beginner, practically without exception, shoots to the left of the target for the reason that while he carefully sights the tip, as he would a gun, he invariably draws the nock to his cheek, ear, or some indefinite point in the air which is to the right of the eye, thus throwing the arrow out of a straight line from his eye to the target. It is therefore obvious that the drawing point, or place where the nock rests while aiming, must be somewhere in the vertical plane which bisects the eye and the centre of the target. Thus some archers draw to the angle of the jaw, some to the corner of the mouth, some to a tooth (felt through the lip), some to a point to the right of the Adam's Apple and some to the end of the collar-bone, but everyone who wishes to shoot well must find some part of his facial or cervical anatomy in the line below the right eye to which he can always draw the nock with unfailing precision.

When the shaft is fully drawn the right hand must be held immovably fixed, because the least relaxation will permit a slight creeping of the arrow with a consequent shortening of the cast. It therefore follows that all variations in aim must be made by altering the position of the left hand in either horizontal or vertical directions.

The proper alignment of the arrow gives true direction and is comparatively easily obtained by sighting along the length of the shaft as one would sight a gun barrel. By vertical alterations, raising or lowering the bow-hand, one arrives at the correct elevation. An archer is much like a gunner with no rear sight, he has to raise or lower his front sight, the only one he has, by relating it to some object seen in the distance. Thus, if he be shooting at as great a distance as 100 yards he must

select a tree, cloud or house which happens to stand behind the target and aim at some point in it that his judgment suggests is of the right height. This spot which he selects is called the *point of aim,* a name and principle which, although it has doubtless been used more or less for untold ages, was first clearly defined and its importance insisted upon by the great Horace Ford.

So far the idea of a point of aim higher than the target is grasped with ease by all beginners but they do not so readily understand that when the range is sixty yards or less, for the bow of average strength, the point of aim is below the target on the ground. It is easy to see why this is so. If the arrow were drawn to the eye every point of aim would be above the target but, in fact, the nock is usually about six inches lower than the eye. Therefore, to raise the tip even as high as the line of sight from the eye to the target would mean a rise of six inches in twenty-eight, an inclination which would send the shaft very much too high. Anything less would mean that the sight must be directed somewhat downward and therefore would fall on the ground, in which case the point of aim must be some such thing as a bare spot of earth, a daisy or a tuft of grass.



Courtesy of the Archers Company.

When the approximately correct place for the point of aim is determined upon the arrow is loosed and if the judgment of the archer and all other factors be correct it will fly accurately to the mark. If the arrow go too low something higher must be selected as the point of aim and if it go too high something lower until the exactly correct point is found.

Authorities differ as to whether the primary vision should be centered on the target, with the point of aim seen vaguely by indirect vision, or whether the sight should be focused rigidly on the point of aim with the target seen indistinctly, if at all. Probably either way is right if it be rigidly adhered to and the archer do not let his eye wander.

Holding is really a part of aiming. It refers to the time in which an arrow is held motionless just prior to the moment of flight, when that final coördination of eye and muscle is effected which is the acme of refined technique. Roger Ascham taught that this moment should be so brief as to be "better perceived in the mind than seen with the eye." Nevertheless, I have noticed that all the best shots in this country hold until they are perfectly certain that their aim is accurate and that all else is as it should be. In this connection I would say that a valuable, but difficult, thing to learn is to relax the string without loosing the arrow and begin the shot again when one feels that something is wrong. The frequent remark, "I knew that was not right before I shot it," is a reproach to the archer.

If the archer has assumed the correct initial position, has turned his head sharply to the left and has nocked, drawn, aimed and held his arrow precisely as he has been directed to do he is now ready for the final act which frees the shaft from his control and leaves it to be guided only by the laws of physics. Of all things in the art of shooting *loosing* is the most important. Without a good loose all that has been done before counts for naught. I emphasize this particularly because most beginners seem to think that the aim is everything,

forgetting that the flight of the arrow depends wholly on its position and treatment at the moment when it is freed from human control, both as to its position and to the propulsive force behind it, and that these factors may be ruined by the slightest side pull or sluggishness in loosing.

To secure a good loose remember that the string must be borne on the first pad of each finger and never hooked in the joint. Furthermore, the weight of the pull must be even on each finger. Usually the third finger has a tendency to carry most of the strain and the second much less, while the first finger takes up its share of the burden so reluctantly that it has been nicknamed, by Will Thompson, "The Shirking First."

The ideal loose is the one that liberates the string with a minimum of disturbance and retains the full tension of the bow up to the very last. It cannot be obtained by plucking the fingers off the string, as a harper twangs his instrument, because that would disconcert the aim. Neither will it suffice simply to open the fingers and let the string escape, for then the cast of the bow is lessened. The best way is to hold the drawing arm as rigid as a bar of steel, with the elbow well up and the hand pressed closely against the jaw-bone, or whatever else it touches, and allow the string to roll off the tips of the fingers while they are being still further contracted. It must leave all three fingers at the same identical moment of time and must do so without jar or jerk.

It seems to me that Ascham should have added to his description of shooting a sixth division which he might have called *pausing*, for, after the string has left the hand, the archer must stand for a moment like a statue, in the exact pose which he held at the instant of loosing. Otherwise he will find it impossible to keep the muscles at precisely the same tension while the arrow is crossing the bow. The left hand must not drop an iota and the right hand must remain resting firmly against the spot it has been drawn to. The best index

at this time is the right elbow; if it has not dropped even a small fraction of an inch the loose will probably have been a good one.

Here I would say that in no sport is the need of exactness in detail greater than it is in archery and also, that the practice which leads to virtuosity consists not so much in mere frequency of shooting as in the careful study of every shaft that is sped.

Thus endeth the first lesson; infinitely the most important one. Many archers have followed the directions just given and some have become experts of the first rank, taking the highest honors in competition. Yet there is much more that may be said.

When taking your stand to shoot be sure to choose the best place for your feet. If you are at a tournament where the ground is full of pegs to mark the positions of the targets at the different ranges, stand exactly in line with those that lead to your target, as they greatly assist the eye in forming a true line. If there be no guide of this sort, choose a spot on which you feel firm and comfortable. It is astonishing what a difference a good firm footing makes. Of course if there be a very good object in the proper place for a point of aim, such as a telegraph pole for the long ranges or a bright flower for a short one, it is only common sense to move about until you can take the best advantage of it. When you have once found the right place be certain that you return to it exactly the next time and that you do so with both feet, having them just as they were before, because the slightest turning of your body will make a difference in your aim. I usually note the weeds or blades of grass against which my toes touch, or on bare ground I trace the prints of my shoes with an arrow and step into them for the succeeding ends.

Before drawing make sure that you are not muscle-bound or stiff. It is a good thing to rock a little on your feet and wobble a little in your joints before making the supreme effort.

ROBERT P ELMER

SETTLING THE HANDS
BEGINNING THE DRAW

NOCKING ARROW
FULL DRAW

HEAD TURNED
AFTER LOOSING

An effort it is to shoot and a very great one if the act is to get the best results. While it is being performed one should stiffen his legs, take a full breath and hold it so as to set his diaphragm and thorax, stiffen his belly, set his neck and clench his teeth. Sometimes, for some peculiar reason, probably fatigue, this can be overdone and if an archer find that he is going bad in his shooting he can change to the better by relaxing himself and shooting a few arrows with a sensation of partially taking it easy.

When you come up to the shooting line after having rested while the others are shooting, give a pull or two on your bow to be sure that your muscles are not stiff or cramped. I have always done better when I have been careful to take this precaution.

After having taken your position nock your arrow in a careful and leisurely manner. Some men whip a shaft out of the quiver and adjust it rapidly to the string as though they were meeting the charge of a wild beast. For this there is no reason at all. You have plenty of time to put on the arrow with exact care, making yourself satisfied that the nocking point and the top of your bow-hand are properly aligned with each other. I do not approve of making a small bead of wrapped thread on either side of the nocking point, as many archers do, because if the string stretch in the least or if there be any slipping at the loop the nocking point will be thrown a little out of its true position. I think the best way is to take a square score-card, or anything else that will give a perfect right angle, lay one edge on the string, while the bow is rested on your lap, so that the edge at right angles crosses the arrow plate and then mark the nocking point which is thus indicated on the string with a drop of ink from a fountain pen. Some archers wind a little fine silk thread, of scarlet or any other bright color, about the point. This is a good way too and helps to preserve the whipping but it has to be frequently renewed.

When the arrow is carefully nocked, raise your head, look straight before you and then swing the bow around to your left side. Here you must carefully adjust both hands by the sense of feeling only, without looking at them; personally I find that I often do this best with my eyes shut.

The bow-hand must be well settled to the grip. There are several different ways of holding a bow, all of which have certain things in their favor and consequently have vigorous partisans.

The most natural way, which is also the oldest and the one almost invariably taught in the books, is to grasp the handle with your strongest grip as you would any bar which you meant to squeeze. In this way the thumb and first finger encircle the handle and for bows of ordinary size the thumb overlaps the finger somewhat where they meet. Although this grip is favored by many archers of the highest skill it is not the one I like best. With it the pressure of the bow is borne on both the thenar and hypothenar eminences of the palm, though principally on the former, and therefore the wrist is turned sharply upward.

The second style of holding, which numbers at least one former national champion among its advocates, consists in encircling the handle with the thumb and first finger but at the same time keeping the wrist straight, so that the bow really rests in the hammock between those two digits. It does not give the broad base of support that the full palm does and therefore with a very strong bow the wrist is liable to crumple. If the archer be strong enough to stand the strain with certainty or if he use a weak bow, not over forty-six pounds for most men, he can do excellent work with this grip. It gives the longest possible draw, because the arm is extended to its fullest extent and it supports the bow exactly behind its centre of gravity.

The third method, which I usually employ myself, is very much like the first except for two things, one that the thumb

is extended either straight up the belly or very nearly so and the other that the grip is decidedly loose.

I do not by any means insist that the thumb should be held up the belly of the bow; in fact I am not at all certain that it is the better way. All I can say is that in my own case I feel that it is more comfortable, keeps the wrist well out of the way of the string, allows the handle to rest firmly on the thenar eminence, or ball of the thumb, and gives me a feeling of control over the bow.

To show how the opinions of different archers vary on such matters as this I will quote a paragraph from Ford which gives a diametrically opposite view: "Some archers have a habit of letting the thumb of the left hand lie extended along the belly of the bow, whilst others extend the forefinger, apparently to keep the arrow in its place. Both these habits are bad, as tending to weaken and unsteady the grasp, and as causing the jar of the bow to be more sensibly felt." I agree with the great master whole-heartedly as regards the pernicious habit of extending the left forefinger.

The question of whether to hold the bow with a firm grip or with a loose one will probably never be settled. In fact I should say at once that while I usually employ the loose grip I will sometimes use a tight one for a few shots in order to change my form when in a slump.

This is the second time I have mentioned changing one's style to get out of what we call a slump and the English call the rots. As a matter of fact it is very advisable that an archer have two ways of doing almost every act in archery, a best one and a substitute, for a sudden change of style will often prove his only means of salvation in an unfavorable emergency.

One reason for a loose grip is that with it an archer cannot so easily throw his bow out of line by a jerk of the muscles. To understand the second reason we must consider what is known to archers as the Archers' Paradox. A paradox is

something which at first view appears absurd but which on investigation proves to be well-founded.

The whole trouble is that the bow is wider than the string. For this reason an arrow at full draw will form a very sharp angle with a line from the string to the centre of the belly of the bow and as the string is slowly let down this angle will become greater and greater. In fact I have taken some measures on my own range to see where the arrow in an undrawn bow would point, at sixty yards, if the string and centre of the belly be in the line to the gold and I find it to be just about fourteen feet to the left. Of course the wider the bow and the lower it is strung the greater this distance would be. Why then is it, when an arrow is thus deviated to the left during the whole time that the string is still in its nock, that it will fly away from the bow directly toward the mark rather than fly off somewhere to the left? Ford was the first writer to work on this problem, so far as I know, and it was taken up later by Butt, who edited an edition of Ford, and by Colonel Walrond in *Badminton*. These gentlemen give partially correct explanations which quite properly take into account the effects of strain and counter-strain on the arrow due to its inertia and consequent pressure against the bow but none of them note the fact that by this very inertia which, on calculation, is found to be quite a force, the arrow literally pushes the bow out of its way.

This is not such a big thing as it sounds. It takes very little force to move an archer's arm sideways; even a slight puff of wind will do it, and the distance to be moved is not nearly half the width of the bow. It would only be this much if the string touched the belly. With the string a fistmele high and considering that the true plane of the bow is always to the right of the arrow, from the beginning of the act of shooting till the end, I do not believe that the bow has to be moved over more than the thickness of an arrow shaft. Suppose, instead of the bow moving away from the arrow it merely twisted a

little in the hand; would not the effect on the arrow be the same as regards the direction of its course? That the bow moves I proved to my own satisfaction in 1913, although the nature of the apparatus which I used in the experiment did not permit of an exhaustive investigation.

What I did was to construct a heavy stand of four 3x4 timbers, properly joined by other boards so that the whole was very heavy and solid. I fastened a bow tightly to a front cross-bar by two U-bolts and arranged a mechanical catch for the string with a trigger. Duff's arrows were used. When I shot the thing it did exactly what one would expect, that is, at sixty yards it threw the arrows far off the target to the left. There was no doubt about it; the reasoning of Ford and Walrond fell all to pieces because the stresses and strains on the shaft itself were not sufficient to keep it straight. The fact was proven that the bow as well as the arrow must be free to move.

The same experiment was undertaken by Dr. Pope, Arthur Young and Stewart Edward White. Mr. White wrote me a letter about it which is so very instructive that I will quote it in full, even though some of the information might more logically be placed in the section on arrows.

Little Hill, Burlingame, Cal.
January 30, 1924.

DEAR DR. ELMER:

Dr. Pope has suggested that I write to you the results from some ballistics we have discovered in regard to the bow. We made an apparatus attached firmly to a post, well planted, by which the bow was held in a clasp lined with an old inner tube for resiliency. The string was caught over two finger-like projections made carefully of dowels carried on a carrier which slid back to a definite point and then was released by a trigger arrangement. After considerable fussing we got this machine to work with fair uniformity.

The range at which we used it ran between fifty-five and seventy yards, according to the strength of the bow and the

weight of the arrows used. The machine itself naturally could not be moved so the range had to be adjusted back and forth. Following are our results:

1. The declination to the left of the aim was from six to seven degrees. In other words, the arrow threw that much to the left of where it would have gone had the bow been held in the hand instead of in the rigid vise.

2. Shooting the same arrow over and over again we got an average group of about eight inches for five shots. We estimated about twenty-five per cent. for crudity of apparatus. The possibility then would be about six inches.

3. Shooting selected but different arrows the groups averaged at the same distance about twenty inches.

4. Out of nine arrows tested, five consistently made a good, close group, and the other four as consistently went out. The outs, however, were uniform in the direction and distance they took. It would be possible, by means of this machine, to select groups of arrows, so to speak, that would make each its own pattern.

5. Placing the cock's feather next the bow the groups were good, but were two feet six inches lower than when the cock's feather was out.

6. The length of time the bow was held then was accurately measured at five seconds per shot. Allowing fifteen seconds' hold per shot, we finally grouped seven and one-half inches lower.

7. Different weights of bows seemed to make a difference with individual arrows. Between forty and forty-eight pounds there was not much difference, but a two-pound heavier bow, that is a fifty-pound bow, exaggerated the left throw and the arrow that had flown accurately with the lighter bow, now flew wild with the heavier bow. It seemed to be a matter of the stiffness of the shaft. I should think from what I saw that in a general way the arrow should be made for the bow, just as much as the bow is made for the man. Arrows that would work well with one bow would not with another.

In conclusion it seemed to me that the machine naturally exaggerated the right and left error for this reason. If the pressure of the arrow against the bow as it flies is, say, two ounces, the arrow will fly two ounces' worth to the left when the bow is held rigid. But when the bow is held in the hand

there is considerable give to the muscles. Then your two-ounce pressure will tend to press the hand two ounces' worth to the right and the arrow will fly straight. The vertical error, however, depends, in my opinion, entirely on the weight of the arrow, on the feathering, and the length of time the bow is held bent.

Most sincerely yours,
STEWART EDWARD WHITE.

Recently I determined to make more exhaustive experiments along this line and I therefore constructed with great care a new machine for holding a bow which was much superior in every way to the one I made a dozen years ago. It consisted of a strongly braced framework, with four legs, which held a movable arm, to one end of which the bow might be attached while at the other end was a mechanical trigger. This arm swung vertically on a heavy iron bolt, which was run through the block at the front end, and the rear end followed a curved slot in a guide so that it could be fastened by a set screw at any desired elevation from the horizontal to forty-five degrees. The string was caught back by a shallow metal hook which was pivoted on a little wooden block resting against the right side of the string. When the hook was moved slightly the string slid off, without any lateral deviation.

The bow was held against the head block by a piece of wood tightened by four long screws. These pieces of wood were of three shapes, one which fitted the handle of the bow exactly and held the bow absolutely as tightly as a vise, one which contained a much larger opening which I filled with sponge rubber to imitate the softness of the human hand and a third which was merely a crosspiece designed to hold a thick wad of sponge rubber against the bow just strongly enough to keep it in place.

I began with the tight grip and a light hunting arrow which was stiffer than a target arrow but not nearly so stiff as a heavy hunting arrow. The bow was a fifty-pound lancewood,

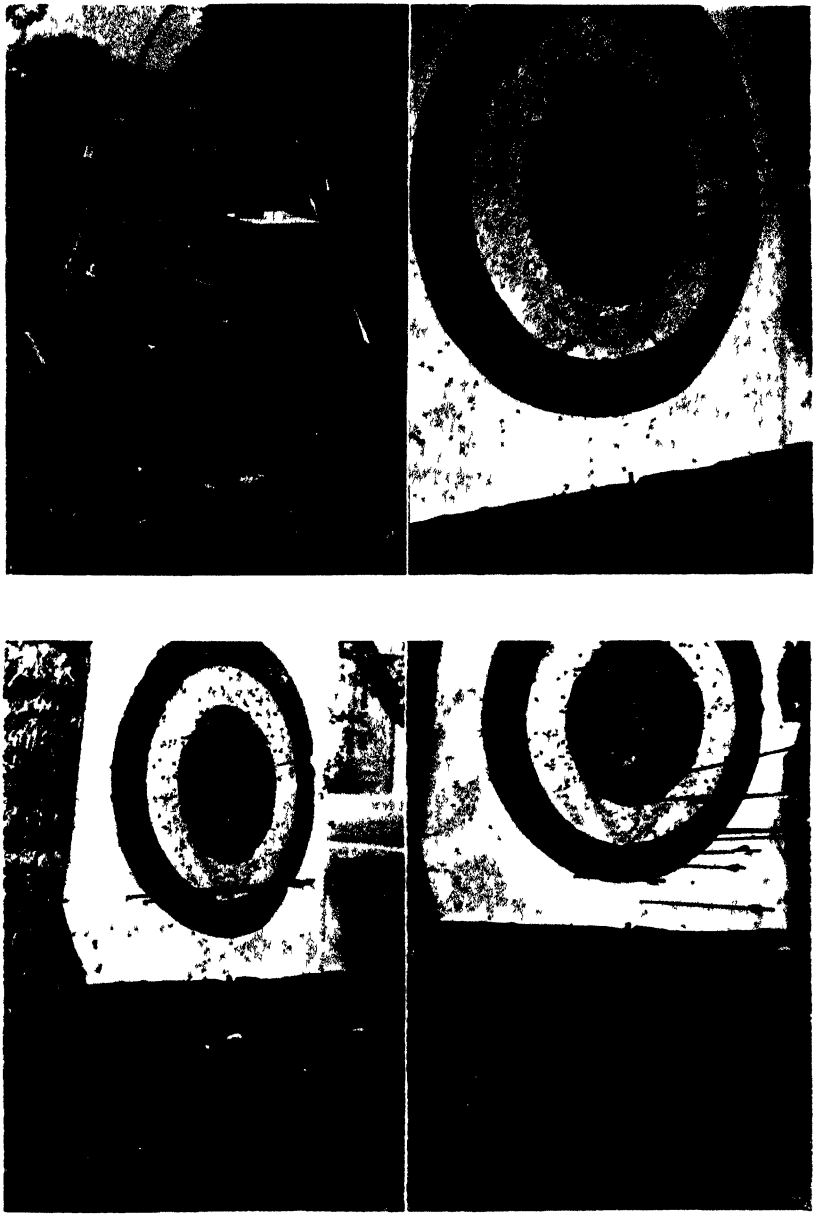
At first everything seemed to work as was expected, the arrows flew about five feet to the left of the target at sixty yards with fair consistency and when I aimed a corresponding distance to the right they hit near the centre. Then I tried target arrows and to my astonishment found that while some of them went to the left many more went nearly straight, either hitting the target when the hunting arrows were passing to the left or missing to the right when the hunting arrows were hitting.

In the meantime something else was making its appearance which attracted my attention. The arrows, particularly the feathers, in passing over the block which held the bow, had begun to wear a groove, which showed their exact direction at the moment of leaving the bow and this groove was nothing else than the line from the bowstring to the side of the bow when in a state of rest, plus, of course, part of the width of the arrow. Sighting along this line pointed, as I have suggested before, to a spot fourteen feet or more to the left of the target according to how high the bow was strung.

Clearly then, some force was at work which gave the arrow a tendency to proceed in the original line of aim, when full drawn, and equally clearly this force could act only if the arrow bent around the bow while passing it.

I then reasoned that if an arrow so stiff that it could not be bent at all were shot from the bow it would follow, to the end of its course, the line from the resting string to the side of the bow. I therefore shot two of the rigid, heavy arrows made by the Archers Company and found my prophecy to work out exactly, thus proving that an arrow which will not bend will go as far to the left as would be indicated by the height of the string, an arrow which will bend a little will go proportionally less far and an arrow of the flexibility of an ordinary 4.9 target arrow may even go straight.

I then took the bow out of the rest, shot it from my hand in the ordinary manner and found that all of the arrows went



ELMER'S SHOOTING MACHINE

Best end made by one arrow shot repeatedly
An average end of six different arrows
Best end of twelve shots with one arrow

true to the target, though possibly the heavy arrows went a little farther to the right than the others, or exactly the opposite of what they had done in the vise. The only explanation I can offer for this is that their greater inertia carried my bow-hand over further.

It then occurred to me that, as the stiffness of an arrow is in direct relation to the strength of the bow, if I used a weaker bow those arrows which had been only fairly stiff for the fifty-pound bow would be relatively very stiff for the weak one and would fly farther to the left. This was shown to be quite true.

Again I thought that if I used my strongest sixty-pound Styles bow perhaps even the heaviest arrows might be made to bend and fly straight. This, too, was proven beyond doubt, for the arrows which had flown fourteen feet to the left now hit the target. However, the findings did not end there for the lighter arrows became like the good man who stands up so straight that he bends over backward; they actually flew far to the right of the direction of aim. Now all my life I have supposed that it was the arrows of weak spine that flicked to the left but here is proof that, at least when the bow is rigidly held, they go to the right, I repeat—to the R-I-G-H-T.

The worst offender of all was a heavy arrow of beefwood, which I have also mentioned in the chapter on tackle. It went farther to the right than any other. Yet the astounding thing is that although the arrows go all ways under Heaven when the bow is held rigid, if the same bow and arrows be shot in the ordinary manner, as I have tried repeatedly, they will go nearly straight.

When I read White's letter, as quoted above, I had the impression which seems to be shared by all others of my acquaintance who have read it, that far greater accuracy is attainable with such a machine than with the bow held in the hand. I doubt if this be so. The best I could do by shooting one selected arrow over and over at sixty yards was an end of

999777, or 6–48. Without trying for the centre of the target but making groups, only, my best was to get the six shots in a circle of eleven and one-half inches diameter. Usually they were much farther apart than this. Shooting six different arrows I thought myself lucky to get them all on the target, whereas, repeating with the same implements by hand, I would make a much better score.

One most important point, with an extremely practical bearing on actual shooting, that was proven beyond any question, was what we may call bow-fatigue, or as it is often spoken of on the range: bow-tire. If the bow were so aimed that by shooting the arrow with ordinary movements the same arrow would fall consistently in, or near, the red, a very quick draw and release would send the arrow above the upper white, while a wait of a full minute would usually strike about the level of the lower black. In other words, as is well known in flight shooting, a bow loses a great deal of its cast in the first two or three seconds. After that the loss, while continual, is progressively slower. The practical application of this lesson is not necessarily that one should act with haste but that he should act always with the same speed.

After having tested the rigidly held bow I tried the grip of sponge rubber, which would permit the bow to turn but not to shift to one side. The results were exactly the same, proving that the turn of the bow probably does not occur.

I then took out the bolt which held the front end of the arm and set that end on a flat board, placing rollers between to minimize friction. To my surprise the arrows still went as far as ever to the left. In these tests I used the very stiff hunting arrows, and the arm of the machine was set so delicately that the slightest touch of the finger would send it rolling to the right.

Fearing that the attachment of the bow, loose as it was, still prevented the correct action I removed it altogether and let the bow remain in place simply by its pressure against the

end of the arm, falling to the ground when shot. Even this made no difference, the arrows uniformly going to the left.

I then thought that perhaps some factor of retention was present which I could not see, so I removed the arm from the stand and held it loosely in my hands like a crossbow. Same result to the left.

Just to check up again I here shot the arrows with my hands in the usual way and, also as usual, they went straight.

I now discarded the machine altogether and proceeded with a new device. I nailed a stick, firmly, crosswise on a tree at the height of my bow-hand and shot in the regular way except that I rested the right side of the bow against the end of the stick so that it could not be moved to the right by the arrow. Here all the factors of ordinary shooting were present with this single modification and the arrow went to the left, as much as when held in the vise. The importance of this lies in the fact that all theories which attempt to explain the Archers' Paradox by the rotation of the string on the fingers, or other incidents of the loose, are wrong.

Thinking that it might be better if I rested the ball of my hand against the bar, instead of the bow, thus giving the effect of a slight pad, I shot a few arrows that way; but always the same flight to the left.

I then simply hooked the bow loosely over the bar, not touching anything but the string. It seemed to me that the maximum of freedom was thus produced, the bow falling each time, but the arrow still went to the left.

At this point in the experiments W. H. Palmer suggested that perhaps we unconsciously threw our bow-hand to one side or the other without being aware of it and that a further test might be made by attaching a rubber band to the unfastened bow, so that at the moment the cord was released from the trigger the bow would be pulled over to one side.

I tried this with great care, using strong traction first to the right and then to the left by a section of an automobile inner

tube about half an inch wide. When the traction was made to the side the arrow was on, in this case to the left, the error was increased. When it was made to the right the error was slightly diminished but was not by any means corrected.

I then tried moving the bow out of the way before the arrow was discharged; by which I mean that I drew the bow, set the trigger, placed the arrow on the string ready to shoot and then carefully moved, or slid, the bow a little bit to the right, so as to leave a space between it and the arrow. Here at last I met with success for I found that if I set the bow away at a distance exactly equal to the diameter of the shaft the arrow would go as straight as though it were shot by hand, always supposing a stiff arrow to be used. If I set it less than this it went to the left with an error inversely proportional to the displacement. If I set it slightly more than the width of a shaft the arrow would go to the right, for example at two diameters it went to the right about four feet at sixty yards.

Yet it is easy to see that to this deflection toward the right there must be a limit which cannot be far away. To demonstrate this by its widest variation suppose the arrow were set so far from the bow that it stood out at exactly right angles from the plane of the cord and bow. Obviously it would then not go forward at all, except for perhaps a very few feet, but would simply be spun about like a weather vane or the arrow-shaped indicator of a child's toy. For every approach toward the true direction there would be a little more propulsion forward and a little less twist. Thus in actual practice when I set the head of the arrow fifteen inches from the side of the bow it was rotated in the same way but not so much and it fell to earth about twenty-five yards ahead and much to the left when the elevation was such that an arrow shot straight would have hit the target at sixty yards. At five inches from the bow the arrow was given a strong lateral impulse but the forward impulse was then so strong that the net result was seen in a very decided flirting with a veer to the left of what I might

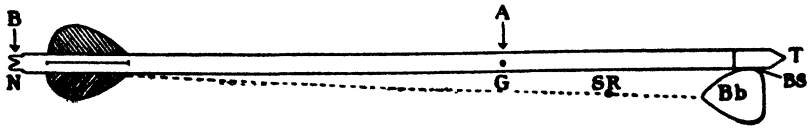
estimate as seven degrees. At four inches the flirt was markedly less and the direction better. At three inches there was no visible flirt and only a slight deviation to the left of perhaps one degree. At two inches it was so nearly straight that I could not tell what variation might be due to the set of the arrow and what to its unavoidable inaccuracy. In fact, between one and two inches the flight was so nearly true that I could not conscientiously draw a finer distinction. At a little less than one inch the arrow passed decidedly to the right, as I have said. Of the exact reason for this I am not certain and since the experimental findings have shown so many other theories to be fallacious I hesitate to hazard a guess in this case. At less than half an inch, or rather at exactly the width of the shaft, it flew straight, as I have mentioned, and beyond this point the arrow began again to fly to the left but for different reasons.

Rivetting my attention on my bow-hand, after this, while I shot, I thought I could clearly discern the instantaneous flick to the right and back to normal as the arrow crossed the bow. The thicker the arrow the more noticeable it is. I even tried it with a shaft an inch thick. It is an experiment which I think you can all perform with profit.

To prove the pudding by the eating I went to the 100-yard range to shoot the heavy arrows. If I held with my arm as usual and my grip loose the arrow flew true. If I stiffened my arm and hand with particular attention to checking the least side play the arrow would fly several feet off the line of the target to the left. It is evidently for this same reason of allowing some freedom to the bow that those teachers of archery who insist on a very tight grip also insist on some relaxation of the elbow.

In my experiments the arrows did not fly quite so far to the left as they did for Dr. Pope. Five feet at 60 yards is 1 degree 30 minutes, 10 feet is 3 deg. 10 min., 12 feet is 3 deg. 50 min., and so on. I suppose the explanation lies in the fact that they used a hunting bow, which was probably wider than my

target bow. In fact I have always felt that the best shooting could be done with a narrow bow and I think these experiments add weight to my opinion.



We must now attempt to explain why it is that an arrow which is thin enough to bend to exactly the right curve will go straight to the target, while one that is stiff will, as has been proven, go far to the left.

Assuming that we use a 28-inch arrow the centre of gravity will necessarily be about twelve inches from the tip, as McMeen has mathematically proven on page 319 and as anyone can discover for himself by balancing an arrow on his finger.

At full draw the position of the arrow and bow are represented by diagram 1 where Bb=Bow Belly, Bs=Bow Side, SR=String at Rest, G=Gravity, N=Nock, T=Tip. BbNBs forms an angle which increases as N approaches Sr. Owing to the property of inertia anything which is set in motion will proceed in a straight line along its centre of gravity unless acted on by another force.

When the string is loosed at full draw the lines NBb and NT almost coincide and the arrow is started in the path of aim. Immediately, however, the angle BbNT begins to widen, T is forced more and more away from the line NBb and the force A is created, by the inertia, which presses against the centre of gravity. Evidently this would set up forces in the same direction against the string and bow, just as any arrow would do if it were held at both ends and pressed in the middle.

By shooting a thin metal tube I found that this force was sufficient to make a slight bend in it.

Inasmuch as only twelve inches of the arrow shaft lie in

front of the centre of gravity while sixteen lie behind it, the angle BbNT is still very sharp when G is at Bs; in other words T has been pushed very little out of line.

Once past the bow, the centre of gravity, or G, tends to proceed in a straight line, and whereas by this time the gathered speed of the arrow is very great and is becoming still greater until the string comes to rest at Sr, and therefore its momentum is correspondingly great and continually increasing, the force A is sufficient either to bend the arrow over the bow as a fulcrum or else to press the bow out of the way. On the principle of the common lever the pressure against the bow is greatest when the string reaches Sr because then the short arm of the lever, in the arrow we are discussing, is about seven inches long while the long arm, or the distance from the centre of gravity to the bow (G to Bs) is nine inches. To put it more forcibly there are twenty-one inches of shaft in front of the bow struggling to hold the shaft true and only seven inches trying to twist it aside.

That the arrow now bends in the opposite direction from the bend which it first tended to take is proven by the facts that I have given regarding the flight of stiff arrows to the left. We may therefore conclude, I think, that if an arrow fly straight from a rigid bow it must be of just such a stiffness, or of so much springiness, that it will bend to exactly the right amount. This explains the very great difficulty of finding even six arrows which are so exactly the same in elasticity and resiliency that they will find the same place in the target if the bow be immovable.

Now the last thing to consider is why a very limber arrow goes to the right. Here I can only surmise that we have to deal with buckling. The arrow is bent about the bow, as in the last case, but it is so weak that the pressure of the string is sufficient to augment the curvature, just as one can bend a light walking-stick by bearing too hard upon it. It is easy to see that an arrow which was curved with the concave side to-

ward the bow would tend to fly to the right. In fact anyone can prove it for himself by shooting an ordinary arrow which has become warped. Sometimes, however, due to the inequalities of grain, an arrow will buckle in a very irregular manner and may fly almost anywhere.

I think that the result of these experiments suggests pretty clearly why I find it better to shoot with the loose grip. It is simply to make the course of nature run as smoothly as possible and to allow the bow to move sideways for its fraction of an inch with as little resistance as may be.

When I thus explain the matter to most people, even to archers who are not familiar with it, they do not grasp what I mean at all. They seem to think that I let my bow wobble about in my hand in a most uncertain fashion, whereas nothing can really be further from the truth, as any of my friends can testify. Everything else about the archer is stiff as steel except only the fingers of the bow-hand.

Returning from this important digression I believe we left the archer standing with his feet placed, his body straight and his head erect, looking forward. His bow was at his left side and his bow-hand was adjusted rather loosely to the grip. It remains now to consider the position on the string of his drawing hand, which for most people is of course the right.

There are a great many different kinds of draws practiced by the various tribes of the earth, as I have described, but for our kind of archery only two are satisfactory. I will speak of the unusual one first, to get it out of the way. So far as I know, it is used only by a few archers of the Pacific coast, including Arthur Young and Donnan Smith, who learned it from Compton, who in turn learned it from the Sioux Indians when he was a boy. It is therefore called the Sioux draw and consists in using all four fingers on the string with the arrow placed above them, lightly touched by the thumb. Young and Compton have done magnificent work with it in the face of mortal danger, so it is not for me to criticise it adversely when

I know so little about it. Pope uses it in his Hiawatha stunt but not in regular shooting.

The draw which has been used in Europe from time out of mind and which every other archer of a white complexion, except those I mentioned, uses to-day is with either two or three fingers. In the Bayeux tapestry and other ancient drawings the two-fingered draw is undoubtedly the one employed, and many Continental archers use it still. Some English and Americans also prefer it, including the British championess for 1923 and the American champion of 1903. It would undoubtedly be better than the three-fingered draw, at least theoretically, if it were not for the question of strength. To pull a heavy bow through a long round needs all the endurance in the muscles of the hand that can be brought into play and the two-fingered archer is more apt to succumb than his three-fingered confrère. In the Continental style of shooting one arrow at a time this factor is not of so much importance.

Nearly all archers keep the tips of the first three fingers on an even line with each other, and lay the string straight across them. I used to think I did the same, but my friend Palmer pointed out to me that I did not. It is queer how one will have a peculiarity and not know it. What I do is to extend the second finger about half an inch beyond the first and the third a little farther yet, so that the string lies very obliquely across them. In the act of shooting this makes the back of the hand be uppermost, where it can be tucked under the ramus of the jaw, and it permits the string to be very smoothly loosed by rolling off the sides of the ends of the fingers rather than off their very tips. It also gives a somewhat lower drawing point because the fingers are bent downward.

This is the position of the fingers which I recommend to all those whose physical configuration makes it possible.

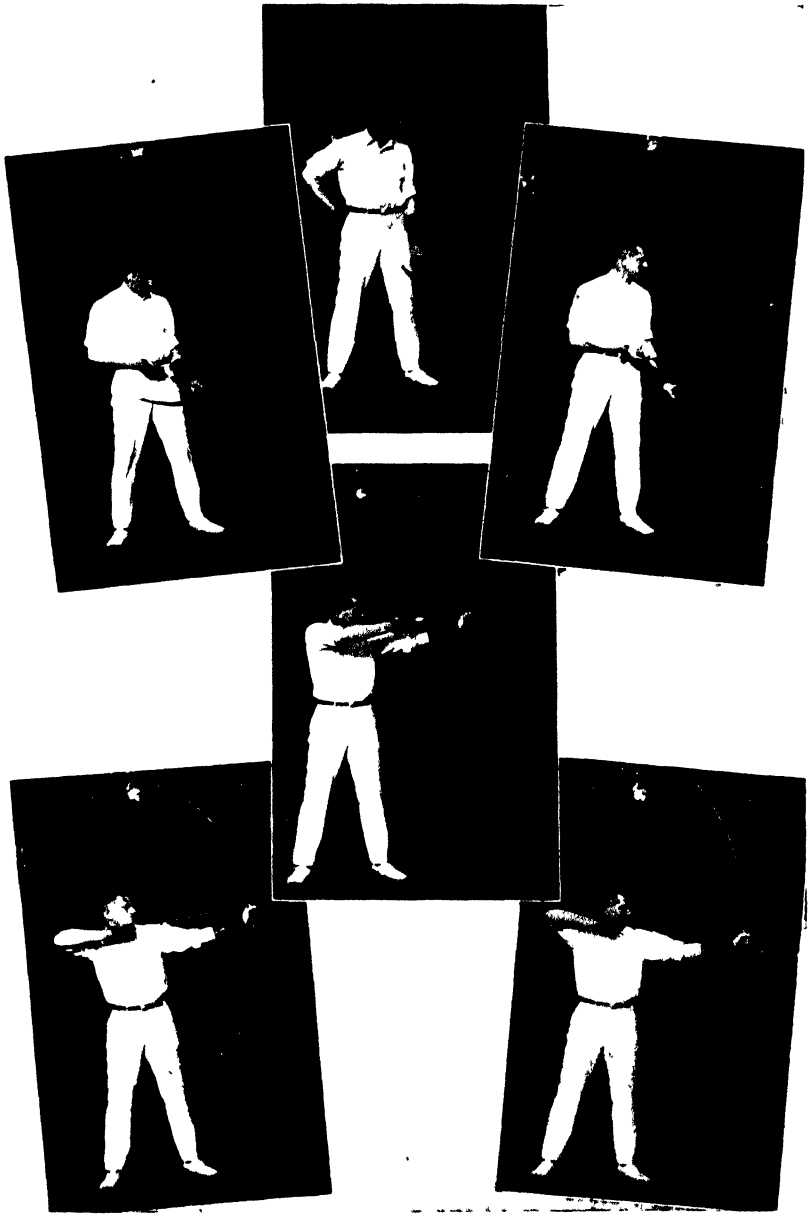
Now while this adjustment of the two hands should be done by the expert archer through his sense of feeling only, it is not to be supposed that the beginner can do it that way. He must

of course look at his hands hard and often until the movements become practically automatic.

The next act is to turn the head sharply to the left so as to look straight at the target. Do not give a half-turn, as most people do, and squint at the gold out of the corner of your eyes, but turn the head squarely about, without moving the body, as though your neck were made of rubber, and keep the head rigidly there during the subsequent acts of drawing and loosing.

It is very difficult to keep the head in one place but when it is remembered that the whole position of the arrow depends on its nock being always in exactly the same spot it is easy to realize that the slightest tilting of the chin either up or down will change the elevation and any rotation will cause a lateral error.

In shooting the bow, as in shooting a gun, some close one eye and some keep both eyes open. It is a question which is suitable for debate and the answer is not the same for every individual. In general the binocular vision is best because it permits a more accurate estimation of distance. In hunting and roving, where the exact ranges are never known it should invariably be used. For 100-yard shooting it is also unquestionably the best. Personally I use it practically always at every range down to sixty yards, but below that, at fifty and forty, I often shut my left eye. The reason is that there is no need at this short distance for doing anything more as regards aiming, or sighting, than accurately and rigidly fixing the tip of the pile on the point of aim and this may possibly be done more infallibly if the left eye cannot interfere. I will quote in illustration an instance that occurred to me at one of the most critical moments of my life. In the championship match of 1925 Dr. Crouch and I were exactly even when we had finished both Yorks, the first American and the sixty, fifty and part of the forty of the last American, or final round. It was a moment of high tension. On the third end Dr. Crouch made



PAUL W. CROUCH

TAKING ARROW FROM POCKET

NOCKING

LOOKING AT TARGET

BEGINNING DRAW

FULL DRAW

AFTER LOOSING

five golds and a red, 6–52, while I made only 6–42. My only hope, therefore, was to equal his performance on my next end. The first three were golds and I had some hope of succeeding, but when I came up for my second three I caught the sight out of the wrong eye and the arrow flew wide off the target to the left. The two remaining arrows were a gold and a red, but that shaft that went wide took all my chances with it. I tell this because here was a case where one who was old enough to know better had not sense enough to wink the left eye before he loosed the shaft.

Even if you do let both eyes be open be certain to assure yourself that it is the right eye which is doing the work by frequently winking the left as you aim. Sometimes the arrow will lie between both eyes and the left will draw it only a little out of line, or some archers even prefer to sight with the arrow between the two parallel lines of vision. I used that method myself for several years. After all each man must be a law to himself.

There is an artificial assistance to the eyesight in shooting which has been invented and perfected by McMeen and which he has found to work very well. It consists of a special pair of spectacles so arranged that the right eye focusses at twenty-eight inches and the left at infinity. By such a contrivance both the tip of the arrow and the target stand out with startling distinctness. I have never tried any device of this sort, as my eyes focus well enough naturally, but there is no doubt that for certain cases of poor ocular accommodation it has a real value. The glasses are worn only while in the act of shooting, as of course such spectacles would prove very trying to the eyes at any other time.

Bring the arm up sharply, as I said earlier in this chapter, with the elbow LOCKED. I print that word large because it is what I mean. Every other writer tells you to let the elbow of the bow-hand be comfortably loose, as otherwise the jar of the bow will soon bring on an inflammation of the joint. I do

not think this is so, or at least it is rare enough to be negligible, and I can assert positively that without a firm elbow no one will ever reach to the greatest heights.

Some men, including Dr. Crouch, draw the bow on the way up. I have made some of my best scores in that way too. It is undoubtedly a perfectly good way to shoot. Yet I think it is even better to first elevate the bow-arm and then draw the arrow back exactly in line with the target. Lagai shoots this way. Here again it is well to have control of the two methods. For example, in the Eastern tournament of this year (1925) I shot in the latter way through the first York and through the first American to the third end of the forty yards. For the first and second ends I had made miserable scores in the 30's and was in very low spirits. By then changing to the former method, of drawing as I lifted the bow, I made a fifty, and finished strongly. Furthermore by continuing to shoot in that way through the second York I managed to win it with a new record and the best 80-yard score I ever made in public. Yet in the second American I had to go back to the draw-in-line and in the national tournament, later in the summer, I used it almost exclusively, getting very discouraging results if ever I tried to change.

It was Harry Richardson who told me to draw quickly and save my strength for the holding and aiming, and I have always felt thankful for the advice. I am glad to have this opportunity to pass it on. Richardson always drew the arrow much higher than the point of aim and lowered down to it, very much as a pistol-shot will bring his weapon down to the mark. I have always preferred the opposite way of drawing too low and coming up and I think it is better because you can more easily keep the range in view during the act. Do not begin to draw with the arrow pointing way down to your feet, as your arm will get tired and seem to stick in its socket on the way up, but draw just about parallel to the earth and then raise the arrow slowly but firmly till it is on the exact point of aim.

It is during this last rise of the arm that one is apt to creep. The only way to avoid it is to keep the left arm as hard as I have described and to particularly remember to pull extra strongly with the drawing arm during that brief space of time.

Practically every beginner is very much annoyed in his early attempts at drawing by having the arrow persistently fall off the bow-hand. When he asks an older archer how to correct the fault he is usually told that if he persist in shooting it will remedy itself. While this may be true one might as well know what causes the arrow to drop away to the left and he can at once do away with the source of the trouble. There are really two chief reasons. The first is that in spite of all instruction to the contrary the grasping habit of a lifetime makes one press upon the nock end of the arrow with his thumb. The second is that in the effort of drawing, which closely resembles any other pulling movement, it is natural to clasp the hand continually tighter by closing the fingers, and, as the arrow is held between the first and second, it is thrown by them in the same direction as they contract. The easiest way to cure this tendency is to start the draw with the fingers already so far bent that they will automatically be straightened out by the strong pull of the arm and thus force the arrow against the bow.

The location of the drawing point is naturally high in archers who specialize at the short ranges, like the French, and low in those who habitually shoot at 100 yards or more like the English and Scotch. If one shoot at something so near that the arrow has an almost flat trajectory it is advantageous to draw almost up to the eye. In this category I would include trick shooting on a stage, or at small objects near at hand, and shooting at birds and squirrels in trees. I have been told, though not with particular authority, that it was by using this very high draw that Mr. Maurice Thompson made his astounding records of breaking 38 glass balls in public and 46 in private out of 50 thrown up at 12 yards distance. I do not

think Buffalo Bill could do any better than this with his rifle, at least not when I saw him.

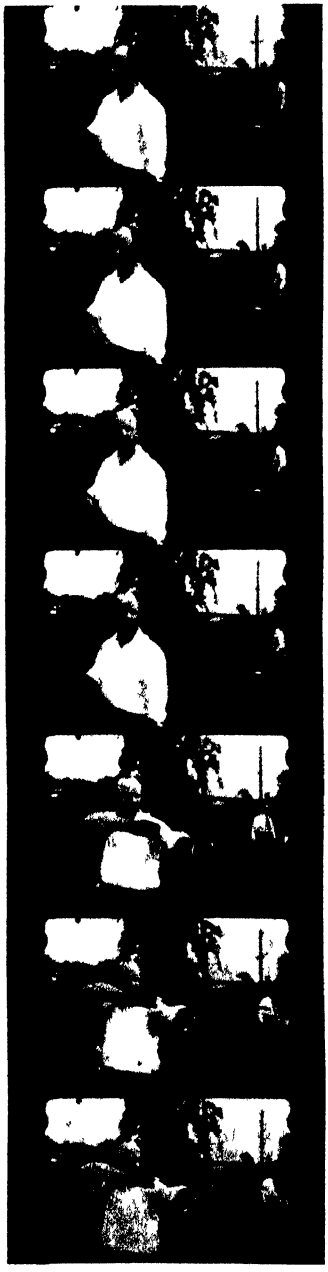
Maxson made some marvellous scores at the American Round and none at the York that were worth mentioning. As might be expected, therefore, his draw was very high, fully as high as the corner of his mouth, as he showed it to me, so that his point of aim was on the target at 60 yards, giving him the same advantage that a peep-sight does the modern archer of lower draw.

If, therefore, the archer be a lady who never expects to shoot any distance beyond the 60 yards of the National, or a man who never intends to enjoy the delights of the York round, I advise her, or possibly him, to draw high. Mrs. M. C. Howell drew on her chin, not below it, I should think about to the root of the right lower canine tooth.

For all men who wish to strike a happy medium which will be high enough to make the American Round a thing of pleasure and yet allow them to shoot at 100 yards without having to search the blue vaults of Heaven for a point of aim I advise the draw just below the jaw-bone, or in reality to the region of the neck, which I have already described.

There are different ways of finding a place which one can be sure to reach for every shaft. I always try to draw my hand lower than my jaw-bone and then come up against it from below with a thump, thus making sure that my hand is not sneaking up farther than it should. When I do it properly the third knuckle of my first finger touches the angle of my jaw-bone. Phil Bryant used his thumb as a guide. At the end of each draw he would stick his thumb straight up and rest it in the little hollow under the ear. This is a good way if the thumb be used only as an indicator but one is tempted to press with it against the bone to keep from creeping and then the elevation is ruined.

Whether or not Will Thompson drew very high when he was a young hunter, shooting at small birds on near-by boughs,



"MOVIES"

I do not know, but I have photographic proof that in 1882 at 100 yards his hand was as low as his necktie, the arrow-nock being a good two inches below his chin. He used this same draw when I shot with him in 1913 and had taught it to Dr. Doughty, who won the championship in that year. It gave him a point of aim about two-thirds of the way to the target at 100 yards, about where most archers would find it for 60 yards, but, as he laughingly expressed it, his point for 40 yards was on the tip of his toe. Mr. Taylor, at least of late years when he has specialized at the York Round, also draws almost as low as that.

For such a low draw it is hard to find a definite anchor to tie to. I have been told that Will Thompson experimented with a button sewed on the lapel of his coat but did not find it reliable. The only guide, besides one's general sense of judgment, seems to be to touch something like the larynx or collarbone with the thumb. For overhand shooting at the clout the very low draw is a necessity but for underhand shooting it does not make much difference.

After drawing comes aiming, then loosing, which I have described, then pausing, or holding oneself rigid until the arrow has either struck the mark, at the short distances, or is well on its way down the range at the long.

This completes the whole act of shooting, but I must enlarge somewhat on the subject of aiming.

Before the time of Ford the accepted teaching was that the archer should centre his gaze on the gold and forget all else, relying solely on his judgment, as influenced by his sense of poise, to carry the shaft as it should go, or, in the language of that time, to keep a length. Ford, as I have said, perfected the use of the point of aim, so that he may be said to have practically invented it, and all good archers have used it ever since. Of the two ways of using the point, whether by direct or indirect vision, I prefer the former, probably because I learned to shoot in that way from the written instructions of Dr. Weston.

I can always make my best scores if I stare hard at the blade of grass which for the time being is of such precious value and see the target, if at all, very dimly in a sort of haze. Yet Rendtorff, who claims the best score ever made without artificial assistance, fixes his vision always on the gold and raises his arrow to a point of aim which is not so vividly seen. In other words he is certain of direction and finds his elevation secondarily. Perhaps I should have said before that the archer raises or lowers to the point of aim to straighten out any mistake of direction which he might accidentally have made if he drew directly to it.

Now this is as far as one can go in learning to shoot by the methods of pure archery and it is the place where, in my opinion, all efforts to increase accuracy by the use of extraneous devices should stop. Yet, even though we all know that archery attracts us as it does because of its elemental simplicity, it is difficult for us to refrain from attempting to better our scores by the addition of various devices which suggest themselves to our modern sophistication.

The first of these was probably an artificial point of aim, which is made by sticking some easily visible object into the ground at the proper place rather than relying on whatever Nature has put there. When I first shot in the national tournaments, and for all the time before that, the use of any such trick was strictly forbidden, so that comparison of all the scores made during those thirty odd years is strictly fair. After the war the practice was permitted by the authorities governing the tournaments, although it had been more or less winked at in the case of certain archers with poor eyesight for a year or two before. It was never legally sanctioned by the constitution. At present little objects, such as small bright-colored balls on wooden rods, discs of paper, little sticks and the like are freely dotted over the green during the shooting of the American Round. Personally I am strongly opposed to their use. So far as I can remember the only time I ever

yielded to temptation sufficiently to use one in a national tournament was in the second American Round at Cooperstown in 1922. I came within two points of losing at that time and it would have served me right if I had, as I have repented of the lapse from principle ever since.

A device which some use, myself included, to assist in finding the point of aim at a strange target might possibly be classed as an adventitious aid. So far as I know it owes its existence to the fertile resourcefulness of Wallace Bryant. You probably have all noticed that artists, in painting, often hold up a brush or pencil at arm's length and measure off on it the size which the object of their scrutiny would assume at that degree of foreshortening. Applying this method to the range Mr. Bryant took a measure from one target, on which he had been shooting and where the range was known, and transferred it to a new target, thus starting to shoot with a point of aim that was practically predetermined. The operation is very simple: hold an arrow upright at arm's length, bring the tip in line with the bull's-eye and slide your finger up the shaft till it is lined with the point of aim. Then walk to the new target, hold the arrow out again and by sighting over the finger see where the point of aim should be. Many archers use this at the present time. I have found that all error is avoided by using a short stick instead of the arrow and marking the distances with a pencil and by resting the stick exactly 28 inches from your face, instead of holding it at arm's length, by interposing an arrow between.

For shooting at 100 yards one should use a strong bow which will give a low point of aim, but many men are not physically strong enough to do this and many others cannot secure bows of adequate cast. For them a mark upon the arrow about eight inches from the tip is very useful, the archer sighting by it instead of by the tip and thereby greatly lowering his point of aim. To do this requires considerable practice, because the bow-hand is between the right eye and the target;

yet by paralyzing ocular accommodation, or in other words by looking at the distant target but not at the close ring, it will be found that both the target and the ring can be seen at the same time and accurately adjusted toward each other. This presupposes eyes of normal muscle balance, for of course neither cross-eyes nor wall-eyes would do it. I used this method of sighting in '16, '19 and '20, and in two of them I made double Yorks of more than 1,000. Yet I much prefer to shoot without rings and have done so ever since. While I say "rings" from habit it is not at all necessary to encircle the arrow with the mark, as only the top is seen. A spot will do quite as well. I have been told that a famous English champion used such marks, but as he is now dead and my source of information was not beyond question, I will not give his name. I got the idea from noticing that some arrows used by Wallace Bryant which he had sold to a friend were marked in this way. Bryant was an inventive genius.

Another way of aiming at the long distances is by the use of a peep-sight on the string. The first one of which I can find mention in America was used by two gentlemen in Chicago in 1880 and was described in "The Bicycling World" of June 26th of that year. They had both been poor shots but with this sight they beat everyone else. The inventor, "although an indifferent shot, made on the 26th of May last 886 at the double York Round;" a splendid score for those days. The sight was thus described:

"Not larger than a dime, with an ingenious little screw clamp attachment, this peep-sight may be affixed to the bowstring, and adjusted to any point upon it, so that when the string is drawn the archer may look through a small hole in the centre of the sight across the pile of his arrow at the target and thus get not only a correct aim sidewise but also a correct aim for elevation."

At the national tournament of that year at Buffalo a man named Burnam came with such a sight on his bow. I have

heard it said that Peddinghaus, who beat Thompson for the championship with his last arrow, used a sight, but that is not true. *The Archery World* for July 24th, 1880, describes it all in full. Here are some excerpts:

"The peep-sight excited considerable controversy, and, while the majority would like to have seen Mr. Burnam use it once, there was a general feeling that it was not archery to use it, and that it should not be allowed.

"Mr. Burnam declared that he could do little without it, but concluded to try and on the first day he led Mr. Thompson at the 100 range; also, in total, for 100 and 80 yards. He shot in the same manner as with the peep-sight, using marks on the string to sight with over the point of the arrow at the gold.

"The archery peep-sight is simply a round piece of thin brass, about the size of a silver three-cent piece, fastened to a grooved wire, which clasps the bowstring and may be moved up or down. Through the centre is a small hole through which the sight is taken, bringing the point of the arrow to bear on the gold. For long range the sight is moved up on the string; a light bow is used, which can be held full-drawn and steady while the sight is being taken.

"Mrs. Brown, the lady champion of last year, who had been using the peep-sight and was intending to do so, was not so fortunate."

While a peep-sight on the string is valuable when the point of aim is above the target the conditions are reversed when the point is below the target and the peep-sight must then be placed on the bow. This is of course of an entirely different nature. Nearly all beginners conceive of the idea of such a sight. Pendry, of Chicago, used to put black rings around his bow above the handle and would line the appropriate one with the gold. This was ruled out by the other men as not being pure archery and after that he got his elevation by extending his thumb up the belly of the bow and lining a wrinkle

or something with the bull's-eye. Last year young Jack Flohr, of Peru, Ill., jumped his scoring in the American Round from 483 to 577 in one week by using a peep-sight. I could cite many such instances, at least three men getting well over 600 by its use. For this reason I cannot bring myself to feel that scores made with the assistance of a peep-sight may or should be fairly compared with those that are made without any such aid.

The best peep-sight is the one invented and made for use on bows of his manufacture by Shepherdson, of Melrose. It is a beautifully constructed little instrument consisting of a slender upright brass bar, about five inches long, fastened at its lower end to a band just above the arrow plate. Sliding on it is a delicate cross-bar, with a loop or bead on the end, which may be set at the right height by a tiny set-screw.

To use this device one simply covers the gold with the bead, makes sure that the bow is tilted at the right angle by noticing that the upright is vertical and looses the arrow. It does away at one sweep with all the difficulties that arise from uneven ground, lack of a suitable point of aim, indirect vision and some of the effects of wind.

If there be no limit to the use of auxiliaries to shooting many other so-called improvements may be found. For example a twenty-seven-inch string connecting the cord and handle will make it impossible to overdraw and also indicate the exact length of a correct draw for each shot. It is also very easy to draw and loose without bothering with one's own awkward fingers. I once made a short, wide hook, set in a cross handle, by which I could draw a bow with ease and could loose a shaft superbly by the slightest side twist.

In fact there are all sorts of things like that but where are they to end? For my part I think that there are distinct limitations which should not be crossed. It reminds me of the time Travis won the British golf championship with a "flat-iron" putter. No one had foreseen such a thing and no rule

existed to forbid it but the powers that regulate golf saw that it was not in the spirit of the game and ruled it out for future contests. It is thus that I, in company with all English and most American archers, feel about the use of auxiliary appliances to the simple bow and arrow.

IX

TACKLE

THE tyro who is anxious to begin shooting wants, and should have, the simplest directions. He should be told in few words what to get and how to use it and should leave the study of the finer points of the art until his growing experience puts him in a position to remember and profit by it. With this in mind I will say to a man:

Buy a six-foot lemonwood bow weighing forty-two pounds and a dozen twenty-eight-inch arrows. Either buy, or make from the directions in this book, a bracer and three finger-tips. He is then fully equipped to shoot and shoot well.

To a woman: buy a five foot six inch lemonwood bow weighing twenty-two pounds and a dozen twenty-six-inch arrows, with the same directions about the bracer and tips.

Now, do not say that I have made him read through thousands of words with a hopeless confusion as the chief result, to find so simple a matter.

Yet there must be reasons for the choices I have made and doubtless many archers think there are still better reasons why I should have specified something else. I will therefore talk freely and fully for any who may care to hear.

The bow about six feet long is our standard weapon which has been tried out through so many centuries and found to be the best that there is no need here to try to defend it. If a person draw a twenty-seven-inch arrow, or if he shoot a bow of forty-four pounds or under a bow may with advantage be shortened to five feet ten inches, or even to five feet eight inches, though in the last case there is much greater risk of breakage. In a general way the shorter a bow the better cast it has, up to the limit of safety. For most men six feet is satisfactory and safe.

A bow consists of an upper and a lower limb, with a grip, or handle, in the middle. On either end is a piece of grooved horn called a tip. One side, which is held away from the archer in shooting, is nearly flat and is called the back. The other side is round, is held toward the archer, and is called the belly, or face.

Unquestionably the best wood for a bow is yew. In Northern Europe it has been the favorite since neolithic times, as the only bow found in England that I know of, belonging to that period, was made of a branch of yew wood, a rather poor piece, full of imperfections, but made with skill, even to leaving more wood in the places which were naturally weak. I suppose that you will immediately wonder why I began this article by advising the purchase of a bow of lemonwood when I now say that yew is the best. The reason is twofold, first that lemonwood is very much cheaper and second, that it is not so apt to break.

Bows are divided into two great classes: composite bows and longbows. The composite bows are treated in another chapter and I will say nothing about them here. Longbows are further subdivided by most writers into self-bows and backed-bows. In a self-bow the back and belly are of one piece and in a backed-bow they are made of two pieces, glued together. I prefer to make the classification a little more definite and carry it to six heads, namely: self-bows, grafted self-bows, backed-bows and grafted backed-bows, jointed self-bows and jointed backed-bows. A grafted bow is one in which the two limbs are different pieces of wood joined in the handle by a splice. The splice may be either a single-fish, when one end is like the letter V, or a double-fish, when one end is like the letter W. It is then obvious that in my classification a self-bow is a bow made of one piece of wood, a grafted self-bow is made of two pieces of wood fished together, a backed-bow is a self-bow with an artificial back glued to it and a grafted backed-bow is made by fishing together two

limbs and gluing thereon an artificial back. Jointed bows have a metal joint that will come apart like a fishing rod, or sometimes like a hinge.

The differences between the six kinds of bows are probably less than you may imagine. All of them are perfectly good weapons. I have shot with all kinds and have made as good or as bad scores with one as with the other except that while I had a wonderful grafted backed-bow I have never owned a really first-class, simple backed-bow, not because it is an inferior weapon but because I never chanced to buy one; neither have I owned a jointed backed-bow.

Nevertheless I should say that my first choice is the self-yew. Some archers say that yew wood varies a little in character in different parts of the trunk and, therefore, if a billet be split into two staves and these be so joined that the ends which lay together in the original wood occupy the same relative position in either limb, that is, grafted together or at the ends, the elastic properties of each limb will then be exactly the same and the bow will be better than a self one. It is a pretty theory and sometimes is true. As you will find in the chapter on making yew bows, it is necessary to follow the curves of the grain in forward and backward directions, though of course a bow must never bend at all toward the side or it will turn and twist when it is strung. Often these curves are very marked and would make a most misshapen bow if they were not matched by splitting and grafting. But when this is done and each limb has exactly the same abnormal curvature in the same place the effect to the eye is even pleasing and ornamental and the shooting qualities are not impaired.

Perfectly straight grain, running for full six feet, is a very hard thing to find in yew and yet it does exist. I have two bows from Styles in which the lamellæ of the grain are as even as a pile of fresh sheets of paper. I think that this is the ideal and in wood of that perfection I do not believe that there

is any real difference in the resiliency of the wood at the two ends. Certainly I cannot see it if there be.

The only complaint that I have ever heard against a self-bow is that it always follows the string, or gets a permanent curve toward the belly. This is undoubtedly true but what difference does it make? Ford said that such a bow was sweeter in the hand than one that was perfectly straight and I see no reason to differ from him. Besides, the curve is never very great and its maximum is reached in a few days' use. One of the best archers this country ever produced used to let a new bow stay strung for the first two or three days to get its set and be done with it.

In a perfect self-bow I would have no handle at all, except an enlargement in the wood itself to make the centre rigid and to fit the hand. On account of "The Archers' Paradox," which I have discussed elsewhere, I believe that the narrower a handle the straighter the bow will shoot and I therefore see no reason for enlarging the lateral diameter of the grip with an external layer of any material.

Grafted bows must have a handle, or grip. The joint is not only unsightly in itself but it is always strengthened and protected from dampness by a tight wrapping of either linen thread or raw flax laid in a matrix of glue. This must be covered, to make it beautiful to the eye and pleasant to the hand. Most archers like something rather soft. Ford said that nothing was better than plush. I formerly supposed that such an elegant material was introduced in modern days of luxury but recently I noticed that an old expense account of the time of the Tudors contained an item of plush for bow-handles.

The bows that have come from Aldred, who is dead, and his son-in-law James Izzard, who is at present heading the archery workshop of Ayres, in London, have often had handles made by winding them about with rough gimp tape, with a selvage on one side only which is overlapped by the next turn.

This kind of tape can be bought of dealers in upholsterers' supplies and if laid on a coating of glue, as all similar handles should be, is well-nigh perfect of its kind. I should say, in passing, that a waterproof glue, or cement, such as shellac, or dissolved celluloid, which is sold under the name of DuPonts' Household Cement, or casein glue is the best to use as it does not become sticky in the warm summer days.

The handles of golf clubs are made of split leather, with an unfinished side out. This does just as well for bows and I have often used it. The same spiral wrapping may be used if desired but I think it is just as good and perhaps better to cut the leather to the proper rectangular shape, skive the edges to give a smooth, overlapping fit, lay it on in glue and wrap a bandage around it to hold it tight till it sets.

Or another way of fitting the leather handle, which is quite as good, and possibly even more easily done, is to skive only the upper and lower edges, wrap the leather around the bow so that it overlaps, and then run a very sharp knife down the back, cutting both thicknesses at once.

Fishing rods are gripped with cork or cane and these also are excellent for bows. So far as I know the first person to advocate the use of cork and to back up his theories by making perfect and beautiful handles of it was Dr. Goldberg, of the Wayne Archers. He used narrow strips of very thin sheet cork, which can be bought at the little cork stores which seem to exist especially at seaports, cut them to special shape as his eye directed and laid them on spirally. Being an oculist and accustomed to the finest possible mechanical work his handicraft was exquisite. A final rubbing with fine sandpaper gave a perfect finish. There is no better grip than this.

I have myself put on cane handles when the original wrappings were worn off, for the simple reason that I always have some cane about the house for mending chairs and it is so easy to do. There is not much to be said about cane that you cannot as well imagine for yourself. It makes a hard,

serviceable and good-looking handle. The Japanese wrap their bows with cane but make the grip of unfinished leather. I might have said that just as so many of our discoveries were found to have been already in use in China for Heaven knows how long, so the old Chinese war bows have cork grips, though they are very crude and rough in comparison with ours.

Dr. Pope and his followers have introduced linen cord as a handle, usually finished for beauty's sake with a small band of split leather at each end. It may be wrapped in any color and has the added advantage of giving great support to a graft, or fish-joint. A coat of waterproof varnish finishes it.

When G. P. Bryant was at his best, in 1912, he slipped a piece of soft elastic rubber tubing over the handle of any bow he used. It gave him just the sort of grasp and feeling that his long experience and masterly skill had taught him to prefer. So most of our master-bowmen have preference for some particular handle which suits both the physical structure of their hands and their particular technique in shooting.

If the hand in which you hold the bow be held out before you, in a natural position with the palm up, you will notice that the two places on which the handle of the bow rests are not in a line. Obviously the handle must lie in the little hammock of skin between the thumb and forefinger. If the hand, in shooting, were kept perfectly straight with the wrist this would be the only place it would touch, and indeed, some experts do hold the bow with just such a loose manner, pivoted on a cord of skin and muscle, as it were. As a rule, though, nearly everyone turns the wrist slightly upward, when the hand is ready for shooting, so as to bring the thenar and hypothenar eminences into line and thus give a support which, in my own case, measures about four inches, to bear on the bow handle. In popular language these two eminences are the ball and heel of the hand. This is a good strong way to

shoot but, in bending the wrist, about half an inch of length of draw is sacrificed.

It was S. G. McMeen whose fertile mind first led him to fit a handle to the shape of his palm. At his first tournament, in 1916, at Jersey City, he wrapped something that looked to the rest of us like a black stocking around the lower part of his handle, although he disclaimed originality and said that he had read of the idea. It is at once obvious that by increasing the thickness of the lower end of the handle it can be made to rest on the heel of the hand while the wrist is still straight. In other words it brings the two eminences to the same distance from the elbow.

The idea seemed to me to be a very good one and when I came home I worked on it a good deal. The first thing I made was a piece of black walnut about two inches long and five-eighths of an inch thick at the lower end. I grooved it to fit the curve of a bow-handle and fastened it on with adhesive tape. It worked perfectly and none that I made subsequently was as good. With it a 28-inch draw seemed almost as easy as a 27-inch without it and my accuracy seemed to be increased. Led on by this I glued large blocks of cork to both the front and back of another bow and carefully sculptured them out till they fit my hand exactly. Somehow I could not do so well with that one. I never used either of them in a tournament, though I could hardly say why. In fact I have shot with a regular handle for years past. Nevertheless the idea of a fitted handle is all right and may be used with assurance by anyone who needs to lengthen his draw or who can shoot better that way.

The jointed handle, making what Ford called a carriage-bow, but which we call a jointed bow, has been used for a long time in Belgium and France. In America Abner Shepherdson of Melrose, Mass., has invented and patented a jointed handle and makes a bow to fit it that is not excelled in cast or beauty by any in the world. It consists of a piece

of one and three-sixteenth inches (inside diameter) Shelby steel tubing, four and one-fourth inches long, which is covered with rough leather and held in the hand. Into each end telescopes a two and three-fourths inch ferrule in which a bow-limb is fitted.

Does it not seem odd that after having used all sorts of handles I should prefer to have none at all, but such is the case.

Now, after having said so much about handles in the middle of the bow, let us focus our attention on the ends and consider the subject of tips.

To my mind the only advantage of a tip lies in its æsthetic value. The bows of all savages and barbarians and even such highly finished weapons as the wonderful composite bows of the Orient have only nocks cut in the end of the bow itself, made for holding the string. They are exactly the same as any boy who whittles a rude bow out of a stick may make. There is nothing better except for looks.

In Northern Europe horn tips have been used on bows from very early times, I suspect almost, if not quite, from the time of the Conquest. Many bows were made with simple notches or with merely a metal peg in one side but, while I cannot quote positive authority, I am inclined to believe that horn tips were used too.

The horn tip permits of curving lines of graceful beauty, like a violin. It is cut in a pretty little twirl that fittingly ends the longer bend of the body of the bow. In Flanders it is often carved into the head of a cock or griffin with artistic effect.

Probably bulls' horn is the best thing of which to make a tip. Next to that comes the weaker horn of the steer or cow. Frentz stresses the essential, æsthetic fitness of things in advocating the use of horn on wood, both products of nature's growth, but I cannot deny that excellent tips may be made of compressed wood fibre and metal. Bakelite has also been tried

out fully but it is too liable to fracture if the bow be set down suddenly on a stone.

I have seen three kinds of metal used for tips. A bow of split bamboo, made in Brooklyn about 1880, which was once in my hands, had beautiful little tips of brass, plated with nickel. They were light, strong and pleasing to the eye and made me wonder why such tips were not in more common use.

A few years ago Palmer had a lot of tips cast in aluminum, at his place of business, from a model which I furnished. These also were excellent and many of them are in use on bows to-day. Recently the California By-Products Company have been using a little tip of metalloid which suits their ash bows very well.

In all metal tips it is possible to bore the hole with parallel sides, on account of the strength of the material and, for the same reason, they may be made very small and therefore light. Horn tips are drilled with a conical hole. It is surprising how much difference in the cast of a bow is made by the weight of the tips. Shepherdson says that a light tip improves the cast as much as would the addition of several pounds to the bow's weight, if that were possible. In any case they should be as small as they can be made and, for the same reason, I repeat that a bow will shoot fully as well, or even better with no tips at all.

Regarding the length and shape of the two limbs I will not speak here because those subjects are fully covered in the directions for bow-making.

As is mentioned in several other places in this book, and as is obvious to anyone by taking a little thought, the back of a bow is stretched and the belly compressed when a bow is bent. Anyone who has made himself a bow of almost any of the woods which have a distinct line of demarkation between the sap-wood and the heart wood knows that the sap-wood comes off under the spoke-shave in long flexible shavings which will

stand considerable stretching. In some woods the heart will do the same but in others it will be short and friable, but hard enough to stand compression well.

For these reasons a yew bow is made with a thin back of sap-wood and a thick belly of heart wood and this plan is followed with many other kinds of timber.

It is not always necessary to do so, however, and especially I think that proportion may be disregarded in making bows of the wood which I set next to yew in merit, namely the Maclura aurantiaca, or osage orange.

This is a wonderful wood, almost, but not quite, equal to yew itself. It grows over a wide area in the United States, partly because in some regions it is indigenous and partly because of its extensive use years ago for making hedges. In many places these old hedges have been neglected almost ever since they were planted and the trees are six or more inches in diameter. Everybody knows the tree, with its great, round, sweet-smelling but utterly useless fruit.

The sap and heart are very distinctly separated both in color and texture, the former being almost white and the latter a rich, tawny yellow. In fact during the war, when we heard so much about dye stuffs that our minds ran along those lines, I made a good mustard colored dye out of an infusion of chips and dyed a piece of wool with it. One of the best bows I own is of osage orange. My friend, the late Mark Mauser, made it out of an old log which had lain on the ground behind his place for at least eighteen years and was even partially decayed on the bottom, though the top was as hard as iron. It was his first and only attempt at the bowyer's art and a rough looking weapon it is. I think I counted sixty-four checks in its back, it is crooked in all directions and when drawn bends almost as much sideways as in the true plane, and yet such is the spring of the wood that I have twice won the flight shoot with it and have made a winning score of over 1,000 in the double York Round. This bow has no sap-wood

at all and neither has another, but weaker, one made from the same log and yet the cast is all one could wish to see.

Pope's experiments with yew seemed to prove that the cast is all in the heart and the function of the sap is to prevent breaking. The maclura is so tough that it will not break anyhow, so there is no need of the sap. In Southern Missouri and that general part of the United States it is common enough to be used for fence posts and I have no doubt that with an increased demand dealers can be found who will supply billets fit for the bowyer's use.

This disregard of the sap-wood also applies to the wood which I name as third choice and of which the vast majority of commercial bows are made. In fact I do not believe it has enough sap-wood to take into consideration.

I refer to what is called lemonwood by the trade but which in reality is Degame or Calycophyllum candissimum D. C., as I have been informed by the Smithsonian Institution. It has nothing to do with lemons and in the log with the bark on, suggests cedar in its external appearance. Inside, it has no resemblance at all to cedar but is of a light yellow color, has a very fine close grain that you can hardly see and is moderately heavy, weighing about forty-nine pounds per cubic foot when dry. It is almost always confused with lancewood. Bows are very easily made of it because the grain is so close that even if it be disregarded to some extent they will still give good service.

Because I put two other kinds of wood ahead of lemonwood does not imply that it should be awarded scant merit in your estimation. Bryant used a lemonwood bow when he established the record for the American round in 1912, although he had plenty of yew bows to use if he had chosen to do so. Jiles, to my personal knowledge, has owned lots of yew bows and has even made a great many of them, yet he has practically given them up and uses bows of lemonwood.

When he won the championship in 1924 he did it with a

lemonwood bow, his reason being that he thinks it is steadier than yew in changes of temperature.

Lemonwood is much the best wood to furnish to boy scouts or to manual training classes. It can be bought very readily, cut into staves which do not need too much finishing, and is easy to work.

Lancewood is almost exactly like lemonwood and everything that I have said about the latter will apply to it equally well. As described by the Smithsonian Institution it is:

"Lancewood,—Guatteria virgata Dunal. Range—Honduras, the West Indies. Wood yellow, weight 52–63 lbs. per cu. ft., elastic, hard, fine-grained. Used for shafts, bows and arrows, fishing rods, spars, lances, etc."

Ash was much used for bows in mediæval England and appears frequently in the laws regulating the practice of archery. In modern times it has been popularized again by its having been adopted by one of our largest manufacturing firms as their standard wood for moderate priced bows. It is a durable wood, very well suited for routine work. It has a good cast and does not break easily, although it is not equal to the other woods which I have already mentioned.

When a bystander who knows nothing of the art of shooting approaches an archer, with his cheeks fairly bulging with questions, the first is whether the string be made of catgut and the second if the bow be made of hickory. The Indians used hickory perhaps more than any other one wood for their bows and for what is probably the same reason it is the wood of choice for the toy bows of boys. The first bow I ever drew was made of hickory for me by an old negro servant and for its kind it was a good little specimen.

Undoubtedly its popularity is due to its toughness, which excels any other wood with which I am familiar. If you pare off a sliver of hickory from a stave that has been properly seasoned you can pull on it with incredible force before it breaks.

Hickory wood can be seen with the naked eye to consist of

alternate layers of dense and porous ligneous tissue. Some think that the spongy layers are crushed by continuous shooting but it seems to me that if this were so it would chrysal, which, in fact, it is not particularly liable to do. Rather do I think that there is a naturally slower spring inherent in it, a more sluggish resiliency than in lemonwood or yew, for though a very fair bow can be made of hickory it will never be quite equal in cast to a similar one made of the other three woods.

Palma Brava has recently been put on the market.

I have never made a bow of it myself so I can judge of its merits only by report and inference. It is quite true that savage tribes use thousands of bows made of palm wood and it is also true that none of them shoot as well as our bows do. Yet here the design of manufacture enters into the question even more than the nature of the wood. Dr. Pope told me that he thought it was a good sturdy wood of very much the same qualities as hickory when used in self-bows, that it was sluggish in cast and heavy in hand and yet, withal, was a good wood, by no means to be despised.

When it was known that bows of extraordinary strength, to be pulled against the feet, were to be used in the flight shooting contest of the national tournament of 1925, Mr. Knight, who is a bowyer of great experience and skill, purchased a stave of Palma Brava and fashioned it into a perfect weapon of Hercules. To his great disappointment it did not cast so far as a good yew bow of fifty pounds and he did not bring it into actual competition. It is safe therefore to assume that while Palma Brava, on account of its reasonably good springiness, straight grain and durability may be a useful wood for bows intended for summer camps, boy scouts and the like, it will never prove a serious rival of yew, osage orange and lemonwood in the hands of experts.

Leaving self-bows and taking up grafted self-bows we come to a more restricted field. Of course any kind of wood can

be grafted with another piece of its own kind or with another sort of wood, though I have never known the latter to be done, but there is no need for doing so in wood which can easily be obtained in full length staves. Why should one graft Palma Brava when the tree grows as high as a house and as straight as a flagpole?

Grafting is almost entirely limited to yew, partly to match the wood but usually because it can be found only in short lengths. However, grafting does permit the setting back of the two limbs so that their backs make an obtuse angle with each other, or, in other words, form a reflexed bow. Whether reflexing a wooden bow is advantageous or not is a question which gives rise to such differences of opinion that it may never be unanimously settled. Perhaps it depends on how the bow is to be used. For target shooting I personally like to have my bow strung considerably higher than the classical fistmele, usually seven or seven and one-half inches, and this is more safely done if the bow have already followed the string so that there is a space of a couple of inches or so between the handle and the cord. A reflexed bow has the tips so far behind the line of the handle when it is new that even if it be bent a little from use the line between the tips will not come much, if any, beyond the grip and high stringing will therefore put it in greater jeopardy. Thomas Waring's book which was published in 1822 contains the excellent aphorism that a bow fully drawn is seven-eighths broken, for it is true that if a bow of yew which is made for a twenty-eight-inch arrow be extended to thirty-two inches it will often break. Of course high stringing has much the same effect as over-drawing and is more likely to be a cause of breakage during the draw in a reflexed bow than in a straight one. Ford says that all reflexed bows kick in the hand. He knew much more about it than I ever shall but nevertheless I am sure that I have shot some reflexed yews which were very sweet.

I do not think that enough attention has been paid to the

danger of a grafted bow's coming apart in the handle. In my own experience I have had four grafted yews and one grafted lemonwood, two of which were made by professional bowyers and the other three by well-known amateurs whose names are frequently mentioned elsewhere in this book, come wholly or partially unglued in the fish and break there. In this list I do not include many other bows made by inferior workmen, including myself, which have suffered a like fate. In justice I must say that I have never seen this accident happen to a bow made by Barnes, nor to the best English bows. English books are always speaking of ways to keep the dampness from a bow. In this country we not only have to guard against dampness but also against dryness. If a bow be kept in one of our hot, steam-heated houses all winter, it will dry out so that the tips will often be loosened and drop off. Such shrinking must put an undue strain on the surfaces of the joint too, I should think. On the other hand a week such as we passed through here a fortnight ago from the time I am writing, when the thermometer averaged ninety-eight in the shade and 120 or so in the sun, and when the humid air felt like a steam bath, is enough to soften almost any glue sufficiently to cause it to slip under the strain of shooting. I remember that we had a hot, humid spell before the tournament of 1920, in Wayne, which proved too much for several grafted bows belonging to our local archers. This danger is sufficiently real to act as a considerable factor in influencing my choice for a self-yew.

A good backed yew bow without a grafted handle I have never seen, although I have seen many good backed grafted bows and one made by Barnes I used to call my $1,000 bow, because I liked it so much. It was a yew-backed yew, which Ford says is the best possible combination, and I am sure that a self-bow could have been no better. Finally it cracked in the back and was ruined.

When archery was in its hey-day in the '80's, it must have been the fashion to use backed-bows. I have seen any number

of them and have owned several myself. The backs were usually of hickory, though sometimes of lancewood or lemonwood, and the bellies were as often made of one of the tropical hardwoods. A friend of mine who has spent much of his life as a civil engineer in South America, mostly in the Argentine, tells me that there is only one tree on the continent whose log will float, a worthless palmetto. All the others, which compose what are possibly the most extensive forests in the world, are so heavy that they will sink. One of them is so dense that it is used to replace bronze bearings in machinery and must be worked with tools intended for metal. Many of these woods are familiar to us from their use in the manufacture of billiard tables and cues. I believe that a great many of them would be very good as the bellywood of backed-bows but I am familiar with only a few of the commoner ones, which are also much used for fishing rods.

Beefwood is the name given to a dark brown wood which has the color of dried beef. It is used more than any other for footing arrows and is also made up into bows. When I asked the Smithsonian for a scientific description of it I received the following:

"Beefwood in Trinidad is Rhopala montana, a valuable timber; but in Australia the name is hopelessly vague, being applied to members of four genera, Banksia, Grevillea, Hakea, and Stenocarpus, and to several species of the widely differing genus Casuarina.

"Bullet-wood, Mimusops globosa Gærtner, of Surinam (Dutch Guiana) is also called Beefwood, and since its uses are similar to several of the woods for which information is sought, may be the one desired. Wood very heavy (63–80 lbs. per cu. ft. dry), straight and close grained, strong, easily worked. Used in house building for beams, floors, and millwork. Used also for shafts and bending." I believe this is the one we know of.

Greenheart is another wood which I have quite often seen

in bows. I once owned a flight bow made of it by Duff. As an example of its durability I have been told that the docks at Liverpool were made of it in the eighteenth century and are in good condition yet. It is very elastic and makes fine fishing rods. Smithsonian reports:

"Greenheart, Nectandra rodioci schomb. Range—Northeastern South America and the West Indies. Wood very heavy (58–76 lbs. per cu. ft.), hard, tough, strong and elastic. Used for piles, bridge and ship timbers, carriage shafts, fishing rods, etc."

Bethabara (accent on the penult) and Washaba (pronounced Wash'-a-baugh) are two names for the same wood. It also is a great favorite for fishing rods. Smithsonian:

"Washaba, Parinarium sp. Range—Guiana and Guadeloupe. Wood very heavy (about 55 lbs. per cu. ft.), moderately fine-grained, open, tough, elastic, works well. Used for furniture and cabinet work, bows and fishing rods."

This by no means exhausts the list of woods available for bow-making. Black walnut backed with hickory makes a good bow and a very pretty one.

Mulberry is botanically affiliated with osage orange and may be worked in much the same way, though I believe a little sap-wood should be left on the back.

Red cedar makes up very much like yew, though it has not so good a cast. An old doctor from Philadelphia used to shoot with our Wayne Archers occasionally who used a great cedar bow backed with rawhide which he had made more than thirty years before. It was light in the hand but looked oddly thick, because the soft nature of the wood necessitated considerable bulk to give it the required strength.

Without going into details, some of which would be more or less conjectural, it is enough to say that one may use sassafras, black locust, gumberry, hornbeam, several of the so-called ironwoods, elm and many other trees. For one who loves tools and likes to experiment there is much fun to be had in

making bows of different materials. The great requisite is proper seasoning and the most annoying fault of our native woods is their frequent liability to chrysal.

A logical extension of the idea of increasing the strength or durability of a bow by backing it might naturally lead to experimentation in lamination or making a bow of many thin layers of wood. For example Will Thompson wished to find out just how much cast lay in the sap-wood of yew and so, to settle that much-mooted problem beyond further dispute, he ordered Mr. Barnes to make him a bow by laminating strips of yew sap-wood together. It was a complete failure, according to Dr. Pope.

In my possession are a dozen or more bows which were made by Matthias W. Baldwin, the founder of the great Baldwin Locomotive Works in Philadelphia. I bought them at a public sale a few years ago, together with many arrows, a belt and quiver, of the short style which was called a " well," and some other things which he used as a member of the United Bowmen of Philadelphia. Evidently the mechanical genius which bore such rich fruit in his profession found relaxation in experimental bowyery for such a variety of laminations I have never seen elsewhere. For example four bows taken at random were built like this:

Bow A.

1. Rawhide back.
2. Black Palm belly.

Bow B.

1. Rawhide back.
2. Strip of Black Palm no thicker than blotting paper.
3. Lemonwood, about one-fourth inch thick.
4. Black Palm.

Bow C.

1. Hickory back about one-sixteenth inch thick.
2. Yellow Pine.
3. Snakewood.

4. Lemonwood. The last three of nearly the same thickness.

Bow D.

1. Hickory.
2. Spruce.
3. Black Palm.
4. Lemonwood.

So I might go on through various permutations and combinations, some tipped with horn and some with bone.

I cannot see that one bow shoots much better or worse than another, among these of Baldwin. They are all thin, weak weapons, pulling about thirty pounds or so. The fundamental fault is that while they are made with a mechanical skill that few bowyers could equal, so far as smooth fitting is concerned, they are not thickened in the centre and consequently lose all their cast because they bend in the hand. However, I think that their sameness of cast does teach us that little or nothing is to be gained from mixing a number of woods together.

Perhaps there is no better place than this in which to speak of the prime necessity of having absolute rigidity in the centre of a bow. If there be any one predominant fault in the general run of cheap bows it is this central weakness which permits bending in the hand. The reason is an economical one; the need for much thicker bowstaves. Wood is the chief item of a bowyer's expenses, not counting labor and overhead, and it is a natural wish to make the supply go as far as possible. By cutting the staves so thin that they will suffice for the limbs but will not give quite enough swell for the grip he can skimp a few pennies but the quality of his output will suffer greatly.

I am sure that one of the reasons for the wonderful cast of Shepherdson's jointed bows is the absolute immobility of the steel handle. Yet even with such a metal joint a bow may have the characteristics of being weak in the centre if the limbs have not the right shape. This is the great fault with many

Belgian bows that I have seen. They are beautifully made and highly finished. The limbs are of backed hardwoods and in the process of gluing are set in a curved frame so that they have a gradually bending reflexion from centre to tip. Some of them are of enormous strength, even up to one hundred pounds, but their cast is very poor in proportion to their weight. One like that was used in the flight shoot at Boston in 1913. We all expected it to cast like the fabled weapon of Robin Hood but its performance was negligible. The reason for this lack of power lies in the fact that the Belgian bowyer apparently believes that a bow should describe an arc of a true circle when it is fully drawn. To get this result the limb must be of nearly the same thickness and strength for its whole length, even to where it fits into the metal handle. If those bows bellied out in the perfect lines which Shepherdson's artistic eye imparts to his their power would be vastly increased.

The proper weight of bows for different people and different uses is an interesting question and one which is instructive to discuss.

I began this chapter by advising the beginner, if he be of the stern sex, to buy a forty-two-pound bow and I think that figure is about right. If any change were to be made I would put it on the conservative side and make it two or even four pounds less. Most men can draw a bow of this weight with reasonable ease and for that reason can fix their attention on the development of technique, or correct form. If an archer be under too great a physical strain it is very hard for him either to focus his thought on details or to coördinate his physical powers to accomplish them.

For shooting the American round this bow will always be heavy enough, even after the archer becomes expert, although many men prefer to use heavier bows, both because they enjoy more vigorous muscular effort and because they think, whether rightly or wrongly, that with the flatter trajectory of a strong

bow they can make better scores. Nevertheless I believe that for distances up to sixty yards, except at the end of a York Round, a man of average strength should not burden himself with more than fifty pounds. Of course there are many exceptions to this rule. Dr. Crouch is a man of extraordinary strength, who can walk on his hands, for instance, but he made his world's practice record of 90–684 with a fifty-three-pound Shepherdson jointed yew. Professor Rendtorff made his equally wonderful 90–682, which many thought incredible until someone else did as well, with a lemonwood by Duff which was heavier when he bought it but which he scraped down himself to about fifty pounds. The extreme, so far as my knowledge extends, has been reached by Earl B. Powell, now associated with The Archers' Company, who shoots 100- and 110-pound bows while hunting and has pulled 127 pounds, Heaven only knows how.

Dr. I. V. Cole ranks next among our American Ulysses as he uses an eighty-five-pound bow. He could do just as well with half the effort if he pulled thirty pounds less but he is a he-fellow who likes to feel his muscles work.

In the York Round the use of a very strong bow is distinctly tempting and should be indulged in up to reasonable limits. If a man pull lower than the neck, or even if he have a tall tree behind his target for a point of aim, he may get on very well with a forty-two-pound bow. If he use the same draw for 100 that he does for forty, that is, as high as the chin, he will find much greater satisfaction in a bow of from fifty to sixty pounds if he be strong enough to control it perfectly. The test of this is the tournament. A man may favor himself on his home range by selecting a suitable background but where favoritism is scrupulously avoided, as in one of the big meetings, the targets are usually so placed that there is nothing behind them but a distressingly low horizon and the limitless vaults of cerulean sky. Many a strong man has failed to equal his practice records by not preparing for this contingency, and

has been obliged to aim high with a weak weapon when ten pounds more would have given him an aim on something definite. On the other hand there is nothing more fatal than to be overbowed. Any man may easily be decoyed into making this error, forgetting that because he can give a few mighty tugs when he is fresh it does not mean that he can last for a whole round. It is particularly an error which is apt to beset growing boys, whose muscles have not yet become as firm as their determination.

If a bow be for hunting it may be much stronger. Under the excitement of the moment, and for one or two shots only, a man who should shoot a forty-six at the target may loose a sixty or sixty-five-pounder at a deer. Hunting arrows are so much heavier than target shafts that strength in a bow is very desirable for big game. For birds and small beasts a light bow is better.

A bow for roving, or for any of the games derived from it, should be as strong as one can pull. Only one or two shots are required and great distance is the important factor, at least in the first shot.

I know of nothing that demonstrates the fundamental difference in the musculation of the sexes more than archery. A girl can always outdance a man, can often outwalk him, sometimes can drive a golf ball as far but she can never shoot in his bow. Neither is there any reason why she should, except in roving, because sixty yards at the target and 120 at the clout are all she is required to do at tournaments, even though she may essay a few Hereford Rounds for practice. Of course flight shooting is an entirely different subject and needs special tackle.

Very young girls of ordinary strength and children should begin with eighteen to twenty-two pounds. Twenty-five pounds, in the five foot six inch woman's bow gives an excellent cast for sixty yards. At thirty pounds most women be-

gin to feel overbowed and beyond this weight they should proceed with caution.

Unfortunately the weights which are stamped on bows are only too often misleading and more than half the time err on the heavy side by several pounds. Why the bowyers are so untruthful about the weight has always been a puzzle to me but so far I have found only one whose weights were proven correct on my scales.

It is a very easy matter to test the weight of a bow for yourself. All you need do is to drive two strong spikes into a post, or wall, about three inches apart, lay the bow on them, measure twenty-eight inches, or whatever the length of the arrow is to be, from the back of the handle, not from the nails, make a mark there, hook a 100-pound spring balance on the string and pull it down as far as the mark. The pointer on the balance will then indicate the correct weight.

The color of a bow is a matter of personal taste. The great majority are left in their natural tint, except for the varnish, or French polish, but I think the appearance of osage orange, lemonwood, lancewood and several other woods, may be improved by a coat of pure nitric acid. It does not burn the wood enough to make any difference in strength and it makes a rich, reddish brown hue without concealing the grain. If you are given to the arts of camouflage you can simulate the appearance of sap and heart wood by wrapping a wisp of cotton around a toothpick, or match-stick, dipping it in nitric acid and passing it along the bow, with the second finger sliding on the back for a guide, at about one-fourth inch from the edge, thus leaving a white back while you paint a brown belly.

As parting advice I would say to buy a weak and cheap bow to learn with, and spend your money on a good yew only when you can safely use it, keeping the first one to lend to the friends whom you will be sure to teach.

The arrow is even more important a part of the archer's artillery than the bow, for, as the Seminole bowman with

whom Maurice Thompson hunted in Florida said, "Any stick do for bow; good arrow damn heap work." This is a lesson that every beginner must learn.

If he blame his missed shots on his bow he is probably wrong in his diagnosis of the source of the trouble but if he blame the arrows he may be right. For example when some young ladies whom I instructed at Bryn Mawr College last year purchased the best footed arrows and substituted them for the selfs which they had been using their Columbias rose nearly 100 points.

In spite of this I would advise the beginner to get a dozen cheap self-arrows. The first dozen do not last long. It is amazing to see with what sagacity they search out every stone, target-leg and tree to hurl themselves against, either nose on or sideways. As with the bow, buy cheap ones, break most of them to pieces in learning your technique and then get two dozen of the best matched arrows that the market affords and if any of your old ones be left lend them to your pupils or friends.

In the chapter on how to make arrows I have said so much that there is no use in repeating it here. At present there are several American fletchers who turn out commercial self-arrows. These are very different in quality. Some are made of birch dowels and fill the vast need of an inexpensive arrow for use in camps, by beginners, in schools, by boy scouts and so on. There is a large field for the sale of thousands of dozens of such arrows and their manufacture should be encouraged by every archer. However, most of these arrows are not straight enough to make the best scores, although under special care in the making there are a few exceptions. The price of shafts of this sort is very properly kept low.

At about twice the cost of these is marketed another kind of self-arrow, which is made mechanically by an excellent patented process with which I am familiar, which is very well fletched, and which differs from the highest priced shafts only

in not having a foot. They are very good and should be used by college students and young archers who wish to shoot well but do not care to pay for the most expensive equipment.

The best arrow on the market is the standard tournament shaft. It is footed with hardwood, has a shaft of what the English books call "deal," which I shall discuss more fully, is feathered with meticulous care, has a nock-piece of horn or similar material, is very carefully painted, and, above all, is perfect in spine, weight and balance. I will confine the rest of my remarks to this kind of arrow, though, after all, there remains but little to say that is not included in the chapters on their manufacture.

It does not seem to me that it makes very much difference as to which kind of hardwood is used for the footing. Make your own selection, guided largely by your preferences in color.

As for the light wood used in the stele there can hardly be said to be such a wide choice. The old writers mention a long list of woods out of which arrows were made in their time but Horace Ford made a clean sweep of them all and said with emphasis to use nothing but *red deal,* even writing the word in italics. Deal is an ancient word in the Germanic group of languages and in its various forms means a board. In modern times it has been restricted to mean boards of fir or pine, similar trees in structure, and so, to us Americans who never use it, it seems too general in its application to be much of a guide.

Red deal, however, is specific. It means the Pinus sylvestris, which may be called Scotch pine or Norway pine according to where it grows. It is a noble tree, found from the British Isles to Kamchatka and as far south as the Pyrenees. Like all trees it grows more slowly in cold climates and on the mountain sides of Norway about four centuries are needed to make a tree three feet thick. For this reason the wood of the north is stiffer than that of trees of the same species which grow in milder climates and is better adapted for arrow shafts

than any other material which was available in the middle of the last century, when Ford wrote.

Our best American rival is the Port Orford cedar, about which I quote the Smithsonian report: "Port Orford Cedar—Chamæcyparis lawsoniana (murr) Parl. Range—Coast region from Southwestern Oregon to California, extending inland about forty miles. Wood light (about 28 lbs. per cu. ft. dry), hard, strong, very close grained, durable, easily worked. Used for interior finish and flooring, railway ties, fence posts, boat and ship building and matches."

Another of our woods which is not quite so good is Douglas fir: "Douglas Fir—Pseututsuga taxifolia Britt. Range —Rocky Mt. region in U. S., and northward to Central British Columbia; Pacific coast. Wood light (about 30 lbs. per cu. ft. dry); very variable in density and quality. Used for all kinds of construction. Known commercially as Oregon pine."

Black spruce, or Picea nigra, is the best wood which our Atlantic seaboard can put on the list. It is tough and strong and is used for many things in athletic games, such as vaulting-poles and canoe paddles. It can be found in most lumber yards.

All of these woods not only make good arrows but they make first-class arrows, the very best that can be bought, always supposing that the particular specimen be a good one.

Beside the bow and arrows the only thing that is absolutely indispensable to an archer is the string. By far the best ones on the market are made in Belgium. The process of manufacture I do not understand at all. If they are teased apart they seem to be made of unspun hemp or flax laid in glue. The eye and noose are formed of three twisted strands, just as our home-made ones are, but the foundation of the whole cord is the fibre itself and not spun thread, such as we use.

The best strings in America, that I know of, are made by Shepherdson and at my request he very graciously wrote a full description of his method for this book. It is so com-

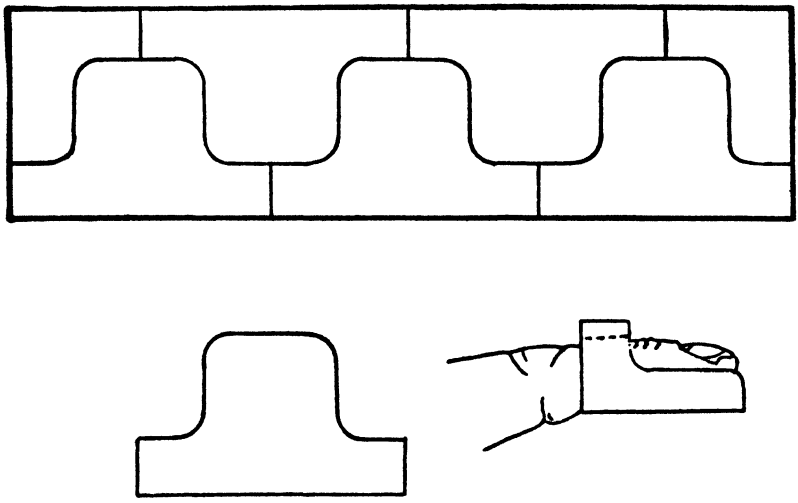
plete and perfect that I see no reason for making any comments on it except to give it the praise it deserves.

A hunter may, and can, so harden his fingers that he can shoot his occasional arrows at game without any protection to his skin. In a few rare instances men have shot through a national tournament with bare fingers, just to show what hardy fellows they were. There is no sense in it, however, and the pain soon becomes so great that even a Spartan would find his accuracy impaired. The Belgians wrap the cord above and below the nocking point with soft cotton string to a thickness of perhaps three-eighths inch. I have given this method some trial, though not exhaustively, and I have not felt that I could get nearly so clean a loose as with leather finger-tips.

Practically all English and American archers use finger-tips, either sewed on a glove or fitted like thimbles of various patterns. I used separate tips for several years but gave them up for the glove, which, however, I think is no better. The chief consideration in the selection of a glove should be that it fit tightly jammed against the ends of the fingers and to make sure of this most people should buy short-fingered, or cadet, gloves. The tip to be sewed on is cut from horsehide or calfskin, is wide enough to reach from one back seam to the other, long enough to reach from the tip where all the seams unite to the middle of the second digital phalanx and rounded at the top to conform to the shape of the finger. Before sewing them on they should first have their edges skived down and then be stretched and pressed over a little wooden form shaped like the end of a finger. It is still better to carve out a two-piece mould, lay the wet leather in it and leave it under pressure over night to get a good set. In sewing, take one stitch through the extreme tip to show the centre, then thrust either a finger of the left hand or a shaped stick in the glove finger to fill it out and mark with a pencil where the base-line should be. After that remove the stick and sew on the tip by whipping it over and over with fine stitches of linen

thread. To make the fit near the top take little tucks at each stitch by making the needle pricks farther apart in the tip than they are in the glove. The back seams should be followed all the way around.

Some archers like a parrot beaked tip sold in the shops and made in England. While I think that every man should act according to his taste where personal comfort is so nearly concerned, my own experience has been that unless my finger-nails are either uncovered or at most pressed on very lightly, as by the kid of a glove, they soon get very sore.



Making Finger Tips.

The best tip that I know of is simply a small tab of leather with the bottom elongated into two short straps which can be sewed together on the back of the finger. They are so easy to make that I often cut out a set for a friend in a few minutes before we shoot. To make them take a piece of leather two inches wide and as long as you please, though six inches is enough for one set. Draw a line one-half inch from each edge and parallel to it. Mark off the one-inch space between these lines by cross-lines at every one and one-fourth inch. To

make the cut use scissors; start on one parallel line and cut to a cross-line, follow the cross-line to the other side and cut along that parallel to the next cross-line, follow it over and so on. You will then have two strips of tips which you can cut apart, fit over the finger and sew. If the skin become sore in spite of the tips protect it with a layer or two of adhesive plaster.

The kind of bracer to buy depends somewhat on the physical configuration of the archer's arm and somewhat on the use to which it is to be put.

For hunting through underbrush it is best to have a large, strong cuff of leather or rawhide which is laced on the back of the arm, holds the sleeve tightly and will not catch in twigs, slip around on the arm nor get loose.

Some bracers are made of rawhide, without lacings or other devices to fasten them, and are expected to stay in place by their own springiness. In cold and dry weather these are all right but if they be worn through a protracted rain, or thoroughly wet as by falling into a stream or worn on a hot day until they are saturated with sweat they will become soft and will no longer hold tightly to the arm.

For target shooting many of these conditions do not have to be taken into account. In the cold weather, when one wears a coat while shooting, or in England where they are worn for traditional reasons, a cuff bracer is of advantage because of its firm hold on the sleeve. Yet a strap bracer does just about as well and is rather neater in appearance.

One must not forget that the string touches in only one place and that no great width of protection is required to keep it from hitting one's skin. In case of emergency even a lead pencil tied to the front of the forearm or held in place by a couple of rubber bands will give perfect protection. If an archer suddenly discover, at the beginning of a match, that he has forgotten his bracer, all he need do is to go to the nearest bush, cut a twig or two and stick them on his bare arm with adhesive plaster.

If an archer have a thick forearm which is apt to be hit by the string, unless he be very careful to keep it in exact line, it is well for him not to add to his girth at that point by using a bracer of heavy leather. In such a case one may be cut with tin shears out of sheet aluminum and pressed to the shape of the arm. It need not be more than an inch or inch and a half in width, with ears left on the corners in which holes are punched, or drilled, for elastic cords. I used one like this, but made of copper, at the Eastern tournament in 1925. Most of the archers had never seen nor *heard* a metal bracer and the loud noise made by the blow of the cord upon it kept many of them turning around to see what was breaking.

Sometimes leather bracers are made of split leather with metal inside.

Most of the bracers on the market are made of a piece of stiff leather about two inches wide and six inches long with two or three sets of straps either stitched to it or cut out of the piece. In purchasing one the archer should be sure that the buckles are in the back, well away from possible contact with the string.

Personally I like to use a quiver but many archers simply put their arrows in a trousers pocket. If you do use a quiver the English style which hangs from the belt by two straps and is exactly large enough for six arrows is quite all right. The only good quiver made in America at present is of soft leather and has a strap-loop on it through which the belt may be passed or by which it can be strapped over the shoulder in hunting. It is very good, although for target work it has the small disadvantage that it holds the feathers so close to one's back that they are likely to be mussed by the clothing.

If one do not care to carry his arrows on his person while at the targets it is a simple matter to stand them in some sort of a rest. The simplest kind is made by turning a loop in the end of an iron rod, bending it over at right angles and sticking the rod in the ground.

Although it is not literally a part of an archer's tackle the target stand may well be considered here. Stands are made of wood or iron. An iron stand as it comes from the shop in pristine nakedness is unfit for use, because of the frequency with which arrows break against it. However, if one take the trouble to cover the legs with rubber hose, or wrap them well with several layers of tarred string it becomes less of a menace.

The best stand is also the cheapest to buy or the easiest to make. It consists simply of three pieces of soft wood one by three inches and six feet long. Near one end a half-inch hole is bored and the three are loosely bolted together so that they may be spread out in a tripod. No special notch is needed at the top as the string of the target may be simply rested on the ends and will never slip off. To keep the stand from blowing over in a high wind tie a single rope to the apex of the tripod and drive it taut to the earth with a wooden peg. Stands are usually painted green but sometimes with the bright colors of the target face so that when a number are standing in a row the archer will not shoot at the wrong target.

The official target of both England and America consists of a painted face sewn on a straw back, or boss. The face is four feet in diameter and consists of a centre of nine and six-tenths inches diameter and four concentric rings, each four and eight-tenths inches in width, painted respectively from within out, gold, red, blue, black and white and valued 9, 7, 5, 3, 1.

It is interesting to note that the correct proportions between the sizes of the different rings may be proven very simply, by mathematics, as follows:

A circle $=\pi R^2$. Therefore circles are to each other as the squares of their radii. Each ring equals a circle of its outer diameter minus a circle of its inner diameter. Therefore, with unity as a modulus, the target is: 1, 4–1, 9–4, 16–9, 25–16, or 1, 3, 5, 7, 9. By inverting these we have a basis for scoring which has always proved satisfactory and which I hope no one will ever try to change.

In buying a target it is a good plan to test the solidity of its boss by trying to bore your index finger through it. If you can do so it is not good enough.

If you wish to make a target boss yourself, a feat which requires great strength of hand, be sure to use rye straw, which has a much longer and stiffer stalk than wheat. Threshed straw can be bought almost anywhere, in bales, but unthreshed straw, which is much better, is not so easy to find. One place where it may be bought is a factory of horse collars.

The face should be made of sign cloth, which takes the paint perfectly and is not shiny, and the paints should be dull. Nothing is more annoying than a target which glistens dazzlingly in the sun.

To begin a boss squeeze as much straw as you can to a four-inch diameter and bind it with strong tarred cord, such as gardeners use. When the length is about two and a half feet double it over on itself and sew it firmly together with a whip stitch, using the tarred cord and a large curved sacking needle eight inches long or a mattress needle. By feeding more straw into the rope, always keeping it four inches thick, and sewing round and round, you finally, with much sweat of the brow, find that the diameter has reached four feet. In principle it is easy to understand but in practice it is hard to do. The main point to remember is that the first piece, in the centre, must be long. If it be short and sharply turned on itself the middle will be weak. With such an elongated beginning an ellipse would be formed if the straw were always kept of the same width but the shape can be brought to circular by using judgment and widening, where required.

It has always seemed to me that target-making would be a good trade for blind men. It is much easier than chair-caning and I should think would produce a better income.

Some of the best English manufacturers of targets use a simple mechanical device which ought not to be difficult to construct and which I think would not only reduce the physical

labor very much but would also result in a tighter and better product than would be possible by the use of the hand only. Perhaps it explains why the English targets can be so thin and yet so firm and lasting.

It consists primarily of two wooden wheels, each more than a foot in diameter and with heavily concaved edges about four inches wide. These wheels run edge to edge, one on top of the other, like a rolling mill for iron.

They are slowly turned by a boy, who also feeds in the straw. As it comes out of the groove, compressed into a hard rope, it is immediately sewn down to the target by the chief maker. Just how these wheels are mounted, or how the machine is kept close to the work, I have not been able to learn, but I should think that any ingenious person, knowing the general principle, could work out suitable details without great difficulty.

A target should be put under cover when it is not in use because a few alternate wettings and dryings will ruin it in an unbelievably short time. If circumstances require that it be left out, as in the case of ladies who find it too heavy to lift, it should be covered with oilcloth or tarpaulin.

On permanent ranges it is well to use butts. They are easily made of three superimposed bales of straw, kept from falling by a piece of pipe or an iron fence-post driven behind and tied fast. As the three iron wires which fasten a bale of

Butt-Shooting in the Thirteenth Century.

straw are liable to break, through rust, or accident, the bale should be reinforced with bands of galvanized wire before the face is sewed on.

The old English butts, which were nine feet wide and seven feet high and four feet thick, were made of sod, a very good but expensive thing in modern times.

X

MAKING A YEW BOW

By Edward W. Frentz

Picture to yourself, you lovers of the longbow, a young fellow in his early twenties standing on the threshold of a dimly-lighted shed, the door of which has just been opened, and letting his eyes rest upon what seems to him an innumerable army of six-foot yew staves, all in the rough, with the bark on, but all thoroughly seasoned. In his heart is singing the knowledge that one of those staves is his, and, what is even more alluring, that it is his privilege to choose it from among all of them. Having made and used bows of other material for some ten years, he has at last determined to have a yew bow. The catalogue of one of the great sporting-goods houses of the day had advertised " self-yew bows of our own make," and reasoning with marvellous accuracy for one of his age, the young man had reached the conclusion that if the house made yew bows it must have yew wood to make them of. Accordingly he has journeyed from the little Massachusetts town where he is teaching school to New York City and there interviewed the head of the firm, only to learn that the wood was all at the factory in Rhode Island. But he came away from the interview with a note to the manager of the factory containing permission to pick a stave for a price named, and now, on the following Saturday, his first free day, he stands at the open door of the shed. The Argo has come to port: he has found the Golden Fleece. It is now forty years ago, yet never since then has he had a more delightful thrill or known a happier day than the Saturday spent in that dim and dusty shed in Pawtucket.

There are several reasons why the fascination of making

bows never loses its hold upon those whom it has once gripped. To the man of sentiment and imagination there is an indefinable attraction in doing something that his prehistoric forebears did in the dim ages when the whole earth was a wilderness and game was the chief source of food, and in doing it with the same tools; for our saws and planes and draw-knives and spoke-shaves and files and scrapers are after all but modified—and more efficient—forms of the flint knife, the obsidian scraper, the piece of sandstone and the strip of shark skin. There is also the anticipation of ownership. A good bow is an alluring weapon and a delightful implement of sport, yet hard to buy; and a fine yew bow, a thing of beauty in the hand and a joy in the field, is almost impossible to find ready made in the shops. Finally, there is the satisfaction of working out a difficult problem, for every stave of yew is a new study. One stave differs from another in character as one star differeth from another in glory. Each must be handled according to its individual characteristics. The game is always new.

It is of little use to tell the amateur who wants to make a yew bow that he should choose "a perfectly straight stave at least six feet long, of fine grain, dark color, and free from knots, pins, and pitch-sockets." Unless he lives in Oregon or California, or can go there and cut his own timber, he must depend for his stave upon what some woodsman sends him, and make what he can of it.

Nevertheless he should know the chief quality or qualities to look for, and the way to learn them is so simple that it is amusing to see how persistently writers on bow-making have ignored it.

What you chiefly require in a bow is cast and durability. If you are to have them in the bow they must first be in the wood, and no test that the eye alone can make is to be trusted. The stave may be dark-colored, fine grained, free from knots and other blemishes, and yet be of little worth. The only trustworthy test is that of the knife. Shave or split off long,

thin slivers from the heart wood on the inside of the stave, and subject them to the same treatment that the bow will get; that is, hold the butt end between a thumb and a finger, bend the other end down *toward* the side that the knife blade just freed and loose it sharply. Repeating that a few times will show you both how tough the wood is and how springy, and that is all that you need to know in order to foretell the quality of the bow. The reason that you should bend the sliver so that the newly cut surface shall be the concave side is that the knife almost always leaves that side full of little cracks that will break the sliver if you bend it with them on the outside.

The best yew, generally speaking, is that which whittles most easily. The shavings follow the knife from end to end of the stave without breaking, and you could make a good bow of such a stave even if you had no tool but a knife. Indeed, one bow that I made from such wood thirty-five years ago with no tools but a pocket-knife and a file is still in use, and has won the flight shot for women five times in national tournaments.

But there are also tests of the eye that should not be neglected. Freedom from knots, pins, checks, pitch-pockets and other blemishes is, of course, greatly to be desired, and so is a reasonable fineness of grain. A rich, dark color adds much to the beauty of the finished weapon but has no other value.

The quality of grain that I like best is that in which the line of demarkation between sap and heart is sharp and clear, and the lines of annual growth when viewed from the side are distinctly marked, sharply separated one from another, and with none or few of those darker flecks running at right angles to the grain that cause some woods (beech, for example) to be known as "shot." Wood that has flecks usually makes a bow that is light in the hand and soft and "sweet" to shoot, but generally it is lacking in stamina, is inclined to follow the string and is seldom very long-lived.

The worst yew in the world is the yellow, coarse-grained kind from which even a sharp knife can hardly cut a shaving

of even thickness, because the blade keeps dipping in or running out. The sap-wood is yellowish, and when cut shows distinctly marked "feathers" like those in the freshly-cut sap-wood of green hemlock, and is hardly distinguishable in color from the heart. It is wood that grew at sea-level or near it, and is sure to show its base origin in its character, for it will be slow and weak of cast, will warp and twist like a fresh-caught trout in the frying-pan, and will take on a new shape with every change of temperature or humidity. If you are so unfortunate as to get any yew of that kind, even as a gift, put it straightway into the fire. Thereby you will save the time it would have taken you to make a bow of it.

Two other things should, if possible, be taken into account in judging yew: the time of year at which it was cut and how it has been seasoned. The first you cannot tell from the looks: you must take the word of the man who cut it. My own preference is strongly for winter-cut wood. It seems to me to be stiffer, more virile, more durable, and to keep its shape better. As for treatment since the wood was cut, you can usually tell whether it has been seasoned in running water by a certain gray tinge in the sap-wood and often, indeed nearly always, by a purplish stain running along where the sap-wood joins the heart. Such wood has lost something. The horse may have been "broken," but his spirit has been broken, too. He will do your bidding, but he will do it in a half-hearted and listless way. A bow made of water-seasoned yew is well enough to potter away with at a target in the American Round; indeed, it is usually steady in the hand and pleasant to shoot, but it will follow the string and be deficient in cast at the longer ranges. The late Mr. Barnes used to maintain that a bow made of wood thus seasoned would not go down in weight in hot weather. The reason probably is that it loses so much in the first few days' shooting—assumes such a stooping and senile shape—that there is no room for any further decline.

I believe that there is no other way to season yew for bows

so good as letting it dry naturally, in the air, but the five years customary with English bowyers is by no means necessary. Leave the wood, with the bark on and the ends painted, for three or more months in a room where the sun cannot strike it and where there is no artificial heat. Then remove the bark; and as you will probably have to make a spliced or grafted bow, since six-foot staves are seldom to be had, saw your billet in two, lengthwise, with due regard to whatever flaws may appear on the back, reduce the two halves nearly to the size you want them, and leave them for another two or three months in a room that is warm but not artificially over-heated, such as an attic in summer. They will then be seasoned sufficiently to work.

The first step in making a bow is to form the back of each stave by reducing the sap-wood with a sharp draw shave to a thickness of a quarter of an inch. If it was not thicker than that to begin with, remove nothing but the bark. The main thing is to *follow the grain* and reduce it evenly. Every break in the continuity of the grain of the back is a source of weakness and the possible birthplace of a sliver. The humps and hollows that may result from following the grain will do no harm. If there are small knots that cannot be avoided, "raise" them; that is leave a little more wood round them, so that they stand up like little pustules.

Having made the back of the staves flat across and straight or undulating lengthwise, as the wood dictates, square the staves to a diameter of about an inch and a quarter in both directions, that is from sap to heart and from side to side; the size must depend somewhat upon the density and stiffness of the wood, of which you can judge by whittling it. On the back of each stave draw a line lengthwise through the centre.

Making the splice for the handle requires accurate laying out and careful workmanship, for the joint must be perfect or it will give. From thin, tough cardboard cut a strip as wide as the staves and two or three feet long. Draw a line

lengthwise through the centre of it and about midway between the two ends lay off a space four inches long by drawing lines at right angles across the strip. Within that space of four inches draw a W as wide as the strip and four inches deep, having all three of the entering angles equal to one another. With a sharp knife cut along the lines of the W until it separates.

You will now have two strips of cardboard that when placed together fit accurately one to the other and form a continuous strip, as at first. Paste one of them on each stave, with the points of the W flush with the end of the stave and the centre line on the cardboard exactly coinciding with the centre line down the backs of the staves. If now you cut the wood accurately to the lines of the W the splice will fit and the glued stave will be straight.

You can best do the sawing in a metal mitre box held in a vise. Set the guide to cut at right angles and clamp the stave to the back of the box in such a position that the path of the saw will lie along one edge of the W. When you have cut that edge, shift the stave to bring another edge in line, and keep on till you have cut both parts of the W. The two staves should now fit into each other and form one straight stave six feet and an inch or two long. The best saw for the work—in fact the only one that will do a good job—is a sharp backed saw wide enough to reach the bottom of the cuts and filed as a professional saw filer will do it if you tell him you want it to cut diagonally at a long slope.

I have never been able to see why, as some bow-makers advise, the W that forms the splice should be carried only to within an eighth of an inch of the edge of the stave instead of to the edge itself. The only possible advantage is that it obviates shortening the outside arms of the splice if the width of the stave prove too great for the desired weight, and it has disadvantages that more than counterbalance that. The direct cut across the grain for an eighth of an inch on each side

weakens the joint by twenty per cent., and if the two square ends on each side butt together, as in a neat joint they should, the butting exerts a powerful prying force that tends to open the joint. It is unscientific and unnecessary.

If the splice as it comes from the saw does not fit, it will be necessary to bring the surfaces into contact by filing them or grinding them down with sandpaper. Since knife files thin enough to reach to the bottom of the cuts are hard to find, the sandpaper offers the easier course. Plane strips of tough wood twelve or fourteen inches long to a width of an inch and a half or two inches and a cross section like that of a thin knife blade, and on one side glue rather coarse sandpaper, say No. 2. Make some of the strips right-handed and some left, but leave one face of each strip bare, as in a file that has a "safe" side. With such floats you can reach the bottom of the cuts and work the surfaces to a perfect fit.

Glue is the bow-maker's best friend or his most insidious enemy, according as he selects it wisely and uses it right or otherwise. There are but two kinds that he can trust in the joint of a grafted bow. One is that which comes in hard, golden-brown translucent sheets—whether it be American, French or German does not matter; the other is the waterproof casein glue that is made from sour milk, and that comes in the form of a fine white powder like plaster of Paris. It was first produced, I believe, at the government laboratory at Madison, Wisconsin, and was extensively used on the woodwork of aeroplanes during the war. Besides great strength it has two other advantages: it is used cold and it sets very slowly. As evidence of its waterproof quality, I may say that after soaking in hot water for two days a joint that I made with it five or six years ago, I was unable to loosen its grip, and finally had to saw the joint apart. Directions for using the glue come with it and should be closely followed.

If you use the common sinew glue, put a little isinglass with it—say perhaps a tenth, but don't confuse isinglass with mica.

By isinglass I mean the product made from the sounds of a fish. Even by itself it is one of the strongest adhesives known, and a little of it mixed with common glue makes the glue less brittle.

Break up the glue into pieces that will lie flat in the inner receptacle of a double boiler type of glue pot, barely cover it with cold water and let it soak over night. Then bring the water bath to a boil and keep it hot till you are done with it.

The best English bow-makers use only newly-melted glue for the joint in a bow handle, but my own preference is for the second heating. The glue is then better amalgamated with the water and of a more even thickness. When ready to use it should be about as thick as good molasses (if there is still any such thing in existence) in the summer. Have both halves of the joint as hot as you can get them, spread the glue over all the surfaces that are to be in contact and bring the faces of the joint together instantly. On each side of the joint place a strip of hickory or other tough wood as wide as the bow is deep, and four inches long, and then apply all the pressure that you can get from three five-inch iron clamps. As you begin to tighten the clamps, see that the bow lies straight, one limb with the other; and, if the shape of the wood permits, that the limbs set back a little in the handle. In other words, " sink " the handle a bit; it makes a better looking bow.

Having made the joint, put the bow away for three or four days, or better still, a week, in a dry but not too hot room, and let it alone, the clamps still on it, of course. The outside surface of the glue may seem hard long before that, but it takes the inside longer to dry than you would suppose.

At last comes the glad day when you can begin the work for which everything so far has been only preliminary: the actual making of the bow. As yet you have made only a six-foot stave.

Plane off the excess glue from the sides, back and belly of the stave, and sight down the back of it to see if the two longi-

tudinal lines on the backs of the limbs now form one straight line through the whole length of the stave. If they do not, erase them and draw a new one. We have purposely left the limbs of full width clear to the ends so that we should have something to "come and go" on if the stave should not be quite straight after the limbs are glued together.

Now at a point at one end of the splice or a very little below it, draw a line across the back, to mark the centre of the bow. From it in both directions measure off three feet and one-half inch, and saw the stave off at those points. The half-inch allowance is for those portions of the bow that will enter the horns beyond the nocks; thus the bow will be exactly six feet long from nock to nock. In laying off the limbs, it is better, if the wood permits, to let the two-point end of the splice—the end that corresponds to the bottom of the W—come at the upper end of the handle, since that is the point of greatest stress. So placing it makes a little stronger joint, but the difference is slight and the arrangement may be disregarded if the length or character of the limbs makes it inconvenient.

I am aware that in advising that the upper end of the splice, or a point very slightly below it, be made the centre of the bow instead of a point an inch or an inch and a quarter below it, I am running counter to nearly all other writers on the matter, both English and American; nevertheless I rest my case on experience. I have found bows so made to be steadier in the hand and freer from jar, and to suffer nothing in cast. If you own or have access to a copy of Ford on archery, open it at the frontispiece, which is an engraving made, as Major Fisher says in his charming little sketch of Mr. Ford, from a photograph. In speaking of Mr. Ford's having broken a bow, Major Fisher says: "It was the very bow itself which remains in his hand and bends to this day in the accompanying illustration (a reproduction of the frontispiece just mentioned). I can remember that bow well, and a fine self-yew it was, of Buchanan's make, and of fifty-four pounds." Now with a

pair of dividers measure from the nocks of the two horns of that bow to the nocking point of the arrow on the string. You will find the distance from the upper horn to be the same as that from the lower horn. The arrow crosses the bow at the centre and not "an inch or an inch and a quarter above it." Since the camera had not then learned to lie as skillfully as it can now, I think I am warranted in believing that Mr. Ford's bow was made as I suggest that we make ours.

We lay out the back of the bow by drawing on each limb two lines that begin at the edge about a foot above and a foot below the handle, and curve in, very gently at first but more rapidly in the last eight inches, until they reach the ends of the limbs at points five-sixteenths of an inch from each side of the line down the centre. That leaves the ends of the bow five-eighths of an inch wide. We now plane off all the wood outside those lines.

To determine the shape of the bow as seen from the side, we begin at each end of the splice and on each side of both limbs draw a curved line that four inches from the end of the splice will be one-eighth of an inch in from the edge of the belly and at eight inches a trifle less than one-fourth of an inch in. From there on to the ends it should be as nearly straight as the shape of the back will permit, but all the time approaching the back at such an angle as will leave the bow five-eighths of an inch deep at the ends. The next thing is to remove the wood outside those lines, round the belly roughly with a draw-knife and a spoke-shave, and take off the sharp edges of the back with a small block plane.

In rounding up the bow, even in the rough, great care is necessary not to let the tool run in and start slivers. Where the grain shows a tendency to tear, the spoke-shave is safer than the draw-knife, and the rasp or file safer than either. It is better to proceed a little more slowly than to spoil a good stave.

From now on, making the bow is chiefly the task of re-

moving wood from the right places, and principles are worth more than minute directions. The thing to keep in mind is that every inch of your bow from the horns to a virtually unbendable middle of eight or nine inches should *work*, and that every inch should do its just share of work—no more and no less. To produce that result each limb should taper toward the horn by exactly the right amount of reduction. A calliper rule moved along the limbs should find no spot that is not a trifle less deep than every other spot nearer the handle. If the limbs are irregular in shape or if the sap dips deeper into the heart at some places than in others, it is difficult for the eye to determine whether the taper is even or not; but holding the bow against a window in the daytime or against a light curtain at night will show it in silhouette, with the sap and the heart no longer distinguishable. Irregularities in the taper can then easily be detected by the eye.

A bow for hunting should have a little different lateral shape from one intended only for fine target shooting. In target shooting a very desirable quality is evenness of pull from beginning to end. There should be no "hard place" in the last two or three inches. Otherwise it is difficult to make the draw of exactly the same length every time. That evenness is best attained by making the reduction from the unbendable portion a little quicker, or in other words shortening the unbendable portion a little. In hunting, on the other hand, the draw is usually quicker—more of a snatch—and an increasingly stiff resistance at the end makes for steadiness. It is just the difference between a set trigger on a rifle for fine target shooting and the four- or five-pound pull that most men prefer in the field.

The proper shape for the cross-section of a bow is the subject of a wide difference of opinion. A back rounding to the curve of that part of the tree from which it was taken, and having rather sharp corners, is, I have no doubt, the most logical shape, but to me it always looks awkward and amateur-

ARTHUR YOUNG

ish, partly, perhaps, because my taste was formed by the best bows of Aldred and Buchanan in the early '80's. My preference, therefore, is for a flat back melting almost imperceptibly into the curve of well-rounded edges. As to the shape of the rest of the bow, I have no doubts whatever. The depth should never anywhere be greater than the width, but depth and width should be alike in the handle; and throughout all the rest of the bow the depth should be less than the width and in an evenly increasing ratio as it approaches the horns. The back should keep its width well out toward the horns and then taper somewhat quickly in the last ten inches. The curve of the belly should be at the handle what Dr. Pope well calls a round Roman arch—a semicircle the ends of which are protracted into lines that approach the back at right angles. From there on it should gradually change to a parabola that becomes more and more flattened and at the same time somewhat more sharpened as it approaches the horns. Of one other thing I am sure: that the high, pointed or "stacked" belly, the Gothic arch, is the worst possible form, especially in a target bow. It undoubtedly adds to the cast, but it is a constant invitation to chrysals and it gives the bow a nervous, hair-trigger quality that is the very opposite of steadiness.

How many, many times, when I have been drinking black coffee from an old-fashioned cup of the right shape, have I mentally plotted the various cross-sections of the perfect bow by tilting the cup with only a tablespoonful or two of coffee in it! As the quantity of coffee and the angle of the cup change, the shape of the pattern changes, too. That part of the coffee that laps the bottom of the cup forms the back of the bow, and the part that rests on the side of the cup makes the apex of the belly. So, by changing the angle at which you hold the cup, you can round the edges of the back much or little, and sharpen or dull the apex at will. It is the easiest and also the pleasantest way I have ever found to fix in the mind those subtle curves that at once delight the eye and make

a bow lively and durable; for if you happen to drink too much of the coffee to produce just the figure you want, the matter is easily remedied by pouring a little more into the cup. It is the only problem in conic sections that I ever liked.

From now on, shaping the bow is a matter of careful work and constant attention to what you are doing, lest you take off too much wood somewhere. The chief things to bear in mind are that you must make the change in the shape of the cross-section gradual from handle to horns and must reduce the depth from back to belly evenly all the way. You must also, of course, follow the grain; but if you followed it on the back, observing the other two requisites just mentioned will take care of that. The only exception is that where there is a hump on the back and a corresponding hollow in the belly you must leave a little more wood in the hollow; otherwise the bow will bend, or seem to bend, too much there. Unless your wood is unusually straight-grained, the half-round rasp, the half-round file (each about twelve inches long) and the scraper, are the best tools for that part of the work.

When you have reduced the bow enough to bend it somewhat, cut notches at the ends with a rat-tail file, deep enough to hold a string, and brace it about six inches. The string should be at least twice as large as you will ever use on the finished bow; for the bow itself at this stage should be much heavier than you intend it to be finally. See now if the bow bends evenly from the handle, and if it does not, mark before you unstring it the places that must be still further reduced; then unstring it and work those places down.

For that and for all the rest of the work from now on a sharp scraper is incomparably your best tool. A flint or obsidian scraper was the mainstay of the primitive bow-maker, and a steel one is the modern bowyer's most useful helper. If it is properly sharpened it will remove a very thin shaving at every stroke, and it does not tear or dig, but follows the grain automatically. It should leave the bow so free from

ridges as to impose little work on the sandpaper; but to attain that evenness of contour that so quickly distinguishes a really fine piece of workmanship from one that is poor or commonplace, you must attend carefully to certain things. See that you are keeping the apex of the slowly changing parabola of the belly perpendicular to the centre of the back. Otherwise your bow will be lopsided—a hideous fault. See also that the rounded edges of the back melt into the curve of the belly evenly, and not more abruptly in one place than in another. You can get that result only by changing frequently the light in which you are working, and by observing the bow from every possible angle. If you have been scraping a limb with the light coming from over your right shoulder, look at the work, when you have finished, in a light from over your left shoulder and see if it still seems true. Hold the bow horizontal with the back down and the edge toward you. Roll it slowly from you, and see whether the evenness of the taper remains true, or is broken by depressions. Keep at it until you have reduced the bow to within three or four pounds of the weight you want and until it bends evenly, and shows no irregularity from any angle or any point of view.

It is easy to speak thus casually of getting the bow to bend evenly, but in practice it means many trials in the tiller, a piece of board or plank an inch or an inch and a quarter thick, a yard long, and two and a half inches wide. In the middle of one end is a rounded hollow to receive the belly of the bow at the place where the two limbs balance, and on the upper edge, at intervals from twelve to twenty-seven inches from the bow end, a series of notches to receive the string. As you work, try the bow from time to time in the tiller. Set the string first in the notch that marks twelve inches, and note how the bow bends. Try it again at eighteen inches and so on, until the bow takes perfect form at twenty-seven inches.

At all the lower notches it should bend a little more in the upper limb, since that is longer when measured from the ends

of the handle; but at the last notch the bend should be absolutely even and symmetrical—not an arc from end to end, but two equal arcs springing from an unbending middle.

A yew bow can easily be made too "whip-ended," that is, made to bend too much at the outer ends of the limbs. Such bows, though quick in cast, are usually somewhat "jumpy" in the hand—I don't mean that they jar—and almost always less durable than bows that are somewhat sturdier in the last quarter of the limbs. They are really too quick for the steadiest shooting—too quick for mind and nerves and muscles to synchronize with the instantaneous response to the loose.

But now let us make the horns, for which the best material in the world is the ends of the horns of domestic cattle. The East Indian water-buffalo, or carabao, provides a harder and blacker material, but it is somewhat heavier and not so tough; it splits more easily. As for tips of pewter, aluminum, bakalite, hard rubber, wood pulp fibre and other materials that have been used, all are abominations. The bow is a primitive weapon and for those persons who have any historic sentiment or artistic imagination, its charm lies much in the fact that it can be so made as to have nothing about it that primitive man could not have supplied from his surroundings. Horn is the one material that is both light enough and strong enough and that is "in character." Metal tips on a bow are as offensive a solecism as a silk hat would be with a pair of mukluks.

To bore the horns you must have a tapered drill or reamer an eighth or three-sixteenths of an inch in diameter at the smaller end, and seven-sixteenths or a half-inch in diameter an inch and an eighth from the end. You cannot find it in the shops, but any machinist can make it for you.

Drill the hole before you do anything else to the piece of horn, otherwise you may split it. Having drilled and reamed the hole, fit a piece of wood to it about six inches long, shaped like the end of the bow; and if you are going to form the horn on an emery wheel—the easiest way—glue it to the piece of

wood; but if you must shape the horn with rasps and files, leave it free, so that you can set the stick in a vise and turn the horn upon it as you file. The great advantage of doing the work in this way is that since the stick is negligible, you can file or grind the horn to a feather edge where it is to join the bow, and so save much work later.

In shaping the horns, remember that so far as utility is concerned, they are only ferrules, but as to finish, they are ornaments. If graceful they add much to the beauty of the bow, but if clumsy they make it bourgeois. The tendency is to make them too heavy, though a little thought by anyone who has ever thrown a green apple from the end of a pliant stick will recall how weight at the end of the stick retards speed. They should be thickest at the lower edge of the nock, and should be nearly round there, but beyond there somewhat flattened at the sides. Cut the notch for the string with a rat-tail file, and round the edges so that they will not fray the loop. Making the upper horn a little longer than the lower, and of a somewhat different shape, furnishes a convenient way of noting whether or not the bow is right side up, though to an experienced archer the balance tells the story.

In fitting the horns take care that the wood of the bow goes "home" to the very bottom of the hole, and that it fits everywhere. Before you glue the horns on, score with the edge of a file that part of the bow that is to receive them; it makes little channels for the glue.

The bow being now in condition to shoot, take it into the field and try it out thoroughly before you finish it. Let someone else shoot it who draws the same length of arrow that you draw, and notice how the bow bends. Mark the places where more wood must be removed, if there are any, and scrape those places down. If by chance it proves to be a little lighter than you had intended, soak the horns off and shorten it an inch, or even two inches—it will still be safe for a twenty-eight-inch arrow—then refit the horns and try it again. It is only

in that way that you will ever get a completely satisfactory weapon. Good old Roger Ascham knew what he was about, and there is no sounder piece of advice in his whole book than that in which he tells his friend to choose a bow that seems to have good wood in it, but is longer and heavier than need be; then, when he has taken it into the field and shot it and tested it out with heavy shafts, to take it to a good bowyer and have him work it over.

Dr. Pope, in *Hunting with the Bow and Arrow*, gives the same advice, and with him, too, it rests on experience. I repeat it, with the same right. When the archer is his own bowyer it is easy and pleasant advice to follow.

Having satisfied yourself that your bow is as nearly perfect as you can make it—that it bends evenly and is free from kick and jar and is of the weight that you want, or a pound or two heavier—proceed to finish it. Go over it twice with sandpaper, first with No. ½ then with No. 0 or No. 00, but bear on rather lightly with the No. ½. You will thus reduce the high places more rapidly and evenly than by bearing on too hard. After the second course, wet the bow lightly all over by dabbing it with a cloth wrung out of water, and let it stand an hour or so. The dampness will raise the grain, and you will then have to sandpaper it all over again. Never mind. If your patience holds out, wet it once more and when it is dry give it still a third sandpapering and follow that with the finest of steel wool. You will now have a surface almost as smooth as glass, and one that will stay smooth; for your alternate wetting and sandpapering the wood has raised and laid the grain for good and all; it will not rise again, even if the bow gets wet.

For the hand grip you can use fish line, leather, worsted braid or cane such as they use for chair seats. If you choose leather, cut it to fit, with enough allowance for a lap on the back, shave the edges that are to lap till you have brought them to a feather edge, dampen the leather, and glue it on or

cement it with leather cement. If you use cane, soak it a few minutes in warm water and put it on while it is still damp, after having first coated the grip with glue. The twine and the braid should be put on dry, but wound in glue, and the twine should be shellacked and afterward varnished. At each end of the wrapping glue a leather band from five-sixteenths to three-eighths of an inch wide, for a finish. The upper band will serve also as an arrow plate, or surface on which the arrow will run when it is in the bow. It is better than a piece of pearl or ivory let into the wood, for it requires nothing to be cut away and can easily be replaced when it becomes warm.

How you shall finish the surface of the bow—with varnish or a French polish—is a matter of personal taste. My own preference is for the French polish. It takes time and patience, but it produces a beautifully smooth surface that is not too glossy, that turns water as well as varnish turns it, and that neither cracks nor shows scratches easily. The best way to apply it is to pour some raw linseed oil into one saucer and some shellac into another; dip a heavy woolen cloth, folded once or twice, into the oil first and then into the shellac, and rub the bow lengthwise quickly and hard, until the cloth begins to get "tacky," let the coat dry a few minutes and then apply another. It will take ten or a dozen applications to produce a perfect and durable finish, but it will be worth the labor. After that you will never have to do anything to the bow except to wipe it now and then with an oily rag.

And now, though we have made a bow and have tried it and found it good, there has been as yet no word of the real secret of it. I have kept that till the last. It is this: Get rid of the thought of time as a necessary element in the job; keep before your eyes a vision of what you wish to produce, and put out of mind the thought that you must produce it within a definite period of time.

A missionary once saw a native squatted on the ground, slowly rubbing a crowbar back and forth on a rock.

"What are you making?" asked the missionary. "A needle," said the native.

That savage missed his calling. He should have been a bowyer.

Making Bows of Other Woods

It does not seem to me to be necessary to write another chapter on the making of bows from woods other than yew because practically everything that Mr. Frentz has said in his masterly article is equally applicable to almost any other material. This is particularly the case if the wood to be used have a distinctly marked sap and heart. For example if one were to make a bow of black locust or mulberry, he could follow every word without change or modification.

In the case of lemonwood the chief directions would remain the same but a number of possible omissions would make the labor much less. For example it is as easy to get a six-foot stave with straight grain as a short one with crooked, so that all questions of raising imperfections, making the graft, following the grain, and the like become non-existent. Neither is there any sap-wood to bother about. Thus all one need do is to mark out the dimensions as they have been given and work away the wood. It must be remembered, however, that lemonwood is stiffer than yew and that the bow may therefore be made a little thinner and may taper more continuously from the middle to the ends.

I should like to repeat that the horns are only ornaments, and, as they are hard to make, I think they may advantageously be omitted in one's first attempt at bowyery or in making bows for boy scouts.

Mr. Frentz has not touched on the subject of backed-bows, as I suppose he thought they were beyond the ability of the average amateur. It is not necessarily so. If the wood be of a sort that should have a back of sap-wood and have not, such as the heart of yew or mulberry, one must be glued to it

or it will break. So far as I know there are only four materials used for backs, rawhide, parchment, hard fibre and a strip of wood. Of course I am not considering the complicated backings of composite bows.

Parchment and rawhide add nothing to the strength of a bow but they do exercise a decided influence on the prevention of fracture. For a wood like cedar, which is so easily obtained and yet so soft, it is an easy and effective way of producing a fairly good weapon. The process of application is simplicity itself. The bowyer wets a strip of the hide, sticks it on the bowstave with good glue, and wraps it about with a bandage to hold it tight while drying. Some even do not take this precaution. I might add that good rawhide may be obtained from manufacturers of artificial limbs.

I have had no experience with fibre backs. They are patented by the Archers Company, of New Orleans, who claim that they are better than rawhide, though they do not claim that they have the properties of wood.

The best backs are made of wood, which not only protects the fragile belly from breaking but adds strength as well. Inasmuch as the one requisite of a back is great tensile strength I believe that the best material is hickory. Many writers, especially Ford, claim that yew is best, especially when backing a yew belly. Perhaps this is so as regards this particular species, as it thereby forms what is practically a self yew bow, but I do not think that with most other woods the yew has any particular advantage. The white wood of yew does not seem to me to give any more cast than hickory when used only as a back.

Professional bowyers seem to make light of the difficulty of making a perfect fit between the two strips of wood, which I attribute to their great skill in the use of a plane. To me it is a very hard job. I believe that the best practical way, if you can bury your pride, is to take the pieces to a good cabinet-

maker, or to a planing mill, and have the surfaces smoothed for you.

The only directions for making the joint yourself, that I can give you, are to have the pieces well fastened to a flat surface, use a long joiners' plane and carry through your stroke from end to end. It takes a wonderfully steady hand.

To glue the back and belly together the English use a backing-frame. This consists of a strong wooden bar about two inches wide and three or four inches deep which is often faced with iron. Fastened to it at intervals of about four inches are iron half-hoops, like little croquet wickets, high enough to take the stave and allow room for wedges. To use the frame the back and belly are heated, if cabinetmakers' glue be used, or put in cold for casein glue, and the two are then firmly pressed together by driving double wedges under each hoop, or loop. A double wedge is made of two single wedges which point in opposite directions and thus present a flat surface to the work.

It seems to me much simpler to use screw clamps, which can even be bought in our "5 & 10" stores. They can be applied with no trouble at all and do not require that the belly be perfectly flat, as is necessary in a frame.

The merits of the various kinds of woods for bows are discussed in the chapter on tackle.

How to Make a Glued Bowstring

By A. Shepherdson

As a working basis, I would suggest for convenience, taking a board about ten feet long and eight or ten inches wide, and planed at least on the side to be used. This is to act as a table or bench by laying it across the backs of two chairs or on a table or bench. Standing at the side of this board, facing it, we start by calling the left end of the board the loop end, and the right end the tie end. With a pencil draw a line

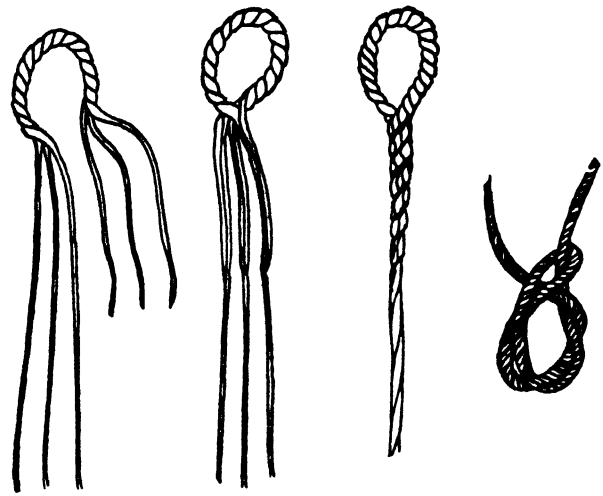
across the width of the board two inches from the end. Call this No. 1 line. Draw another line seven inches from the end of the board and mark a cross on it to act as the upper nock of the bow and the centre of the loop. Make another line one inch to the right of this cross line or eight inches from the left end of the board, and call it No. 3 line. If the bow to be fitted with a string is six feet long, measure six feet along the board to the right from the cross and make another line across the board. This is to act as the lower nock of the bow. If the bow should be five feet six inches, make the mark five feet six inches instead of six feet. If the bow is some other length treat the marking in the same way. Go back and measure eleven inches to the right from the left end of the board and draw a line, calling it No. 4 line. One inch to the right of this No. 4 line make a No. 5 line. Take a wire brad or nail without much head and drive straight into the board at line No. 1, leaving about two inches projecting. Measure down the board to the right nine feet, for a six foot string, and drive another nail (No. 2) the same as the first. For a five foot six inch string make it six inches shorter. Then we are ready to make the string.

Use Barbour's No. 12 Irish Flax. Take the end from the inside of the ball and tie it to nail No. 1. Pass the thread to and around nail No. 2 and back, and around nail No. 1, then to nail No. 2, and so on until you have ten threads. Loop the last thread around nail No. 1 and cut it loose from the ball. Pass the ten threads between the fingers and thumb from one end to the other, which will make them cling together more or less until the string is made. Lift the threads from the nails and lay to one side while you repeat this process twice more. This gives you three strands of ten threads each. Place all three strands on the board, but not close together so they will become tangled. Put the left ends all at line No. 1 and with a sharp knife cut them all at line No. 5. This will give you three strands ten inches long to use for strengtheners in the

loop of the string. Cut off twelve inches from the other end of the three main strands to use as strengtheners in the tie end of the string. Take all of these short strands, one at a time, and wrap in the centre once around the forefinger of the left hand so that the end can be laid out straight for about three inches on the board. Hold them tightly with the thumb to prevent slipping. Begin about two inches from the end of the strand and scrape with a knife. In this way you will fray out or scrape away some of the threads so that the strand will become smaller at the ends but the original thickness will be left in the centres. By reversing the strand on the finger and tapering the other end in the same way you will have all these shorter strands the original size in the centres but tapering for about two inches at each end. Taper the left ends of the three main strands, and the string is ready to put together.

Take one of the three main strands and lay the point of the tapered end up flush to the left end of the board and straight away to the right across the numbered lines. Take one of the ten-inch strengtheners and lay with it having the centre of it come on the cross line, one end at No. 1 line and the other end at No. 5 line. Take it firmly in the left hand at the cross line, and, with a piece of pure beeswax, wax the two strands together permanently by drawing the strands through the wax so that the whole of the short strand becomes a part of the main strand. Repeat the process with the other two main strands. When this is done lay all three main strands with their pointed ends flush with the left end of the board and together as one piece. Grasp the whole at No. 3 mark between the forefinger and thumb of the left hand. With the points or short ends up, bearing slightly to the right as you naturally will, bring both hands in front of you to work. Begin by holding the left hand still and with the right hand take one of the short pointed ends and twist for two inches to the right, and pull toward you and down sharply. Then take the second strand and do likewise, and the third the same. Repeat alter-

nately for about two inches, in which process the left hand will have to follow up to where the strands are being twisted. You will then notice that the three strands are taking the form



Three Steps in Making the Eye.
A Timber Hitch for the Noose.

of a perfectly twisted miniature rope. When two inches have been twisted, bend the twisted portion in the centre making the loop. Spread slightly the three main strands below the loop, separate and lay one of the short ends on one of the main strands and squeeze together as one strand. Do likewise with the other two, bringing the twisted ends of the twisted loop snugly together. Grasp the loop at the junction between fingers and thumb of the left hand and twist the main strands to the right one at a time, in rotation, and bring them down and toward you, in the same manner as twisting the loop, down to the ends of the strengtheners. This completes the loop.

Now comes the most important part of making the string. Care must be taken to have twists and snarls out and to have each individual thread lying straight, or all the labor will be in vain. To avoid the error place a scratch-awl in the loop,

sticking the point into the board at No. 4 mark so it will not pull out under strain. Wrap a small cord around the string just where the twisting stops and tie it tightly with a single bow-knot that can be untied hastily. Take one of the main strands between the fingers and thumb of each hand, beginning at the knotted cord, and pulling down the board from the loop to the end of the strand in a sliding and combing motion, keeping the strand as flat as possible (not round) until by feeling you know that all the strands are lying straight. Then, keeping the tension on the whole strand, lay on the twelve-inch strengthener so it centres on the six foot mark, or the lower nock, and wax in its whole length to the main strand. Do the same with the other two. Then, with all three strands, begin back at the knotted cord, placing the strands between the fingers separately: one strand between the first and second fingers, another strand between the second and third fingers and another between the third and fourth fingers. Use the same sliding motion with one hand and then the other, from the loop end to the lower strengtheners until you are quite sure that they are all flat and free from twist. Then with equal tension on all three strands, grasp them where the strengtheners begin with the left hand firmly. Release the tension and twist the strengthened ends into a cord as before. On finishing the end, take one strand around the other two in the form of a single knot, which keeps it from ravelling.

Hang the loop of the string from a hook in the ceiling. At the lower end tie with a single bow-knot to a hod of coal or something that will weigh thirty or forty pounds, with slack enough to permit slipping loop off the hook. The weight at the bottom should be placed on a table or chair while doing the coating and lifted off and allowed to hang full weight on the string while twisting the centre.

Make a solution of good glue (Cooper's A Extra I find the best) the consistency of thin cream when the glue is hot. Mix three parts of this to one part glycerine in an open vessel.

Take the loop of the string from the hook, straighten string out and twist three or four times around to left to keep strands from separating, and coil it up in the hot glue pushing under until it is thoroughly soaked. Draw out through a cloth held in one hand, beginning at the loop. When all is clear of the glue dish, hang loop on hook and lift weight from table or chair, putting full weight on string. Start revolving weight to the right which will twist the centre in the same direction as the ends. While the string is twisting rub it with the bare hands to free it as much as possible from surplus glue, wiping it from time to time with the cloth. This process must be accomplished as quickly as possible to free it from too much glue before the glue sets. Do not twist it too much, but when enough, anchor the weight down to prevent untwisting, and remove tie string under loop. When dry put on the bow and rub with beeswax where the serving is to be. This will keep the serving from loosening. Whip in the usual way. This makes a small and keen shooting string. A thirty-strand string of this type will stand perfectly safe on a fifty-pound bow.

The glue mixture may be used over and over again, but if by use the solution becomes too stiff when dry add water and glycerine to bring it back to its original consistency.

Further Comment by the Author

It is undoubtedly best to take the time and trouble to make a string with glue in the way Mr. Shepherdson has described, as his home-made strings are the best I have ever seen and as the professionally made strings of Belgium are also laid in glue.

Yet one often needs to make a string in an emergency, such as might occur while hunting or even if one's supply of strings should run short during a tournament. It is not absolutely necessary to use glue; some very good stringers never use it. It is really quite enough in many cases to simply wax the

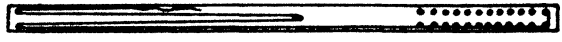
threads well for their whole length and then work them into a cord as " Shep " has described.

Knight, with his vast experience among boy scouts, has pointed out that one need not have a board for marking off the strands. A simple way is to measure off six or seven feet, according to the length of the bow, either by using a tape or ruler, comparing it with your height or measuring from the tip of your nose to your full reach as a dry-goods salesman does. When the length of the first thread is found it is simply pulled back and forth in the hand, measuring off others beside it, till the whole ten are made. If a taper be desired it can be made by laying each thread a half-inch shorter at each end than the one before it. The reinforcing strands are made by cutting up an extra long strand into six lengths of a foot each.

McMeen invented a very ingenious board for measuring strings, a little thing which can be carried in an arrow box of large size.

It consists of a one-inch slat thirty-three inches long. At intervals of one inch twelve brass brads are driven in two parallel rows near the edges. At the other end of the board two brads are driven and nearly in the very centre of the slat is a third single brad. All of the brads protrude far enough to allow the thread to be held by them.

To make a strand, begin at one end, pass down to a pin at the other end, then around the centre pin, back to the other end pin and so to the place of starting. This makes a thread of the maximum length. To make the taper pass the succeeding threads over nearer brads.

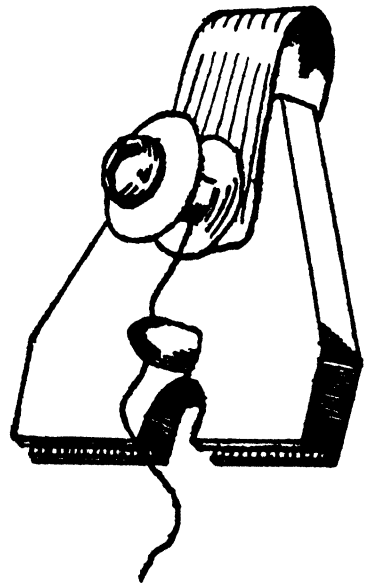


For ladies' strings set another centre brad three inches nearer the end.

It seems to me that the whipping of a bowstring deserves comment. I think the best material to use is a hard linen

thread, like Barbour's No. 40. If wound on by hand do it thus:

String the bow at the proper height as though you intended to shoot. Mark the proper nocking point on the string and begin to wrap an inch and a half above it. This may seem unnecessarily high but it is better to err on the safe side in case the string should let down, thus dropping the relative position of the serving. I usually lay the bow across my knees while serving but some prefer to rest the lower horn on the ground and lean the bow against a shoulder, somewhat like a man playing a cello or harp. The string may be served as a single thread or time may be saved by laying on from two to four strands at once. If more than two be used it is more apt to come undone or to slip on the string, leaving an open place where the arrow nocks.



To fasten the upper end is very easy, as one merely wraps under a short end of the thread. To finish the lower end is not so simple. The best way is to throw a large loop over a

finger and wrap the thread within this loop for six or eight turns, thus making it possible to encompass the string tightly by wrapping it about with the loose string which formed the large loop. When all is wrapped pull the thread taut, or, in other words, pull the slack of the loop through the last few turns which overlie it.

Personally I serve all of my strings with a small device consisting of a bobbin from a Singer sewing machine screwed loosely on a small flat piece of wood and kept at proper tension by a flat spring, as shown in the illustration.

XI

HOW TO MAKE ARROWS

MANY archers, and I am sure a majority of the best ones, find pleasure in making part of their tackle or in some cases even all of it, sometimes to put to a practical test various theories of construction but more often for the joy that any craftsman feels in producing the thing he loves.

I will tell, as best I can, how to make arrows of the various kinds.

It is best to begin with the easiest sort and improve our models as we acquire skill. Let us then consider the kind that are made by the thousand and sold to toy stores, boys' and girls' camps, boy scouts and so on. They fill a very valuable place in archery; for example, I have fitted out my four children with quite fair arrows, some of which were used in the last two national tournaments, at a cost of perhaps four cents a shaft.

First buy a sheaf of 100 hardwood dowels, five-sixteenths of an inch thick and usually made of birch or maple, the former being preferred. The last bundle I bought cost $1.25. Then send to some manufacturer of rifles (I personally buy from the Remington Arms Company) for 100 cupro-nickel jackets for rifle bullets, size 30 calibre. They are very cheap. The only other necessities are feathers, glue and paint.

With all of our materials thus in hand we start to work, taking for our first trial the shorter arrow of 25 inches which is used by women and boys.

Lay a dozen dowels side by side on a table with one end against a board or any straight edge. Mark off 25 inches on the two outside ones, lay a ruler across them all and with one sweep of the pencil mark every arrow. With any fine saw,

cabinetmakers' saw, hack-saw or whatever you have, cut each one off at the mark. If you use a vise at any time to hold an arrow fit it first with soft wooden jaws with round grooves cut in them so as not to pinch the shaft.

Next put on the point. Nothing could be simpler. Just take a knife or broad chisel, lay the shaft on the table, place the edge of the tool on it about three-fourths of an inch from the end and roll the shaft while making pressure, thus cutting a ring around it. Then, using care, trim down the diameter of the end portion either with a flat file or by reducing carefully with the same tool that made the ring till the bullet can be forced on with a driving fit. To force it home use a wooden club or mallet or else start it with the fingers and then shoot the arrow with a bow against the floor.

To make the nock saw a slot one-fourth inch deep in the other end with your fine saw and widen it with a key file to the size of a bowstring. At the same time shape the whole nock end of the arrow with the file to a pretty, rounded taper for about one-half inch.

At this stage of the operations the shaft looks quite like an arrow and I usually give it a good rub with sandpaper before proceeding to fletch it. Fletching, or feathering, requires knowledge, skillful dexterity and great care and as the subject is the same for the best arrows as for these cheap ones I will treat of it in detail.

First, a feather is of little use unless it be stiff and so the ones in common use are the pinion feathers of the turkey and peacock. In old English writings the feather of preference was from the gray goose, but that was because they did not have the turkey in those days. At the present time all the English arrows that I have ever seen are fletched with the feathers of the two birds I have mentioned, either in their natural colors, or white from albino varieties, or dyed. Lately I have obtained "Black Eagle" feathers from Duff, who gets them from a dealer in New York. Just what bird they really

come from we do not know, although they are much like those of a turkey buzzard, but they are possibly the best of all. Turkey feathers may be obtained from manufacturers of feather dusters.

Preparing a feather is not easy. There are many ways, such, for example, as clamping it in a saw-set and filing down the quill, but all that I know of are slow and unsatisfactory except the ancient hand method which I have learned from watching Duff at work. As done quickly and neatly by his practiced hand it looks simpler than it really is, but one will not ruin many feathers before he can do a fair job. A *sine qua non* is a razor-sharp knife. Some use a safety razor blade, but it is not strong enough for my liking. I made a very satisfactory knife by grinding down an old key file. Whatever may be the kind you use it must be stropped after every few cuts.

The rough trimming of the whole feather is done with an ordinary pair of scissors. With a few rapid cuts trim off the big quill and a little of the vane at the proximal end and as much of the distal end as has too small a rib for use. Cut the narrow side away entirely and trim the wide side to five-eighths of an inch. Then lay the feather on its back, that is with the convex side down, on a perfectly smooth, narrow board with the rib near the edge where the knife-blade can reach it easily.

Now, here come the two master cuts. The first is flat to the table. Holding the rib down with the thumb and finger of the left hand draw the razor-sharp blade through it with a slicing motion, thus cutting it perfectly flat on top and down level with the sort of groove that the vane grows from. If you cannot do it with one adroit movement trim it up afterward with little slices where required.

The second master cut is vertical to the table. Holding the rib as before cut it down with one skillful slit, beginning at the small end, so that the back, or unseen, edge of the cut is close

to the vane and the upper edge, which the eye can direct, leaves a little of the rib, or quill, for the glue to hold to. The thin layer of cleanly cut pith is allowed to remain and should not be scraped out.

After these two cuts I usually straighten up my backbone and breathe a sigh of relief.

The feather is long enough to make two or three arrow vanes and is quickly cut into the correct lengths by laying it on pencil marks ruled on the cutting board and severing it with knife or scissors.

A very important fact about feathers to be borne in mind is that the right and left wings of birds bear an opposite relation to each other as our two hands do. The feathers curve in different ways and it is therefore necessary to use them from the same wing, or at least from wings of the same side on different birds, on any particular arrow. As a further refinement of this idea I prefer to have all of a set of arrows feathered from the same side, either all right or all left, but some good archers do not think this is necessary.

Perhaps I should have said before this that, while it adds nothing to the durability of the arrow to dye the feathers it does add to its beauty and permits the archer to give play to his artistic tastes. I well remember what a charming picture one of the ladies made at a tournament with her arrows dyed and painted a delicate blue shade to match certain parts of her attire and it made me wonder why others, who know what colors suit them, do not order from the fletchers according to their preferences.

To dye feathers is interesting, but, to insure success, one must know exactly how to do it. I know of nothing better than the familiar Diamond Dyes which are sold in every drug store. The envelope contains full directions for preparing the dye bath, which to be effective must be at boiling temperature. The two essential things for the dyer of feathers to remember is that they must be wet in cold water before being immersed

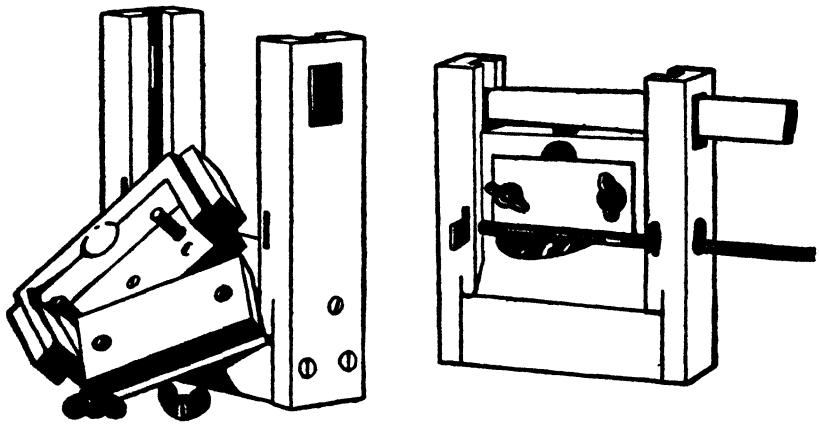
in the ebullient fluid and that they must not be kept in the dye long enough to be cooked.

The best way is to protect your hands from being stained by wearing rubber gloves, take a handful of feathers, swish them about in a dish-pan of cold water until they are thoroughly wet, then do the same in the boiling dye, then back again for a douche under the spigot or in the dish-pan of water to wash off the excess dye and they are ready for drying. During all of this operation the stems of the feathers are held in the hand.

No doubt other dyes which have been put on the market more recently may be just as good as the Diamond but I have had no personal experience with them.

Feathers have a natural curve and yet on the shaft they must be quite straight, although some fletchers give them a slight bend to make them act like a ship's propeller and make the arrow rotate in the air as a rifle bullet does. Whether or not this makes the arrow fly better is a mooted point. When Will Thompson shot in the tournament of 1913, with his bow arm much weakened from having been broken at the elbow, he used the lightest shafts I ever saw, with a very light bow, and arrows that fairly spun in the air because of their greatly spiralled feathering. The arrows with which I have made my best scores have had absolutely straight feathers with no spiralling at all. If the fletcher prefer a spiral he must make it by hand. If he put the feather on straight he may do it either by hand or by using a clamp. Clamps are of various forms and are always made by the archer himself or by some more ingenious friend, as I know of none that are on the market. Some are made of metal and will put on all three vanes at once but most of them fasten only one feather at a time. A good example of such an one, which almost anyone who has enough mechanical skill to essay the making of an arrow can fashion for himself, was invented by George Nichols of Chicago, who was the first winner of the Duff Silver Arrow, and

was described by him in *Forest and Stream* for July 26th, 1913. The accompanying illustration is almost self-explanatory and one can easily see how the vane is clamped between the two pieces of the holder, glue rubbed on its exposed edge and the whole pressed up against the shaft by the sliding wedge. I have made two of these little instruments and have often used them when I wished to replace a single feather that was broken. To feather many arrows with a clamp is



rather a tedious process, involving frequent reheating of the glue, and the finished work is no better than that done by hand. The following manual method, which I think is unquestionably the best, is the old way of the English workshops and I have learned it from watching Duff.

Have a piece of heavy woolen stuff, such as a few thicknesses of an old blanket, perhaps one foot by two in size. Dip it in boiling water till it is well soaked, pick it out, wring it a little to get out the excess water and lay it on a table. To do this without scalding the hands use two short sticks, as dyers do. Quickly cover half of it with feathers, all cut and ready for the shaft, fold the other half over on them, place a flat board and heavy weight thereon and let them lie and steam. In a few minutes they will be so limp and flat that they can be

easily handled and are ready to be glued on. McMeen has told me that he has had good results from simply wetting the feathers well in unheated water but I have never tried this even more simple way.

Gluing on the feathers is the rock on which most amateur fletchers founder but, as in most things, its apparent difficulties disappear with proper instruction. The first step is to prepare the glue. This may seem surprising to those whose household mendings have never carried them beyond the liquid glues of commerce, but I wish to emphasize strongly that the most satisfactory work for target arrows can be done only with hard cabinetmakers' glue slowly melted in a double boiler or in an electric glue pot. It is true that for toys and hurried work very fair jobs can be done with Major's Cement, LePage's Liquid Glue, Royal Glue, Imperial Glue (which Z. E. Jackson strongly recommends in *American Archery*), Rock Cement and Amberoid. Of course there are many other good commercial glues but these have all been well tested. Amberoid is used by Mr. Breck Trowbridge of New York, who has killed geese in Currituck Sound with home-made artillery, because it is waterproof. Rock Cement is also more or less waterproof. I have used it a little for arrows but the chief use I have made of it was for fastening on the arming of bow-handles.

There is nothing difficult about preparing hard glue, although many people approach the job with misgivings. Merely cover some glue with water in a glue pot or double boiler, or in any cup placed in hot water, and let it slowly soften, giving it an occasional stir and keeping the outer water just below the boiling point. Some people steep the glue in cold water over night and it is a good thing to do. If ordinary glue be mixed with Russian isinglass it is much better but at present the unsettled state of commerce makes it almost impossible to procure the real stuff. Russian isinglass is made from the sounds, or air-bladders, of sturgeons. It looks like

ordinary gelatin. It is used for clearing drinks, either soft or fermented, and for making cements.

Before attaching the feathers to the shaft the latter must be marked and sized. The marking is done just as it was in the beginning when the dowels were measured to twenty-five inches. Again lay them side by side and sweep a pencil across them one inch from the nock end to show where the feathers should be placed. Then size the shafts by wetting the thumb and finger with glue and rubbing the part to be feathered till it is covered with a thin film. It is best to do this several hours ahead or even the day before so that it will be quite dry.

Now comes the crucial operation, which astonished me by its ease and quickness when I first saw Duff do it. I had labored with clamps and windings of string to hold the vanes in place but here I saw that nothing of the sort was required. All that one need do is to rub a thin film of glue on the trimmed portion of quill with a toothpick, stick the vane on the shaft in its proper place, with little more fuss than putting a postage stamp on an envelope, and lay it aside to dry. In a few minutes run the finger-nail along the vane again to be sure that it is stuck fast.

The condition of the atmosphere has a great deal to do with the success of gluing because if the glue set before the feather dries all is well, but if the feather dry before the glue has hardened sufficiently to hold it where it should be it curls up into its natural curve and tears itself loose from the shaft. The fletcher must also see that his glue is neither too thick nor too thin as in the former case the quill does not lie close enough to the arrow shaft, because of the thick glue between and in the latter the glue dries too slowly. It is astonishing how long the feather will retain its tendency to resume its natural shape. I doubt if it ever loses it as I have taken feathers off of arrows used by the United Bowmen of Philadelphia about the time of the Mexican War and they curl just as much as if they had been trimmed the day before.

In drying the arrows after gluing, or painting, they may be laid on a table, with the ends protruding, but the best way is to set them in a crib. This is a stand about a foot and a half in height with a top full of holes to put the arrows through, thus standing them up in ranks. This top may be made of a board, drilled with a hundred holes or so, but the easiest way to make a crib is to nail a piece of one-half-inch wire netting over the open side of a box. This, by the way, is a good thing for schools and such places to have in which to keep the arrows which are set apart for general use.

I should not close this discussion of gluing without speaking particularly of DuPont's Household Cement. This is a comparatively new preparation and I believe consists of a solution of celluloid in acetone. It is a splendid adhesive, one of the very best that can be procured and some fletchers use it for feathering arrows. Inasmuch as the feathers must be used dry I have never been able to get them quite straight but others get excellent results.

Casein glue is also very good if used with a clamp. It is used wet and the feathers may therefore be soft but it is very slow in drying and unless the feather be in a clamp it is pretty sure to curl and loosen.

I do not make three longitudinal pencil marks to show where to put the vanes. If one set the cock-feather at right angles to the nock, so that it will stand directly away from the bow when the arrow is shot, he can easily judge by his eye when putting on the two hen-feathers at 120 degrees apart, or one-third of the way around.

The shape in which the feathers shall be trimmed is largely a matter of personal preference. Up until the time of men still living the common shape was the triangular, simply made with a single cut of the knife or scissors. That style is still used by a few good fletchers but the usual shape of to-day is the balloon feather, whose outline more or less closely approximates a parabola. At the last tournament some feathers cut

by Frentz looked good to me. They combined the sharp rear end of the triangular with the curved upper edge of the balloon.

To cut the feather in the triangular and Frentz patterns the feather knife and a templet are all that are necessary. By a templet I mean a piece of celluloid, tin, stiff paper or the like, cut out to shape and laid on the feather to guide the knife.

This method may also be used for the balloon feathers but the simplest way in the end is to make a stamp of the correct shape. One may be made by a tool maker, forged from the solid bar, and will last and give service forever but a cheap and good way is to make one yourself out of a steel scraper blade. The end of the blade can be bent correctly by hammering it on the edge of an anvil or vise. Of course, as in all tools used for cutting feathers, the edge must be ground and stropped very keen so as to cut clean by hand pressure only without the use of a hammer.

Regarding the length of the vanes there is now a practical unanimity of opinion. Two or two and one-fourth inches is proper for the ladies' twenty-five-inch arrow and two and five-eighths or two and one-half inches for the men's twenty-eight-inch. I have some old Ainge & Aldred arrows which once belonged to Matthias Baldwin, that so far as I can see are exactly like the ones used by Ford. Their feathers are just five inches long and of course cut triangular. A few years ago McMeen and I decided to try out an arrow with several features that might turn out to be improvements and one of them was the use of the old five-inch vane, although it was cut five-eighths inch wide instead of three-eighths as in the old model. He made a dozen of these and I tried them very carefully but my conclusion was that on the whole the short feathers were better. It may be that at the short distances of the American round the big feathers gave a steady flight, although I never felt wholly certain about it, but I am sure that for the York Round in a high wind they had more drift, as would naturally be expected. Furthermore it is not

likely that all the archers of the United States and England should have changed to the short feather unless it were better. I have some Belgian arrows made by Remi Gyselinck, of Detroit, which have immense vanes, five inches long by seven-eighths wide, but they are not satisfactory for our style of shooting. In fact I am confident that the only effect the big feather has is to offer more resistance to the air and retard the flight of the arrow. On the other hand the feathers on the special arrows made by Whitman for Phil Bryant, with which he made the American record of 618 in 1912, had triangular feathers about three inches in length, if I remember correctly.

With the completion of the feathering the arrow is finished so far as its shooting qualities are concerned but it is still unsightly and will be greatly improved by being painted. While an infinite number of designs may be elaborated they follow a more or less conventional plan, for, although the decoration is still called the "crest," suggesting that heraldic devices may have been used in former times, it is now always in the form of rings of varying width.

The spaces between the feathers should be painted first with a solid color, touching the feather itself and serving the very useful purpose of protecting the glue from dampness. It must not be forgotten, however, in this connection, that if the arrow be subjected to continued wetting, as by lying out all night in the dewy grass, the feather itself is permeable to water and may become so soaked that the glue will be softened and the feathers drop off even if the paint be good.

Usually only a narrow one-eighth or one-fourth-inch ring is painted between the feathers and the nock, as more than that would soon be rubbed off by the archer's fingers, but two or three rings varying in width from one-fourth to one inch are used below them.

To do the best job it is not necessary to chuck the arrow in a lathe, nor can it readily be accomplished entirely by free

hand. The way of the professional fletchers is to lay the shaft in a simple rest of two notched pieces of wood and rotate it with the left hand while holding the paint brush with the right.

The cheap arrows which I have been describing are painted quickly and roughly but, as the method is the same for arrows of the highest grade, I will suggest a few refinements of technique. Do not use an oil paint, but have the colors ground in Japan and, if necessary, thin them with turpentine. Better apply two coats, if necessary, than have the paint hard to manage. Let the rings of color be close together, without any of the wood showing between them, and divide them with very fine black lines. These delicate lines add greatly to the finished appearance and are made by using the finest of brushes and paint that is thin enough to run easily. Those who are skilled in gilding can get very rich effects by laying on gold leaf, as Izzard has done with my best arrows of his, or Ayres, make.

When the paint is dry the whole shaft should be finished by varnishing or by rubbing with French polish, that is, dipping the rag first in white shellac and then in linseed oil.

An interesting trick in painting that was devised by Mosher, of Camden, N. J., is the use of luminous paint. There are many archers who shoot in the evening, because they have no other time at their disposal, and it usually happens that, when darkness is approaching, the target remains sufficiently visible long after it has become impossible to see just where the arrows strike. Luminous paint solves this difficulty quite satisfactorily and at the same time makes it very easy to find arrows which have missed the target and lie snaked in the grass.

I think this ends the description of the simple dowel arrow. The next step upward is to the self-arrow, which is made of a lighter wood and one which for target use, though possibly not for hunting, is usually considered superior.

Such wood is very hard to find. I favor spruce and Norway pine but Port Orford cedar, Douglas fir and occasional

specimens of yellow pine may make splendid arrows depending on the grain and stiffness, or spine, of the piece of wood in question. This word *spine* should be graven on every archer's mind. It means the ability of the shaft to resist too much buckling, or bending, when shot from a heavy bow, coupled with a quick return to straightness. The handsomest arrows in the world are useless without it as I and nearly every other archer have found to our cost, financial and otherwise. The only sure way to test the spine of wood is to cut a sliver and bend it, learning from experience when it is extra stiff. In general those specimens of wood are best which have the closest grain, indicating that the tree has grown in unfavorable conditions which have made a very thin layer of wood each year, thus developing a microscopical structure of much cellulose and little plasma, or cell filling.

However, this closeness of grain is by no means an infallible rule for the determination of spine. I shall always remember how astonished I was to find that the stiffest pieces of Douglas fir are often those with the widest grain. Some makers, especially Donnan Smith who uses this wood exclusively and has therefore had immense experience with it, say that the spine depends on the thickness of the bone, or resinous layer, which is also known as " summer wood."

Weight is not a good index of spine as applied to woods of different species, although it may be considered among specimens of the same kind. For example I have made arrows of the heavy South American woods like beefwood and, while their weight is relatively enormous, they would buckle so much as to have no value at all.

Fletchers of my acquaintance usually pick over the stock of a lumber yard till they find an occasional board that suits them and lay it aside for purchase. I remember Whitman saying, jocularly, that he had looked over half the lumber yards in Maine before he found his best stock of wood.

The advantage of the coniferous woods, which I will call

light woods, is this very quality of lightness in proportion to their spine. Thus an arrow of given weight made of light wood will stand a much heavier bow than one of the same weight made of hardwood. Conversely, with a given bow the arrows of light wood will weigh less and therefore fly farther and with a lower trajectory than if made of hardwood.

The disadvantage of light wood is its liability to fracture. If, on account of wind or a poor loose, the arrow do not fly exactly head on it may hit a target leg or tree and break in the middle of the shaft. More often it hits a stone or the target stand right on the nose and then breaks just behind the pile. The nock, too, will split when cut in light wood. To overcome this last objection the ancient English arrows, like the Chinese arrows of to-day, were made very thick at the nock end. That is not pleasing to the eye and is most disagreeable to the drawing fingers and I think it might deviate the flight of the arrow somewhat, though I know of no experiments made on this subject.

The modern way is to strengthen the nock with some other material and the one preferred by most experts is a small wedge of horn, Asiatic buffalo horn being the best, which is stuck into the end of the shaft for about an inch or an inch and a quarter.

There are different ways of cutting the V-shaped notch for this horn. Duff does it very quickly by simply sawing down the two sides of the V with a very fine saw while the shaft is held in a vise. While this method excites my unqualified admiration for the steadiness of hand and accuracy of eye that it indicates, it also seems to me to be wholly beyond the power of the average amateur mechanic. The way I do, and Frentz says he does the same, is to first cut a straight slot down the centre of the shaft with a fine saw and then widen it out to one-fourth inch with a knife file, or a file the shape of a knife blade. After that the procedure is as described for the dowel

arrow, the slot being cut through the wedge viewed on its broad sides.

Nowadays hard fibre is often substituted for horn, care being taken that the grain runs the length of the wedge and not across it. It is probably better than steers' horn and buffalo horn is hard to get, indeed I do not know where you would get it unless from some English fletcher.

Nocks of aluminum, hard rubber and Bakelite have been used with satisfaction. All such materials are either fitted on the end of the shaft as a cylinder around the wood, the nock being cut both in them and the wood within them, or they are made solid at the end and slipped on like the ferrule of a cane with no wood showing in the nock at all.

The breaking behind the pile is usually left to chance but McMeen has invented a self-arrow with a wire nail, or fibre rod, cored into the end which has successfully withstood any reasonable shock and I think this feature should be used extensively. It seems to me to be a cheap and easy way to make a very good arrow. It might be noted in passing that the pile of a Chinese arrow has a slender piece three or four inches long which is set up into the shaft and wound about with a strip of bark.

The making of a light wood shaft requires great skill for the very finest work but the average man need not despair of soon being able to do a fair job. If you start with an inch board from a lumber pile, as you most probably will, have it sawed at a mill into strips one-half inch square. After this I think it is better to work by hand, except as will be spoken of later under the mechanical manufacture of arrows.

First plane the stick, after cutting it to the desired length of from twenty-five to twenty-eight inches, to a three-eighths-inch square with a jack-plane or, better, a joiners' plane. Duff uses wooden planes only but I cannot see why modern iron planes are not just as good.

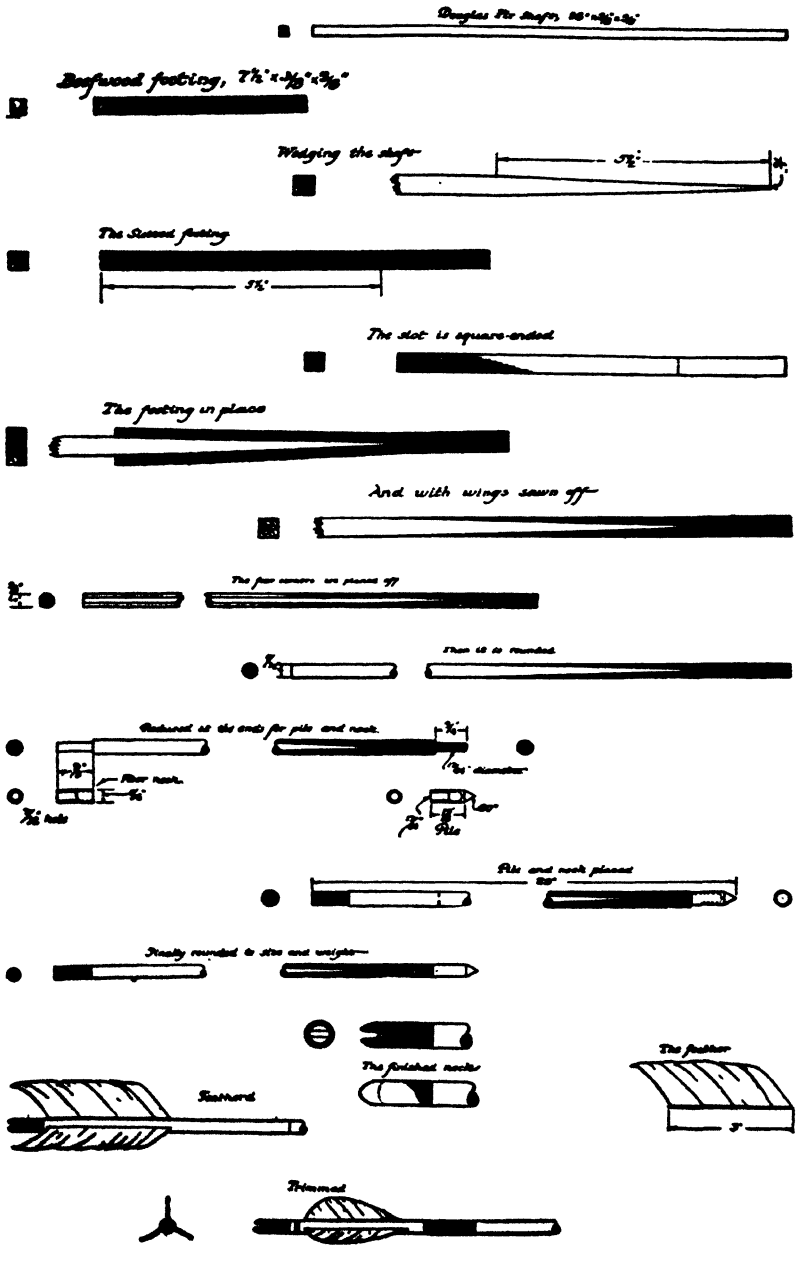
From now on it is a matter of care and judgment. With a

finely set block plane keep cutting the edges off till the shaft is round. It is astonishing how round you can get it with a flat edged plane. Duff uses a half round moulding plane and it is probably a better tool for the purpose if you can guide it perfectly straight. On the other hand the professional makers of golf clubs that I happen to have seen use the flat blade in shaping handles and they certainly get them beautifully rounded. Duff makes his shafts so smooth with his rounding plane that they hardly need any sandpapering, although he does chuck them in a lathe and paper them a little.

The last five inches at the nock end should be given a slight taper, ending with a diameter of one-fourth inch at the horn nock, but the rest of the shaft should be cylindrical. Nothing is to be gained by barrelling or chesting an arrow.

The last kind of target arrow that I have to describe is the sort that is used by all the experts whom I know of and is put on the market by all fletchers as the *ne plus ultra* of their art. It is the footed arrow, so called because of a footing, or piece of hardwood, spliced on the lower end to give it strength and balance. Footings may be made of any strong wood such as lancewood, hickory, snakewood, amaranth, ebony, rosewood, beefwood, greenheart, Bethabara, etc. I think that one kind is about as good as another except that when a dark wood is used the contrast of colors is very pretty, exactly as in a billiard cue. Yet of the dark woods beefwood works best under the plane.

The process of footing is more simple than the finished product would lead you to suspect. You take a piece of the desired wood seven inches long and three-eighths inch square and saw a slot for five inches down the middle of it. Then shape the three-eighths inch square piece of light wood, of which the shaft is to be made, to a wedge for a corresponding distance of four or five inches, cover it with glue and jam it into the saw slot. It is well to concave the sides of the wedge a little as it seems to make a better fit. The thing to be care-


Douglas Fir shaft, 28"×⅜"×⅜"
Redwood footing, 7½"×⅜"×⅜"
Wedging the shaft
7½"
The second footing
3½"
The slot is square-ended
The footing in place
And with wings sawn off
The four corners are planed off
Then it is rounded
Reduced at the ends for pile and nock.
⅜" diameter
Pile
Pile and nock planed
Finally rounded to size and weights
The finished nocks
Feathered
The feather
3"
Trimmed

ful of is not to get the end of the wedge thicker than the slot, lest it split the footing when driven home. As an extra precaution the footing may be pinched in a vise while the shaft is being set in it. Wrap a string about the footings while the glue is hardening.

The planing of a footed arrow is much the same as of the simpler kinds except that one must be a little more careful not to run against the grain. In fact it is impossible for the grains of the two woods to run exactly parallel because the footing is sprung out of a straight line by the wedged end of the light wood. Only the eye can guide the fletcher and he must turn the shaft this way and that as he planes around it. He must remember, also, that the light wood is reduced by sandpaper much more quickly than the hard wood of the footing so that if he be not careful the cross section of the splice will become an ellipse instead of a circle.

The old phrase "straight as an arrow" must always be borne in mind. If there be the slightest curvature, even so little that the eye can scarcely detect it, the shaft will not fly true. To find such slight deviations a good way is to balance the arrow at its centre of gravity on the palm of the left hand and give it a spin with the right thumb and forefinger. If everything be perfectly true the arrow will lie flat and steady as it rotates but if there be the least thing wrong it will jiggle up and down. After this test you must carefully sight along the shaft or lay it against a straight edge to find where the fault is.

Bending a crooked arrow back to a straight line will usually not effect a permanent cure though it will help the archer out in a pinch, as when he is lacking in spare arrows during a match. The right way is that used by savages from the earliest times to the present day and by manufacturers of many objects made of bent wood, for instance violin bows. Simply heat the arrow over a flame at the crooked place, bend it straight, either in the hands or, preferably, against something

stationary, and hold it motionless until it cools. The Indians bend their bows by pressing them against hot stones and they stay set permanently.

Arrows are not held in clamps of any kind while being planed. It is best to use nothing but a low stop to bear the end against and hold the shaft in the fingers. In order to keep out of the way of the plane you can use a narrow piece of board about one inch square, held in a vise, so that you can touch the arrow from beneath or else you can have your stop at such a distance from the end of the work-bench that an inch or so of the arrow protrudes beyond it and can be held by the fingers.

The seasoning of the arrow wood is of paramount importance. Of course it goes without saying that kiln dried wood is absolutely useless. It is weak and brash and has all the life taken out of it. Inasmuch as a great deal of the lumber which comes from the far West is treated in this way the buyer must be on the watch not to be deceived. If the dealer be honest he will say how it is seasoned; otherwise the poor quality of the wood gives mute testimony against itself.

For the best work the light wood should be seasoned in the plank, under protection in the open air, for at least two years, then cut into one-half-inch staves and seasoned in a house, or shed, which is not steam heated and therefore almost equivalent to a sort of kiln, for two years more. Furthermore I am positive, and can show proof of it, that arrows which are made of wood even so well seasoned as this will improve tremendously if allowed to stand for a couple of years after being completely finished. To quote one of many examples I can recall that in 1919 I bought two dozen of the best English arrows and to my great disappointment found that they had not spine enough to stand in a fifty-pound bow. I put them away in storage in a small, unheated workshop that I have and did not use them again until 1924, when I found that they

flew perfectly and would stand in my strongest bows, which were about sixty pounds.

It may be that some archers will read this book who live where bamboo and similar reeds grow which may be made into arrows. I understand that the Japanese method of straightening these is to cut them while green and hang them up with a heavy weight attached to them. Japanese arrows are exquisitely made and are used by many of our expert American archers. Like most of the Japanese craftsmanship that is descended from the older times when modern industrialism had not intruded her malign influence these arrows are works of beautiful and soul-satisfying art. The only fault that I could ever find in them is that they have a very light pile which does not carry quite so well for our style of bows as a heavier one. Some of our best archers change the centre of gravity by pulling off the stubby pile, about one-half inch long, which comes on them, and either adding an ordinary English or American pile only or else, in addition, sticking a piece of steel wire, or wire nail, or a length of lead wire into the hollow end of the bamboo before capping it with the pile.

I had almost forgotten to speak of the pile, important as it is. Bullet casings are very good but if they be drawn back on the bow itself they will deflect the flight of the arrow because of their conical shape. The usual shape used on American arrows is the cylindrical. This is about one and one-fourth inches long, made in a lathe from the solid bar of cold rolled steel, five-sixteenths in diameter, with the point cut off at an angle of forty-five degrees and the other end drilled out like the ferrule of an umbrella for three-fourths inch.

The English still make their piles of two pieces, a solid end and a small piece of sheet steel wrapped into a truncated cone and the whole brazed together. It seems a more elaborate process than simply boring and cutting the bar in a lathe, as we do over here, but by practical experience in the use of them I have noticed one advantage. When an arrow with a solid

pile strikes a stone the pile is apt to be rammed back against the shoulder of the footing which is flush with it so hard that the wood is burred and chipped. Of course, in making the arrow, care must be taken to have the end of the shaft completely fill the pile but even then a hard blow will have the effect I mention. A brazed pile, under the same conditions, will usually split and not hurt the shaft, so that it can be pried off and replaced by a new one. I do not, however, think that the English gain anything by slightly tapering the pile but, on the contrary, I think that if a tapered pile be drawn back on the bow it tends to deflect the arrow as I said in regard to the bullet casing. In *American Archery* Mr. Z. E. Jackson, of Kansas City, told how he made piles in this English manner except that he used Shelby seamless tubing and soldered the tip on instead of brazing it. He also swedged the tube to a taper because he said that a cylindrical pile at once opened a full sized hole in a target and thus made it easier for an arrow to go through. My experience does not lead me to agree with him in this last particular as I have many arrows with both kinds of piles and can see no difference in their power of penetration.

To make the piles stick on tightly some fletchers use ferrule cement, which is like sealing wax and worked in the same way by heat, some use glue, some depend only on a tight fit and some tap a dent in the pile with a center-punch. Duff advises Collins Cement, which is on sale at all Woolworth stores. All of these ways are good. If arrows, even of the best seasoned wood, are kept in the dry air of a steam-heated house all winter they will contract so much that in the spring their piles will come off. This can be corrected by standing the arrows in a glass of water about two inches deep before using them or by pulling off the pile, wrapping a little piece of paper around the wood and driving the pile on again by shooting it against a board or tree.

When speaking of long feathers I mentioned some experi-

mental arrows that McMeen made after specifications which we had arrived at in conversation. The principal other feature was that they were black, both shaft and pile. Our thought was that the field of vision on a brilliant, sun-lit range is very light and therefore a black arrow would show more clearly to the eye than a light colored one. This idea, extended to the pile, led McMeen to have them treated by the Bower-Barff process, by which they are oxidized to a grayish-black shade. The feathers were supposed to be dyed black but in reality they came out of the coloring bath a very dark and handsome green. Like so many things that sound well in archery these theories were found to have no great practical value. It is true that the arrows were good ones but they were no better, nor more easily sighted than ordinary ones.

Arrows are usually made in sets of a dozen but you will soon notice that even if you cut your shafts from the same board and make them of the same diameter they still will not weigh exactly the same. The chief reason for this variation is that the layers of wood are not uniform and some arrows will have a denser structure and greater weight than others. It is best to make up a larger number of shafts than you expect to finish, or at least use in one set. About eighteen is a good number, as a dozen can pretty surely be picked from them that will be fit to use together.

The question of the centre of gravity, or balancing point, of an arrow is one on which archers have debated so long and so vigorously that I am glad to be able to put an end to their discussions by giving an opinion which seems to me to be final. It is contained in a letter from McMeen and states the matter so concisely and well that I will simply quote his own words in full:

"Every so often there appears among archers one who has the obsession that an arrow will fly more accurately if the balancing point be brought away forward of where it appears in commercial arrows, and if he have a friend who is a fletcher

he beseeches him to make a dozen with the centre so placed, say at three inches from the pile's tip.

"Sometimes the fletcher tries to do that, but not if he have the vision of the underlying laws of physics; for there is a law that says:

$$\frac{Lw}{2W} = X$$

where L = the length of the arrow,
w = the weight of the arrow without the pile,
W = the total weight of the arrow with pile on.

"Under this law, which is simply that of a loaded beam, the three-inch requirement states thus:

$$\frac{28 \times 300}{2W} \text{ (the weight minimum of a shaft)} = 3.$$

"Solving this one gets W = 1400, the weight of the finished arrow!

"Imagine shooting such a missile at 100 yards.

"But there is worse to follow: I have had archers ask for arrows with the balancing point an inch from the pile tip. The weight of the pile for that kind of arrow will be 3,900 grains, or 400 grains more than half a pound.

"A fellow can break the commandments and the Volstead Act, but not the laws of the universe.

"Now there is an interesting conclusion to be drawn from all this. It is based on the fact that, if made of known materials, no shaft is stiff enough to fly true unless it weigh 300 grains. Also no shaft is good for the York Round unless it weigh under 451 grains. Assuming the minimum pile to weigh fifty grains, as an example, then the limits of the balancing point are these:

Shaft — 300 grains, Pile — 50 grains, Total — 350 grains,	Balancing point, 12 inches from tip to pile.
Shaft — 300 grains, Pile — 150 grains, Total — 450 grains,	Balancing point, 9⅓ inches from tip of pile.

"Which means that in a practical arrow one cannot get either way from these limitations *at all.*"

I have known many amateur fletchers who made their first arrows from written directions, without having seen any of the best work of professionals. Many of these shafts were very good, reflecting credit on the intelligence of the maker but without any exception they all had the same fault, a lack of finish due to the failure of the craftsman to appreciate the extreme care and delicacy with which the best arrows are made, an exactness such as is used in the making of instruments of science, as indeed they are.

My best arrows do not differ in weight more than one grain in most instances, with an extreme variation of three grains. For ordinary work a maximum of ten grains may be allowed but the closer you can come to uniformity the better.

Weight and size are not always in constant relation. Even from the same stock of wood arrows of the same diameter will differ in weight according to their microscopic structure.

After all, as the final proof of the pudding is in the eating, so the final test of the arrows is in their shooting. A set may look exactly alike to the eye and yet when discharged from a strong bow show considerable individual variations.

If you select a day on which you feel that you have unusually good command of the bow, number each arrow and plot on a paper target where it hits. To your surprise you most likely will find that after many ends, say at sixty yards, number six will be making an average of nine o'clock blue, number twelve perhaps four o'clock red, another may be going high and frequently missing above the target and so on. It is

rather discouraging to find your marksmanship altered by the missiles themselves but the situation may be controlled. If your stock of arrows be small you will simply have to learn the vagaries of each shaft for each distance and allow for them in your aiming, but the best way is to experiment until you have found six that will fly the same. Of course six that will fly straight for the gold are the ideal to be striven for but if you get six that fly with the same error the eye will soon allow for it and you will do almost as good work with them.

I think that the only two features of an arrow which still remain to be discussed are its length and weight. I have already said that twenty-five inches is the usual length of arrows for women and children but that presupposes people of average size, say five feet six inches. A woman of five feet eight inches or more can often shoot more comfortably with a twenty-six or twenty-seven-inch shaft as she can then extend her left arm out stiffly as she ought to do. On the other hand little children of twelve or less can do better with a twenty-one-inch arrow.

Arrows for men are standardized, and have been for time out of mind, at twenty-eight inches. That is the real length of the "cloth-yard shaft" of the old English ballads because the Flemish weavers brought over the continental cloth-yard of twenty-seven inches and it was so called to distinguish it from the standard yard of thirty-six inches which survives to-day. With the inch-long pile added to it the cloth-yard shaft thus became a twenty-eight-inch arrow. Nevertheless a great many of our best American archers prefer a shorter shaft. Jiles uses twenty-seven-inch, Taylor twenty-six-inch, Walker twenty-seven-inch and so on for a long list. I still stick to the twenty-eight-inch but I am not at all sure that it is the best length for me as my chief fault is creeping, owing to the difficulty of holding a full draw.

The weight of arrows is not a figurative expression, as it is with bows, but means exactly what it says. The English and

Americans have different conventions regarding the expression of weight, we simply stating it in grains, which seems to us to be simpler and more exact, and the English using the monetary terms of shillings and pence.

The shilling is eighty-seven and one-fourth grains and the penny is seven and one-fourth grains. In actual practice only the quarters of the shillings are used, the arrows for example being 4–3, 4–6, 4–9 and 5, meaning four shillings three pence, etc., but they are never 4–1, 4–8 and so on. This permits a latitude of twenty-one and three-fourths grains in a set of arrows with the same marking which is entirely too great a margin of error. As a matter of fact the English fletchers balance the arrows of a set against each other and simply mark them within the three penny weight because, as I said, a dozen arrows may be within one grain. Furthermore I have two sets of 4–9 arrows from the same maker which balance perfectly with their mates but each set is decidedly different from the other. Our American way of saying 370 grains, 406 grains, or whatever the weight really is seems to me to be much better.

Ordinary balances, such as the classic figure of blind Justice always holds, are as good as any for weighing arrows, which may be kept from rolling off the scale-pan by a little bent piece of paper or one pan may be taken off and replaced with a frame of bent wire of the same weight. Ladies' arrows should weigh about 3–6 to 3–9. Men's twenty-eight-inch arrows should not weigh less than 4–3, or 370 grains, which will have enough spine for a thirty-six or forty-pound bow, and it is not necessary to go above five shillings or 435 grains for any but the heaviest bows such as most of us cannot manage at target shooting. The best all 'round weight is 4–9, or about 414 grains.

All of these weights are for footed arrows twenty-eight inches long. I do not know just what self-arrows should weigh, though the difference ought not to be very great, and of course if a man make a short arrow the weight may be

somewhat less and yet the shaft be strong enough. It is better to err on the side of too heavy an arrow than too light a one and I have read of one husky Irishman who shot a 100-pound bow and nine-shilling arrows.

Now I am sure that from reading this long description of the processes of fletchery you have at least come to realize that the making of arrows which are exact mates is not an easy matter. To me these puzzling variations add to the interest of archery much as the individual characteristics of our friends react on us in our wider lives. Duff has expressed this feeling with quaint delicacy in some verses written in his mother tongue. They describe the musings of an old archer who looks over his last half-dozen arrows; a father soliloquizing on his wife and five daughters:

Eh yer bonnie in yer feathers an' yer pent an' tinsels braw
But yer jist like ilka lassies, kinda dour an' unco thraw.
Ye'll only gang yer ain wey but that wey's no fer me
Ye een maun tak the stracht road as weel as please the ee'.

An' you, ye muckle hussy, weel I ken ye, Number Twa.
There's no a chiel can trust ye as faur as yin can thraw.
Ye'll hae tae men yer mainers, my dainty wee bit quean.
I canna staun yer flirting richt before my verra een.

An' here's a sonsy limmer in her Easter braws sae fine,
Tae delicht the een o' man-kine, but she raises wrauth in mine.
Gin I sen her on an errand she'll begin tae dance an' sing.
Man, she loups jist like a Scotsman when he daes the Hielan fling.

An' then, thou dear auld faithful, in the past ye've din yer pairt,
But noo yer frail an' cranky an' it fairly sears my heart
Tae think again o' byegane days when ye were in yer prime;
Noo, like masel, ye'll tak a rest, I'm feared we've had oor time.

An' noo, my last two dearies, Number Five and Number Six,
Yer jist as true as ever withoot ony kittle tricks,

Had I a wheen mair like ye I wad let the hale warl ken,
They could pin mair faith in lassies an' no hauf as much in men.

I think the foregoing pages cover the subject of making arrows by hand about as thoroughly as need be but within the present century various processes of expediting and standardizing the work by the use of machinery have been devised by several investigators.

Chief among these are McMeen and Shepherdson, both of whom have turned out specimens of the fletcher's art of such perfection as to entitle them to the highest honor which is within the power of the Archers' Guild to bestow for such work, the degree of Master Fletcher.

As anything which I could say would be only what I learned from those gentlemen, since I never made an arrow by machinery in my life, I have asked McMeen to describe the whole process. He has not only generously consented to do so, but in addition has embellished his description with beautifully drawn illustrations, so that every step is made clear as day.

Before we proceed to it I think I had better speak of another method of shaping the shaft which he has not seen fit to describe, though I have owned and shot many perfect arrows which he made by it. In general it is also the method used by Shepherdson.

I refer to turning arrow shafts on a lathe. To the layman this might seem to be a very simple procedure, and he might also wonder why a modified machine for making dowels, or lead-pencils, would not turn out arrows as fast as might be wished. The objection lies in the fact that all such methods either fail to give perfect straightness or else take away some of the spine of the wood, by a loosening of the fibres.

No matter how fast a lathe may turn it will not make as stiff an arrow as can be made with a plane, if the cutting instrument be a chisel.

McMeen devised the rotating cutter, which consisted of a milling wheel spun at great speed by a small electric motor. This was attached to a travelling chisel-rest and was fed along the rotating shaft at a slow speed, so that the wood was taken off in the form of dust so fine that it floated on the air. Later, a carborundum wheel was substituted for the steel cutter and served just as well. Shepherdson uses a steel wheel covered with sandpaper, or perhaps garnet paper, which cuts perfectly. I have seen him make a shaft in about a minute, giving the final taper of the shaftment by turning the handle which sets the cutting wheel a little closer to the wood.

Possibly McMeen has not spoken of this method because it necessitates the use of an expensive machine lathe, but I can assure you that arrows of a high grade can be made in this way and without nearly so much demand for great skill as is required by the use of a hand plane.

Mechanical Aids in Arrow Making

By S. G. McMeen

The processes of arrow making are largely hand methods, as the art is principally practiced, yet the requirements are those of quantity production. That is, in the making of target arrows, it is necessary that all of a lot shall be as nearly exactly alike as possible, and that all of them be turned out at a reasonable cost. Quantity production addresses itself to the making of a great many things exactly alike, and at minimum costs. There is much to be gained in adopting these principles in the arrow making art.

These notes are the result of an effort to utilize machine methods in a part, not all, of the steps of making target arrows. There are some steps for which it seems that hand methods must still be used, not because there is no machine method possible, but because the hand method seems to be better adapted to the particular needs of those steps. In other

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words, with the mechanical processes available to modern industrial practices, some of the hand methods of the past still have the advantage of being less fussy.

The best target arrows are always footed. The footing is always applied to the soft wood of the shaft by what might be called the "clothes-pin" method, in which the footing is slit and slipped over the wedge-shaped shaft. The technique of this first step in the making of a target arrow is this:

The footing is made of hardwood—beefwood, snakewood, amaranth, lancewood, preferred by the writer in the order mentioned—and is ripped on a saw table into prisms 7½ inches long by ⅜ inch square. Each piece is then slit up the middle on the saw table with a novelty saw for a distance of say six inches. This is an incomplete cut, for the reason that the novelty saw leaves the cut rounded at the end, the shape of the saw, and what is wanted is a square-ended cut. The cut is then completed on a jig-saw or on a band-saw, as is convenient, and in that process the cut is made square-ended; that is, is compelled to come out at right angles to the length of the piece, so that the wedge-shaped shaft may fit into it.

It will be remembered that it was said that the circular saw cut in the footing was made with a novelty saw. This is a tool too little known. It has no set; it has both long and short teeth; in a cross-cut novelty saw five inches in diameter there are sixty short teeth and twelve long teeth. In a rip novelty saw of that size there are forty-two short teeth and fourteen long teeth. In both cases the intention and the performance are to produce a very smooth cut. As the wood leaves the saw it is as smooth as if planed. This is the reason for the choice of such a saw for use on the hardwood part of the joint between footing and shaft in a target arrow. For if the cut in the footing be rough the roughness will show in the finished arrow. This is because the footing material is hard, and also because of its usually dark color. On the main shaft the facts are otherwise. It is, and should be, sawed with a rough-cut-

ting saw, in order that the glue may grip best, and no matter how rough the cut on that soft wood there will be no optical unevenness in the finished joint.

The wedge-shaped end on the forward portion of the soft-wood shaft is also made by sawing. For this is used a jig or guide running in one of the guide grooves of the saw table. Almost all saw tables have such grooves, provided for the direction of the cross-cutting guide. The latter is not used in this step of the process, but instead there is made a strip of wood formed and equipped as shown in Figure 1, bearing on its under side a strip of metal fitting the guide groove. This strip of metal is set at an angle to the length of the piece of wood, so that the shaft square laid along its side has also an angle to the cut of the saw. This angle is just that required to bring the wedge into conformity to the slit in the footing.

The taste of the fletcher usually governs the amount of solid footing left behind the pile, but from 1½ to 2 inches is customary. If the rear screw that fastens the metal guide to the under side of the wedge-cutting jig be arranged to work in a cross-wise slot in the wood guide, the angle of the wedge can be adjusted to suit the footing slit if that be varied from time to time.

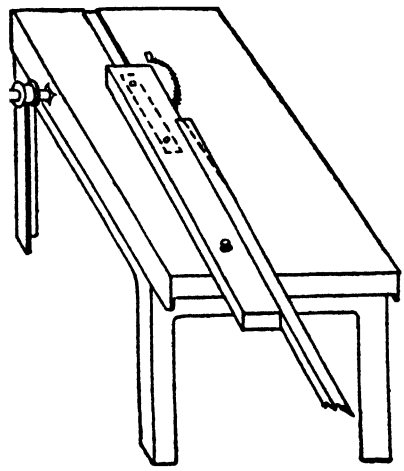


Figure 1.

The right-hand side of the jig has a cut on it to receive the three-eighths-inch square stock of the shaft, and, fitted to this cut, the shaft, accompanied by the guide, is fed forward. The rip saw slices off a triangular prism from the shaft. The latter is then turned over and a cut taken from the opposite side, at which point the wedge is finished. The whole operation takes

just ten seconds, is done with slavish exactness, and is a considerable improvement over hand planing in its uniformity and speed.

The slit cut in the footing and the wedge formed on the shaft, the next step is to glue the two together. The most exacting and conclusive tests have determined that casein glue is the best material for this purpose. These are the reasons principally applying to the case:

Casein glue is water-resistant to a degree almost warranting the term " waterproof."

It is worked cold, and does not " cheese " (set jelly-like) as does hot glue.

It has greater strength than the best hide glue, and still greater strength than any liquid glue.

These are all qualities demanded by the requirements of a good target arrow.

Casein glue is a cream-colored dry powder, looking something like very fine cornmeal. It is mixed according to maker's directions, these usually calling for the union of one part of the dry glue by weight with one and eight-tenths parts of water by weight. (An ounce of water fluid measure weighs one ounce avoirdupois.) An egg beater is good for mixing. In half an hour after mixing the glue is ready for use, having in that time changed from a stiff paste to a semi-fluid mass. This material is then smeared (a spatula or palette knife is a good applicator) on the wedge of the shaft and into the slit of the footing and the two slid together. A clamp on the footing just above the slit prevents it from splitting if the fit be close, but if everything has been done with nicety that will not be necessary, though in the earlier trials it is a wise precaution. Whether clamps are necessary along the joint also depends on the fit, but there too it is well to err on the side of a little extra work and put them on. Three are a maximum.

In six hours the glue will be dry enough for the work to proceed. The next step is to get rid of the extra wood that is

projecting from the sides of the joint, where the prongs of the footing are forced outward by the wedge. This is done on the saw table, and is shown in Figure 2; here too a jig is used, but this time it is guided by the regular side guide of the saw table, and not by a special groove-strip. This jig is merely a strip of wood having a notch for the wing of the footed, rough shaft, and the task is only to rip off the footing excess on each side. When this is done the footed stick is again a three-eighths-inch square, as the softwood shaft and the foot were at the beginning. The saw, it should be added, is a rip saw with the usual set, as it does not matter how rough is the cut. Figure 3 also shows the footing before and after sawing off the wings.

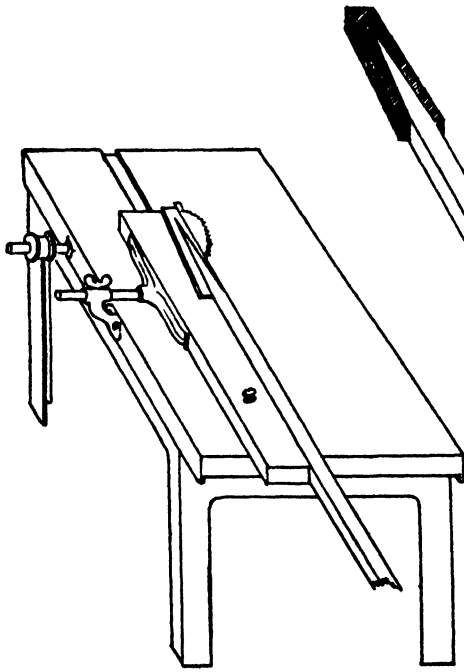


Figure 2.

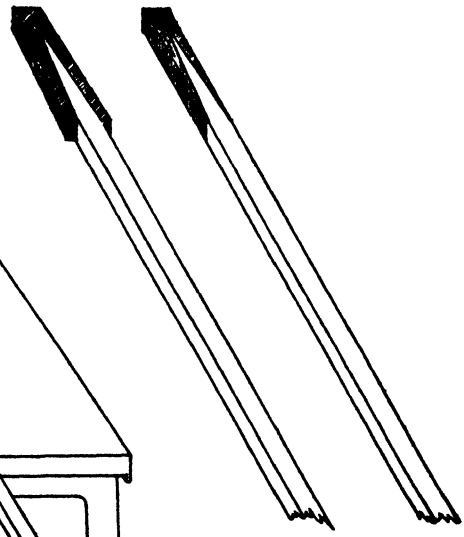


Figure 3.

At this point the process for the first time leaves the realm of pure mechanics and becomes a hand method. The squared

shafts are now laid in a V-shaped groove in a heavy strip of wood and planed off as to the four corners until the shaft is an octagon. (The V groove is well made by applying two bevel-edged strips to a four by four inch piece.) The octagon is now ready to be made round and for that purpose we need a new tool.

Figure 4 shows that tool, and it is what has been termed by Captain Cassius H. Styles a "book." It is book-like, and is made of two strips one and one-eighth inch by two and one-fourth inch, hinged together. Each of these strips is provided with a half-round groove, so related that the two grooves combine to make a perfectly straight round hole through the device.

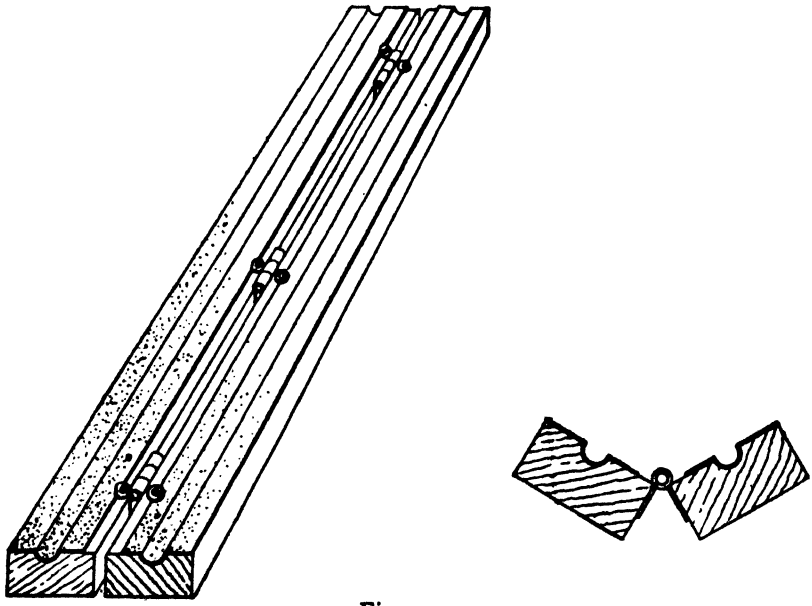


Figure 4.

The "book" is further lined with garnet paper. This paper is held in place in each half of the device by means of screws and washers. One of the little conveniences of its structure is to have the washers soldered to the heads of the

screws and to tighten the left-hand screw first in attaching the garnet paper to the "book." This allows the sliding of the paper, if any takes place, to be taken up by the sliding at the next screw.

This garnet paper tool is thirty inches long. The strips of garnet paper are two inches wide. The grooves are one-half inch wide and so the hole they form through the book is a one-half-inch cyclinder. When lined with the garnet paper this will cut, as we shall see, to five-sixteenths inch or less, depending on the use. The garnet paper lining is pressed into the grooves by clamping a rod of metal between the halves at the groove and pressing the halves together in a vise.

The octagon shaft is now placed in a lathe by its end, with the slide rest and tail stock removed, and spun at a rate of 2,500 revolutions a minute. The garnet paper tool is placed over it, hinges upward, and gently closed around it. The abrasive will at once reduce the octagon to a round shape, and in a very short time the arrow will be a nearly finished shaft. It is well to slide the tool endwise in an oscillatory motion during this abrasive process.

During the latter portion of this brief forming of the rounded shaft, it is necessary to watch the diameter of the missile. Sliding calipers are a convenience at this stage, as one can read the actual diameter in that manner. Another convenience is a scale of the gravity type, for weighing the shafts. These may best be of the type that reads direct in grains on a scale without the need of balancing.

It will be remembered that we have referred in the foregoing to garnet paper and not to sandpaper. There is a sharp distinction. Garnet paper is coated with crushed garnets and sandpaper with sand. There is no sort of comparison in their performances as abrasives. The former is preëminent for use on wood. There are special reasons for its use in fletchery. The spine of an arrow is its most essential qualification. Every other quality is secondary to that. This spine depends on the

nature of the union between the cellulose and the resin of the wood. It is never better than provided by nature, yet it may be made worse by undue application of heat. To work on an arrow by any process that destroys this union between cellulose and resin will injure the spine of the resulting shaft, and one such method is to heat the shaft unduly in its process of forming. Now too fine an abrasive in the tool for rounding will heat the shaft unduly, and so will too slow speed. *Therefore:* run the shaft at high speed (2,500 a minute or so) and use No. 2 garnet paper. This is a coarse grade and cuts cool because coarse. The finer grades are sure to heat the wood and should be used only for finishing, where the cut is light and short.

At the end of the book-forming the shaft is round, and ready for the pile and nock. Both of these, in one of the successful processes, are attached in the same manner. The process to which we refer is that of providing the nock with external rather than internal protection against splitting. The only purpose of horn or aluminum or fibre at the nock is this protection against splitting, and anything that will accomplish that and give reasonable drawing-finger comfort is acceptable. The use of aluminum is objectionable because of the softness of the metal and its inability to stand the shock of being struck by another arrow in the target. The best horn nocks will split when the weather is cold, and often when it is not. The only indestructible nock is the externally applied vulcanized fibre nock.

This is made in the following simple manner: Provide a tool as shown in Figure 5, which is nothing but an end mill. That is, it has teeth cut in its end and is hollow, and has a stop. The latter is merely a screw with a tightened fit, enabling the length of the cut to be governed. It is placed in a chuck in the tailstock and the shaft is placed in a collet in the hollow spindle of a lathe, the main body of the shaft lying in the spindle. The latter is spun, while the tool in the tail-

stock is fed up to it. In one second the diameter is reduced to that required for the attachment of the pile or nock.

In my practice, the internal diameter of the pile is seventeen-sixty-fourths inch, and of the nock seven-thirty-seconds inch. The two tools (end mills) are of corresponding diameter, allowing room enough for the cement of the pile and the glue of the nock.

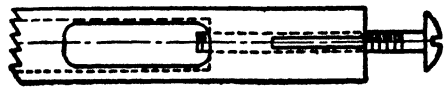


Figure 5.

The pile is of the usual American type, made from cold rolled shafting, five-sixteenths inch outside diameter, seventeen-sixty-fourths inside diameter, with a nose of sixty degrees included angle, which is rather sharper than may be preferred by all archers. This pile is turned from the solid stock, and has no taper except at the point. That is, it is in the main cylindrical, which by exhaustive tests shows itself to have no less stopping power than a conical pile and so is in all ways to be preferred. The English makers have expressed but one objection to a pile turned from solid stock, and that is that the oil in it, left from the turning operation, interferes with the holding power of the glue used in attachment to the footing. To this there are just two things to be said: First, that there is no need for oil to remain, as gasoline will wash it out, and second, that glue is worthless as a pile attachment, particularly in a dry climate like that of the United States generally. The only satisfactory material for pile attachment is ferrule cement, used principally by makers of fishing rods. If a good grade be secured—and trial alone can tell as to that—there is nothing better.

To use ferrule cement, heat the end of the footing in a Bunsen gas flame, heat also the stick of cement, spread the cement on the footing, where it will flow; then heat the pile and place in position, holding it there while you cool the pile in water. If the fit is so close from your tools that air is im-

prisoned to such a degree as to tend to push the pile off before the cement cools, then a preliminary step is required, this being to file a slight flat lengthwise on the shaft where it is reduced for the pile, so that the air can get out. This is always good practice.

Now as to the nock. Please recall that we are discussing the external, fibre form. It is to be made by cutting up black fibre tubing, five-sixteenths inch outside diameter by seven-thirty-seconds inch inside diameter into pieces seven-eighths inch long. The shaft having been reduced to receive them by means of the end mill, as has already been described, the sections of fibre tubing are slipped on and glued in place by means of either hot hide glue, casein glue or any good liquid glue, the reason for the large liberty of the glue being the absence of any great endwise strain on the nock in shooting. The blow of the string on the shaft is entirely insufficient to start the nock whichever adhesive is used. Its position against the wood of the shaft helps as to that.

The arrow is now complete except as to feathering. There are no mechanical aids possible here, the best way of doing such work being described elsewhere in this book.

After feathering comes the painting between the feathers and the painting of the crest or distinguishing mark of the archer. Here again much saving of time and a superior quality of work are made possible by the use of tools. The painting tool that is most satisfactory is shown in Figure 6, this consisting of a motor and an accompaniment of parts, the whole constituting a miniature lathe with a hand rest. It is hoped that the drawing is self-explanatory, but it may be added in words that the motor at the left is of the sewing machine type, that the hand rest is cut out to allow the feathered arrow room to revolve, that there is an intermediate rest to prevent excessive vibration, and that the right hand stop that receives the pile end of the arrow is provided with a concave centre. The two breaks shown in the base are merely introduced to

shorten the sketch. The device is actually about three feet long.

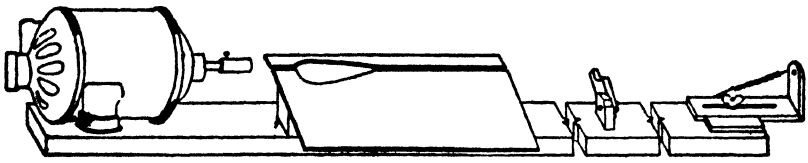


Figure 6.

A short list of places where supplies may be obtained:

Garnet paper. The Manning Abrasive Co., Troy, N. Y.

Vulcanized fibre for nocks. The Continental Fiber Co., Newark, Del.

Casein Glue. Casein Mfg. Co., 15 Park Row, New York City.

Casein Glue Mfg. Co., 135 W. Lake St., Chicago.

Waterproof Adhesives Co., Milwaukee.

The Napco Corp., Indianapolis.

Union Casein Co., 822 N. Broad St., Philadelphia.

Dodge's ferrule cement, for attaching piles, may be obtained at fishing-rod stores.

There occurs to us as meriting description one more mechanical aid, this being the device for cutting the nocks in the fibre ferrules. In any nock the best practice requires that the portion at the bottom of the nock be *curved two ways.* This is, the bottom of the cut must be round in one direction to fit the roundness of the string, and also must be round in the direction at right angles to that to fit the *curve* of the string. For when the arrow is released, the string, freed from the fingers, is bent into a curve in the nock. Surely there must be no sharp corners left there, or the string will wear too fast. The point is not a great one, as to this latter curve, and arrows will shoot well without such treatment, but archery is made up of niceties and perfections of equipment. The best arrows one sees have both these curves.

The device for cutting the nock does three things, practically all at once, and in a few seconds. It consists of a small saw, with a rounded edge, as thick as the nock-cut must be wide, on the side of which is clamped a disk of fibre or metal just as much narrower than the saw as the depth of the nock requires. This disk is to serve as a stop for the end of the arrow when the nock-cut is deep enough.

There is placed before the saw a fixed support with a semi-circular cut in it, to serve as a rest for the arrow. This only barely clears the saw. That is all the rig.

To use it, the arrow is laid in the rest and pressed home toward the saw while the latter runs. This cuts the nock to the required depth and automatically stops cutting as soon as the arrow touches the fibre or metal disk's edge. But the nock now has roundness one way and concavity the other way. The latter is instantly changed by first bringing the pile end of the arrow up, then lowering it (above and then below its horizontal position), while holding it in against the disk's edge. That is all. The cut now is rounded two ways.

XII

ROVERS

We twentieth century people have so standardized our sports that they have lost much of the spontaneity which to many is one of the chief sources of pleasure. Veteran archers, with years of painstaking study behind them, naturally wish to avail themselves of the fruits of their work by accurate shooting at the target, under strictly specified conditions, and making satisfactory scores. So, too, does the enthusiastic student who is developing his technique in the hope of reaching those Olympic heights.

Yet there is a large class of men who wish to shoot the bow and arrow in a freer manner, without care and without worry, just for fun and to find relief from the cares of work. For them the ideal form of archery is the ancient game of rovers.

It certainly is older than golf by at least twenty-five thousand years, for it is essentially what the Aurignacian cave man practiced when he shot at random marks to gain the skill necessary for killing his daily supply of meat. It is what the military archers of every race have done from time out of mind to the present day. It has the sanction of vast antiquity and yet fits easily into our modern life with the same thrill that it gave to primitive man.

I seriously think that there is excellent evidence for thinking that golf is a derivative of roving. It is true that knocking a stone from one dirt hole to another with a stick may have a primitive origin in the human psychology, but the long distances between golf holes, the desirability of an irregular terrain as in roving, the fact that golf developed among peoples who were skilled in roving and accustomed to playing it, suggest that if roving were not the actual predecessor of golf it had at least a great influence upon its development.

Roving in its original and primitive form means shooting at casual marks which may present themselves to the notice in the fields, such as trees, bushes, patches of colored earth, and the like. These marks are called *rovers,* and from this the pastime itself is sometimes known as rovers.

At the end of a day's work anybody can take his bow and a pair of arrows and go for a pleasant ramble before the sun sets. He may shoot a lonely way from tree to tree, or if a friend be with him, so much the better.

The most agreeable development of this form of the sport is a regular roving party. A few years ago I rented a small and ancient stone cabin on the edge of the "Hundred Mile Woods," in which lies Valley Forge. We called it "Forest Neighbor." Sometimes in the brisk weather of the fall and early winter, when the garnered crops left the fields free for finding the shafts, a party of congenial men would assemble there for an afternoon of roving, to be followed by a good supper beside the open fire, the table lit with hand dips and the flickers of the firelight playing in the deep recesses of the windows and among the unhewn beams of the ceiling. On one of these cozy occasions the most talented member of the group drank so many cups of coffee, brewed from rain-water to extract its full value, that when he retired for the night he found that Apollo would not give place to Morpheus and demanded his service with the lyre as well as the bow. During the evening the talk had centered on ancient ballads and chanteys and so, in the depths of the night, he sat in his pajamas and to a peculiarly compelling metre fitted these verses, the best picture of roving that words have ever drawn:

A-roving! a-roving! Oh, who will go a-roving,
To sight a target in the mead,
To watch the feathered missile speed
And quiver like a plumed reed
To draw you on a-roving,
A-roving, a-roving,
Across the hills a-roving till daylight dies?

A-roving! a-roving! Mark well the flight a-roving!
Give heed the bowstring's twanging sigh,
And watch the humming pot-shot die
In Heav'n and drop from out the sky
A winged wand a-roving,
A-roving, a-roving,
Come back to you a-roving till daylight dies.

A-roving! a-roving! Lift up your eyes a-roving!
O'er all the woodlands' magic sway
Behold the wonder of the day
And let the fancy freely play
To yonder hills a-roving,
A-roving, a-roving,
Adown the valleys roving till daylight dies.

A-roving! a-roving! The dusk comes on a-roving!
At Forest Neighbor on the hill
Is found the wherewithal to fill
The last desire; completely still
The hunger born of roving,
Of roving, of roving,
The appetite from roving till daylight dies.

A-roving! a-roving! The time is past for roving!
Put on a log and let her roar!
Another glass! Foot up the score!
Good fellowship brings more and more
Of happiness to roving,
To roving, to roving,
To happy days a-roving till daylight dies.

—MARK H. C. SPIERS,
23 November, 1919.

The "pot-shot" of the poem means shooting directly upward with all the force of the bow and attempting to hit some object close at hand, like a stump or a hat thrown on the ground. It requires very nice judgment, as the wind will carry the shaft an astonishing distance. In no form of shooting has the skill of our forefathers been more grossly exag-

gerated by both modern and contemporaneous writers than in this. You remember how Conan Doyle makes his young Saxon shoot high in the air and drop on a stump, and I find, as an example of ancient hyperbole, this scene from one of the old Scandinavian sagas: "King Olaf took a spear, and put its point into the ground; then he placed an arrow on the string and shot into the air; the arrow turned itself in its course, came down with its point into the end of the spear-shaft and stood there upright. Heming took an arrow and shot, it went very high, then the arrow point came down into the shaft of the first arrow."

During my lifetime, and perhaps for a generation before, this style has been called "Turtle-back" shooting, because the Indians along the Orinoco River are said to kill the big turtles in this way. I had privately considered this to be a first cousin to a fish story until a few years ago when I heard Professor Farabee, of the University of Pennsylvania, a great authority on those regions, give an illustrated lecture in which pictures occurred which showed giant turtles lying side by side in vast numbers. Instantly the possibility of shooting them by a falling arrow became perfectly obvious and although I was disappointed in having the doctor tell me that he had never seen Indians kill them in that manner yet I am sure they could if they wanted to and my impression is that he shared the same opinion. In roving it is naturally a dangerous kind of shot and should never be attempted if there be any doubt of everyone's being able to follow the arrow with the eye. I know a gentleman who pierced his niece's hat brim and pinned her skirt to the ground between her feet.

It seems to me that there can be no better place than this in which to speak of the competition between an archer and a golfer in the hybrid game called archery-golf. Just when it was played for the first time no one will ever know and I should not be surprised to learn that it is as old as golf itself. As I have said before, there is so much similarity between golf

and rovers that the enthusiast in one naturally thinks of it when he sees the other.

My first experience was in the fall of 1910, before I had ever seen another archer shoot, not only at archery-golf, but at anything. It was a nine hole game on the course of the Saint David's Golf Club, about a mile from my home, and my opponent was the club champion, Frederick J. Wendell. We halved the game for both medal and match play, winning an equal number of holes and making a gross of eighty-one. I shot at a four-inch disc of cardboard laid on the green. It is reported in *Forest and Stream* for November 30th, 1912.

So far as I know this game was the first in America but I am quite willing to acknowledge the priority of anyone else who may present a better claim. Certainly neither of us had ever heard of such a thing before. I mention it only because I want to do what little I can to stop the unending claims of new archers who believe they are the first to have played the game. Not a year goes by but someone appears in print with a statement that he has discovered a wonderful new sport, unquestionably destined to be received with enthusiasm wherever golf is played.

Now what are the larger aspects of the question which we archers should face with candor and attempt to solve? Is it of sufficient merit to take a permanent place in the program of golf clubs? Does it show the beauties of archery to such a degree that it may entice some of the great horde of golfers away to what we think is a better game than theirs, acting as a sort of stepping stone to real archery?

As a parliamentarian might express it, the answer to both interrogations is in the negative, and the reason is simply that archery is at its best only when it follows one of the forms which have become conventionalized through a long process of selective evolution.

In the first place an initial flight shot has none of the difficulties of the drive. While it is true that every archer loves

courses and but a few regularly laid out roving ranges, many archers who wish to shoot in the roving style will have to make a virtue of necessity and play archery-golf or nothing, unless they rove the unmarked fields.

Of regularly laid out roving fields there are two sorts. One of them has been in existence for only two or three years and frankly draws its inspiration from golf. The course winds about like a great serpent, just as it does in golf, and crosses itself as seldom as possible. Hazards are interposed as often as the ground permits, so that one must shoot either over or under a tree or over a rock or hill. The essential difference between this form of rovers and the old English game is that the mark must always be hit, even though it may require many shots, just as one must always hole out in golf.

The mark used, therefore, is a twenty-inch straw target with a face on both sides which is divided into a four-inch white bull's-eye, a four-inch black ring and an outer four-inch white ring. Every shot counts one against the archer and on hitting the target the bull's-eye counts one shot, the black ring two and the white ring three. There are eighteen marks and the lowest score wins; all being as much like golf as may be.

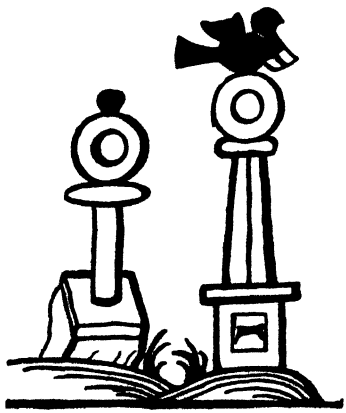
It is a first-class game, admirably adapted to large public playgrounds, summer resorts and in fact any place where golf is usually played. It was invented by archers of the Pacific coast and was first provided with a regulation setting by the municipal authorities of Oakland. Rule books and equipment for playing it may be obtained of the California By-Products Co., of San Francisco and New York.

The source of our knowledge of what old English roving really was is confined almost entirely to the records that remain to us of the associated companies who shot over the Finsbury Fields. From what has been said of them before it is evident that they were the representative archers of the metropolis and, although they are first mentioned in 1590, it

is probable that they preserved the best traditions of hoary antiquity.

Fortunately Hansard has preserved a list of their marks, with the distances between them, and, in order to visualize the range more clearly I have drawn them off to scale as is shown in the map, which Mr. Mang has kindly embellished with quaintly suggestive sketches.

Assuming that many Americans are as unfamiliar with the location of the places in modern London which lie on the site of those old shooting grounds as I was until I searched them out on the map, I will try to locate them by starting from the Tower of London. About a mile north of it and a little to the east are Finsbury Circle and Finsbury Square, about all the uncovered ground which remains of the Finsbury Fields except the Artillery Ground on the other side of the street, another little park which still bears testimony in its name to the bow and arrow. Here, or somewhere in the vicinity, in a place called the Pretend Mead, stood the Castle, or first of the marks, not a stately mediæval fortress but a stone set in the earth containing a hole in which a decorated pillar was set.

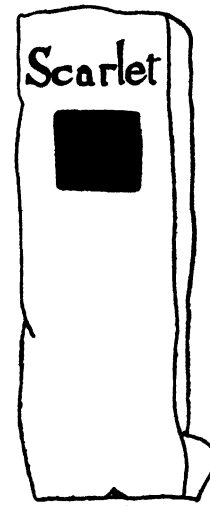


Markham's *Art of Archerie.*

Two of these foundation stones of the ancient marks have been discovered in modern times. A few years ago the one called Whitehall was at the end of Dorchester Street, a little thoroughfare only a block in length in Hoxton, north of Finsbury and near the Regent's Canal, but it has now disappeared. The other was the Scarlet Lion, which was found built into the wall of the canal itself. Fortunately the H. A. C. had it removed in 1881 and taken to their armory, where it is now on exhibition. The word Scarlet is carved

in the stone in lettering which looks to me of no older a style than of the seventeenth century and below is a square recess which I suppose contained a metal, or perhaps wooden, plate with a lion carved or molded on it.

The origin of the names of the marks is lost in obscurity but the older writings prove that it was as natural to speak of a shot from Arnold to Absoly as of a road from London to Windsor.



From *Badminton.*

Colonel Walrond says, in *Badminton,* that in 1628 there were 164 marks, which in 1737 had decreased to twenty-one marks and three butts. If that be so the original fields must have been enormous because the comparatively small route indicated by Hansard began in Finsbury, led northwest through Hoxton and ended on Islington Common, where the butts were placed.

In olden times rovers was encouraged for the sake of developing military archers and therefore the ranges were very long and an arrow could be shot only once at each mark. It differed from the modern game described above in that hazards were never used, as a direct, strong flight of the arrow was desired, and no arrow could be pulled from the ground and shot a second or third time.

The lay-out of the field is also different. A glance at the map will show that marks were placed at long distances around the periphery, with a few others in the interior of the field. By shooting from one to another in different directions an almost infinite number of variations might be found.

With the exercise of a little ingenuity a modern roving field might easily be laid out on this general plan. It would require a total space half a mile long by a quarter broad and would have to be adjusted to the terrain.

On the map I easily plotted off a twenty-eight mark course

of three miles total distance which began at Lambeth and ended there without shooting twice over the same range. The ancient rules decreed that seven was the game and that each archer should shoot two arrows at each mark, the nearer winning.

Personally I think this is the highest form of roving, developed from centuries of experience, and I should like to see it played on American ranges.

Although the old Finsbury marks of wood and stone were characteristically British in their solid and permanent construction they undoubtedly must have been very hard on the arrows. For modern use I would suggest either a small butt of sod, two feet square and three feet high, or, which I think is better, a rod, thickly lashed about with straw and covered with canvas.

In all kinds of rovers it is well to use the strongest bow that one can command. Ordinary target arrows are suitable for use in fields that are free from stones and against soft marks, but for very long shots it is well to be equipped with a few flight arrows and for roving at random marks, or on stony ground, stout shafts of hickory or birch are most satisfactory. It is well to paint them in brilliant colors.

Clout Shooting

Shooting at the clout was the old English form of competitive archery at a single mark. It was played like rovers except that the archers did not move on from one mark to another but shot repeatedly at the same object as we do in target shooting. It gets its name from the fact that a white rag tied to a stick or stretched on a frame was the early form of objective. From target shooting it differs essentially in the great length of the ranges, which are never less than nine score and may even be as great as twelve score, a distance which would have won many of the flight shooting contests in our American tournaments.

For at least a century and at the present time there have been only two archery societies in Great Britain which have shot in this way: the Royal Company of Archers and the Woodmen of Arden.

The Royal Company shoot at either nine or ten score at a clout three feet in diameter; a white straw target without rings but with a black spot in the centre. To be in the marking an arrow must strike within four bows, or twenty-four feet, of the clout-pin. Of these the only ones that count are those hitting the clout, no matter how many there be, which score two points, and the arrow nearest to the clout but not in it, which counts one. Thus if no arrows hit the clout, as is very often the case, the only score will be a one for the man whose shaft is nearest.

On practice days, however, they shoot at the "rings," as they call it. In this form of the game rings are marked on the grass around the clout at distances of half-bow, bow, bow and a half and two bows, or three, six, nine and twelve feet, the whole thing thus becoming a twenty-four-foot target with the clout as a bull's-eye. The scoring is the same as on the Scottish four-foot target: 5, 4, 3, 2, 1.

The number of ends, of two arrows each, at clout shooting, is not definitely fixed in Scotland but is determined at each match by two judges of the day who usually set from seven to ten.

There is a flavor of times long past in the matches and ceremonies of this ancient company, as there is in most Scottish formalities, for the strongest races are the most sentimental. What can depict the charm of clout shooting in Scotland more convincingly than such reports as these?

"The Royal Company went down to Selkirk, in Ettrickdale, this year (1925) to shoot for the Selkirk Silver Arrow. The name on the oldest medal attached to the arrow, bearing date 1660, is Walter Scott, of Godelands. They received, as ever, a warm welcome from the Provost and Magistrates and

Townsfolk of the ancient burgh and marched through the town to the deer park in the Hainine preceded by their Pipe Band, who wear the kilt of the Royal Stewart tartan, and the two Town Halberdiers, one carrying the Silver Arrow tied to his halberd. Before many spectators ten ends were shot, resulting in a tie. In the evening a dinner was presided over by Lord Armidale at which the arrow was presented to the winner by the Provost of Selkirk, accompanied by the usual and ancient custom of a 'riddle' of claret, which was duly honored."

"Shooting for the King's Prize, which is Twenty Pounds, presented annually by His Majesty to the Royal Company, for the winner to buy a piece of silver to commemorate his success, instituted in 1787 and first shot for in 1788, took place at the Archery Range, The Meadows, Edinburgh, on 9th July, the distance also being nine score yards. The day was ideal for shooting in every respect, and the contest was witnessed by a large number of spectators. Brigadier Sir Thomas Hutchinson, Bart., won with a score of 3, made by having the nearest arrows in as many ends.

"On the previous day the monthly match and dinner were held at Archers' Hall, the custom being that sides should be drawn and, after the match, one of the losers has the honor of presiding while the highest scorer on the winning side gains a 'free' dinner. The shooting is at nine score yards and at the 'rings.' Five ends constitute a 'party' and there were three 'parties' shot. The winner made 11 hits out of 30 arrows, with a score of 25." (Editor's note: In English target values this would have been 39.)

The clout used by the Woodmen of Arden is two feet six inches in diameter. For the first century of their existence they shot under the ancient rule of acclaiming the arrow nearest the clout, or nearest the centre of the clout if two or more were in it, as that of the winner. In 1887 a series of triennial matches at clout shooting was begun between the Woodmen and the Royal Archers, the latter presenting a handsome silver

CHAPMAN AND PHILIPS CLOUT-SHOOTING IN THE SNOW

WOODMEN OF ARDEN CLOUT SHOOTING AT THE RINGS

bowl for a prize. To establish fresh conditions for this match the Woodmen decided to shoot at numbered rings drawn around the clout but they were of different width and number from those of the R. C. A. The clout is encircled at distances of 18 inches, 3, 6, 9 and 12 feet and the values are 6, 5, 4, 3, 2, 1.

Exactly one hundred years before the gift of the bowl, in 1787, Heneage Finch, Lord Aylesford, presented a massive silver bugle which was to be shot for at not less than 9 score nor more than 12 score, the distance to be determined by lot. This competition still goes on at any of these great distances that may happen to befall. A year later the Countess gave a silver arrow, which with true feminine compassion she stipulated should be competed for at the least range of only 9 score. This also is an annual event. The number of arrows at each round varies from year to year, which seems peculiar in modern days.

Practically all of the chief features of the shooting at Meriden and Edinburgh are the same except in regard to the size of the targets. At both places double clouts, or clouts at each end of the range, are used, and both have markers, or men who stand behind shields near the clouts and signal the result of each shot. Each marker has a little white flag on a short stick. For over-arrows he waves backward, for short, points to the ground in front and extends his arms for wide. For hits in the rings he gives as many flaps as the number warrants and for a clout he falls over on his back.

At the competitions between these two societies there are about ten or a dozen men on a side. There were four matches, from 1878 to 1887, of which the Scotch won the first three and the English the last. The regular triennial series, which began in 1890, has continued till the present time except for the interruption of the war and, so far as I can gather from the *Archers' Register* and *Archery News*, the Scotch appear to have a

slight advantage. The matches always seem to be very closely contested and must be interesting affairs to participate in.

In America the first clout shooting was held at Cooperstown in 1922. James Duff, who had been a marker for the Royal Company for eight years in his youth, laid out a 40-foot ring for us, but we used a regular four-foot target for the clout. Why we used 40 instead of 48 I do not know. Our scoring was different from any in Great Britain, as we counted three for a hit in the clout, two for the nearest arrow and one for every other arrow within the ring. I was the lucky man that year with a score of 36, including three clouts. I remember that it was blowing a regular gale so that one had to aim what seemed to be thirty or more feet to the left of the target to allow the arrows to drift on. It was nearly all luck with me. The clout was at 180 yards and I found that my bow at its full draw and forty-five degrees would shoot exactly that far. All I had to think of was direction and distance took care of itself. The women shot at the same target but at 120 yards.

In 1923 the same kind of clout shooting was put on the program of the Eastern Archery Association at Jersey City. Miss Katherine Howe, of Dorset, Vt., won with a score of 39 for the 36 arrows. I notice on looking over the old scores that I was twentieth out of twenty-six contestants.

In the National Archery Association at Chicago, a month later, W. H. Palmer won with the fine score of 41.

In 1924 the men and women contested separately, for the first time, at the E. A. A. tournament at Rye. Miss Dorothy Smith won for the ladies and I was lucky again among the men for the same reason as before, that the bow, although another one, shot exactly that far. The next week, at the N. A. A. at Deerfield, the same bow carried only 170 yards, draw and loose as I would. Palmer won again, making 40.

All this time the same 40-foot ring and four-foot target had been used, and it was rapidly becoming accepted as fact that the true American Clout Shoot was of that description. This

year (1925), at the E. A. A., it was thought that a change to counting by the rings might be introduced with advantage. The foreign methods were studied with care but were not considered satisfactory, chiefly for the reason that an arrow just skimming the top of the clout would not land in the next ring but would go over into the second one.

We therefore devised a target of which the gold was formed by a standard four-foot target laid flat on the ground, the red was four feet wide and the blue, black and white were each six feet, the whole thing being forty-eight feet in diameter. To mark the clout distinctly a small white flag, like the old original clout, was stuck in the centre. The men shot at 180 and the women at 120 as usual, but this time each sex had its own target. The rings were made with white tape, such as is used for marking tennis courts, wired down by broad staples placed about a foot apart. It proved to be very satisfactory and permitted of no disputes, such as might arise from the irregularities of marking with lime.

Seventy-two arrows were shot; the first three scores for each sex being:

Miss E. True.....	63-279	Dr. Crouch.....	64-282
Miss D. Smith....	61-251	J. Barrow.....	60-230
Mrs. B. P. Gray...	56-228	W. H. Palmer, Jr..	59-227

It thus appears that scoring at this distance is much easier than at the 100 yards of the York on the small target. Perhaps it may be properly compared to the 80 yards.

This tournament showed clearly the advantages of the ringed target but also proved that the straw clout might as well be given up entirely and a return made to the original cloth clout, used merely as an indicator of position.

With these changes in mind the target at the national tournament at Rome was simply a reconstruction of the regular standard target except that the unit of measurement was the foot instead of the inch. Thus we had a forty-eight foot

target with a gold of nine and six-tenths feet and rings of four and four-tenths feet. It worked out in practice to the satisfaction of everyone and I believe that in future our American clout shooting will be done in this way. With 180 yards as the standard distance and thirty-six arrows as the number to be shot it will be possible to have an accurate comparison of scores and no doubt records will soon begin to appear.

At present the high mark is of course the winning score of Dr. Crouch, who shot in beautiful form and made 36–172.

The technique of clout shooting is essentially different from that for distances of 100 yards or less, because the elevation of the bow is usually either at 45 degrees, where the maximum distance is to be obtained, or not very far below it. Overhand shooting, therefore, necessarily implies either a very low draw to the breast or a point of aim high in the sky. As most archers, at least in America, indulge in clout shooting only as a secondary amusement and do not wish to spoil their form for target shooting by drawing in two different ways, they are averse to the breast draw and by necessity are forced to take the high aim.

An aim in the sky, however, is the most uncertain thing in archery. If it be a cloudless day one is left with nothing to fix his vision on and must rely wholly on his judgment, the ancient style of shooting which never brings good scoring, and even if clouds be in the sky they are always on the move and are extremely deceptive.

To avoid these difficulties the English have shot with an underhand aim for time out of mind, as is implied by the very use of the words forehand and underhand in the older writings. By this method one sights at the clout, or point of aim, from below his bow-hand, usually by aligning with some mark on the lower limb of his bow. Although I am opposed to the use of artificial aids in archery I feel that if they are ever justified it is in clout shooting. If one put a band of rubber,

or a piece of adhesive plaster, or a piece of marked paper at the right place on the lower limb of his bow he can sight it in line with the horizon, or the clout as he may prefer, and thus obtain a very consistent elevation. In fact I think it is the only accurate method of clout shooting.

This form of archery has distinct charms of its own. It allows a freedom of action that is not nearly so exacting as the finished technique of close work at the targets, although I do not mean to imply by that that one should be careless of details if he wish to excel at nine score or over. Unquestionably it is one of the most beautiful kinds of shooting, with its great sweeping trajectories which seem to cut the clouds. It is the blood brother of roving, except that it allows of greater accuracy because of continually repeated shots at the same mark.

There can be no question but that clout shooting is a highly desirable variety of shooting, with a legitimate place of its own. It is especially suited for men of æsthetic appreciation, who enjoy the long flights and long walks and who are lucky enough to have at least a narrow range of 200 yards at hand, even though they may not have a field large enough for rovers nor care to keep so large a space of ground in condition.

Flight Shooting

The whole object of flight shooting is to send an arrow the greatest possible distance without particular regard to direction. Undoubtedly the longest flight shot of which there remains a record so authentic that it can be accepted without a quibble was that of the Persian archer named Aresh, who stood on top of the mountain Damovend and, just as the sun peeped over the horizon, loosed a shaft with such splendid vigor that it did not strike the earth until sunset, when it landed in the banks of the river Gihon about five hundred miles away.

With such an example set before us what can we do to emulate it?

There is so much fable mixed with fact in all the ancient accounts of shooting for distance that we cannot be very sure of what the real performances of the ancients may have been. Of one thing we are certain; that the bow with by far the best cast is the Oriental composite bow which is described in the next chapter. The first shot, of which we have undoubted proof, that was made with such a weapon was that of Mahmoud Effendi, the best report of which is given in a footnote to page ten of Roberts' *English Bowman,* as follows:

"In the year 1795, Mamhood Effendij, secretary to the Turkish Ambassador, a man possessing very great muscular power, shot an arrow with a Turkish bow four hundred and eighty-two yards in the presence of three gentlemen, members of the Toxophilite Society, now living; who measured the distance, and to whom he observed that the present emperor (Sultan Selim) could shoot further than any one of his subjects."

This statement I absolutely believe. The bow and arrow with which he did it have been in the possession of the Royal Toxophilite Society ever since and the present record is so near to it as to put the feat well within the bounds of credibility.

There are many other shots which we must regard with suspicion. For example Stuart (*Antiquities of Athens, Vol. I, p. 10*) mentions a shot by Hassan Aga, the waiwoode of Athens, of 584 yards and one foot, English measure.

I know of nothing that will help us to distinguish between truth and fiction in these old reports except our own good sense, as sometimes the authors of the most astounding tales appear to be men above reproach. For example Sir Robert Ainslie, English Ambassador to Turkey, said that in 1798 he saw this same Sultan Selim shoot 1400 pikes (Turkish measure) which he translated as 972 yards 2¾ inches.

During the whole of the nineteenth century there was not very much flight shooting done in England of which any record

has been published, with either English or Oriental bows, and the great shot of Mahmoud began to take the form of a questionable myth. In 1905 the celebrated sportsman and authority on firearms, Sir Ralph Payne-Gallwey, appeared in competition at Le Touquet with a Turkish bow and made a flight shot of 367 yards. James Duff told me that he had seen Sir Ralph shoot 376 yards in Edinburgh, in 1905, with this same bow, which drew 100 pounds, and that an arrow from it had pierced the steel marker's shield behind which Duff was standing, at 200 yards. I mention this particularly to refute the absurd statement, often made, that while the Turkish bow will shoot far it will not shoot with great striking power.

Even though this record at Le Touquet exceeded by 7 yards the best distance claimed for a bow of yew it was destined to be beaten eight years later by Ingo Simon.

In June, 1913, he startled the archery world with a shot of 259 yards 8 inches but in the next year, June 26th, 1914, he not only equalled but measurably improved it. *The Archers' Register* reports as follows:

"In the afternoon flight and rover shooting took place on the golf links. Mr. Ingo Simon beat his former long shot by 3 yards, and shot a distance of 462 yards 9 inches. He used one of his Turkish bows, pulling 80 pounds, and Turkish flight arrows, and drew the string by placing it behind an ivory ring, which he wore on his thumb, and tucked his thumb under his first finger."

This last shot is usually spoken of as the world's record, though I feel that it does not deserve that distinction without qualifying it by mentioning the apparently undisputed shot of Mahmoud. There is also no doubt that arrows have even been shot much farther than that of the Turk, as he did not seem to think he had performed a very remarkable feat. How unfortunate it is that with the passing of archery in the East we cannot look forward to having some accurate modern measurements of just what those best shots were!

I do not see any reason why a skillful and resourceful American cannot make a good flight bow of the Turkish pattern. If he will follow the measurements which I give in the next chapter I think he may expect success.

Certainly he will win the flight shooting contest at any of our tournaments if he succeed in making such a weapon.

Both Sir Ralph and Mr. Simon were men of great personal strength. The latter is not a native born Englishman, although he has lived there for many years. They both used short arrows, about twenty-one inches long, which they drew for four or five inches more by means of a bone guide fastened to the wrist of the bow-hand.

The cast of the ancient English yew bows of the best quality was no doubt as much as 300 yards, as more than that can be made to-day by strong men. One of the marks of the Finsbury Archers was said to have been eighteen score, or 360 yards, in early times, although nothing so long appears on any of the maps nor was it given in later lists except as a sort of authentic tradition. Formerly I would have doubted the possibility of shooting so far with a longbow but Mr. Curtis has come near enough to that distance to make me feel less skeptical.

It is natural for us to be incredulous of all athletic records that were made in the eighteenth century, as so many of them were carelessly measured or even deliberately falsified, but just as Simon has forced us to believe in Mahmoud, so Curtis has put within the bounds of reason the following two scores, which are reported by Roberts in these words:

"Mr. James Rawson (of Cheetham Hill, near Manchester, who died about the year 1794, the best archer of his day) told Mr. Waring that he once shot upon ground, very little declining in his favor, eighteen score yards (360). And in the year 1798 Mr. Troward (a member of the Toxophilite Society) shot on Moulsey Hurst, an uncommon level piece of ground, and when the wind was very still, seventeen score

yards (340). It is not believed that, for at least a century or two past, these two instances of distant shooting have been surpassed.

"The shot made by Mr. Troward was not an accidental shot; he repeatedly shot, both up and down the wind, that distance, the same day, in the presence of many members of the Toxophilite Society. As his shots were made during the contest for a prize, each shot was measured with the greatest possible accuracy and the field had been previously staked out in scores and half-scores. Mr. Troward shot with a self-bow, of the power of sixty-three pounds. His arrows were flight arrows, of the length of twenty-nine inches, and weighing about four shillings, arrow-weight. The bow with which Mr. Rawson shot was a backed-bow."

Roberts goes on to describe Rawson as a very stout, middle-sized man who was a maker of men's shoes. "In the exercise of that business he increased the force and hardened the muscles of his arms to such a degree that his power over the bow was exceedingly great."

I may honestly say that I see no reason to doubt these careful statements, particularly that concerning Mr. Troward.

Of flight shooting in Great Britain between this time and that of Ford I know nothing except for the interesting remarks which Ford himself makes concerning Peter Muir, the famous bowyer of Edinburgh. He says that although Muir was a man of great skill and strength he found that he could shoot further with a bow of from fifty-eight to sixty-two pounds than with a stronger one, but that, with such a bow, he never could quite reach 300 yards.

Ford himself passed that mark and as everything of his best that he said and did should be known by all students of archery I will quote the paragraph as he wrote it:

"In flight shooting, I have, personally, had very little experience, but in the autumn of 1856, in the presence of a brother Archer, I succeeded, upon several occasions, in ex-

ceeding the 300 yards, the longest shots being 308 yards, with a slight wind in my favor, and in a perfect calm 307 yards one foot; the ground was carefully measured with the tape. The bow used was a sixty-eight-pound self yew, taken at random from Mr. Buchanan's stock, and was by no means remarkable for quickness of cast, though it has since proved an excellent target bow. I believe, therefore, that with practice, 300 yards is fairly attainable by many Archers of the present day, and that several might even reach very considerably beyond it."

It seems to me that these English archers did not give enough heed to the arrow in flight shooting but that they appeared to think the differences in the distances which they obtained were due solely to the power and cast of the bow. I cannot help feeling that if Ford had shot a flight arrow of the kind which we use to-day he might have made a better record than even 308.

After the time of Ford I think that flight shooting was almost non-existent until it was revived by Sir R. Payne-Gallwey.

Flight shooting in America owes its firm tradition almost entirely to L. W. Maxson, who won the event in the annual tournation of the N. A. A. fourteen times. Although he won it for the first time in 1887, eight years after the first tournament, there had been only three contests before that and I have an impression that Maxson was in at least two of them. I think I have said elsewhere that Maxson was a big man of unusual strength, a former oarsman at Yale, and it evidently was a delight to him to exert his powers in a strong bow. His best record of 290 yards, made in 1891, remained unbroken until 1924, although G. P. Bryant came within eight inches of it in 1916.

To my mind there is no question but that every one of the N. A. A. flight shoot records from 1882 to 1909 is wrong. It is a self-evident fact for, if you look at the list closely, you will see that every score is expressed in even yards except two

which have half a yard added. This is so absolutely impossible that one wonders if sometimes the distances were not even paced off, or measured in some such careless manner. In 1910 the event was won by Mr. Homer Bishop, who is a man of extraordinary mechanical exactitude, and for the first time inches were included in the measurement. Since then I am sure there have been no mistakes of any magnitude. It was even worse with the old English measure by the score. It is impossible to tell within sixty feet just what they meant.

I won the flight shoot in 1910, making 270 yards nine inches, with a six-foot lancewood bow from Aldred's, of London, which I think weighed about fifty-three pounds. The arrow was an ordinary target arrow from my regular set by Whitman which was numbered thirteen and, perhaps for that reason, always flew too high at target shooting. Fred LaPorte, of Kansas City, had told me the evening before that flight arrows had small feathers so I cut mine down to mere nubbins. When I came home I put that arrow away in a safe place so that I would be sure to have it next year and I have never been able to find it since.

There was a howling wind blowing and I shot very high to catch it. I also used a six-inch bone guide, which I wired to the bow, so that the total draw must have been about thirty-two inches. Just how much the bow weighed at this distance I do not know.

In 1913 I won with 260 yards, using the sixty-pound osage orange bow by Mauser that I have described in the chapter on Tackle. I shot a light target arrow with trimmed feathers, drawn in the bone guide.

In 1922 I used the wonderful little five-foot bow of Paraguay ironwood which Pope had made and with which he had won the year before. Through an oversight Pope's distance is not recorded in the books of the N. A. A. but my recollection is that it was just ten yards better than mine in 1922 which was 269 yards. We both used the same flight arrows,

beautiful light shafts of bamboo, thirty inches long, footed with birch and tipped with a bullet casing, in fact exactly the same kind of arrow that is now made by the California By-Products Company. Some of the arrows were made without heads but they did not carry quite so far.

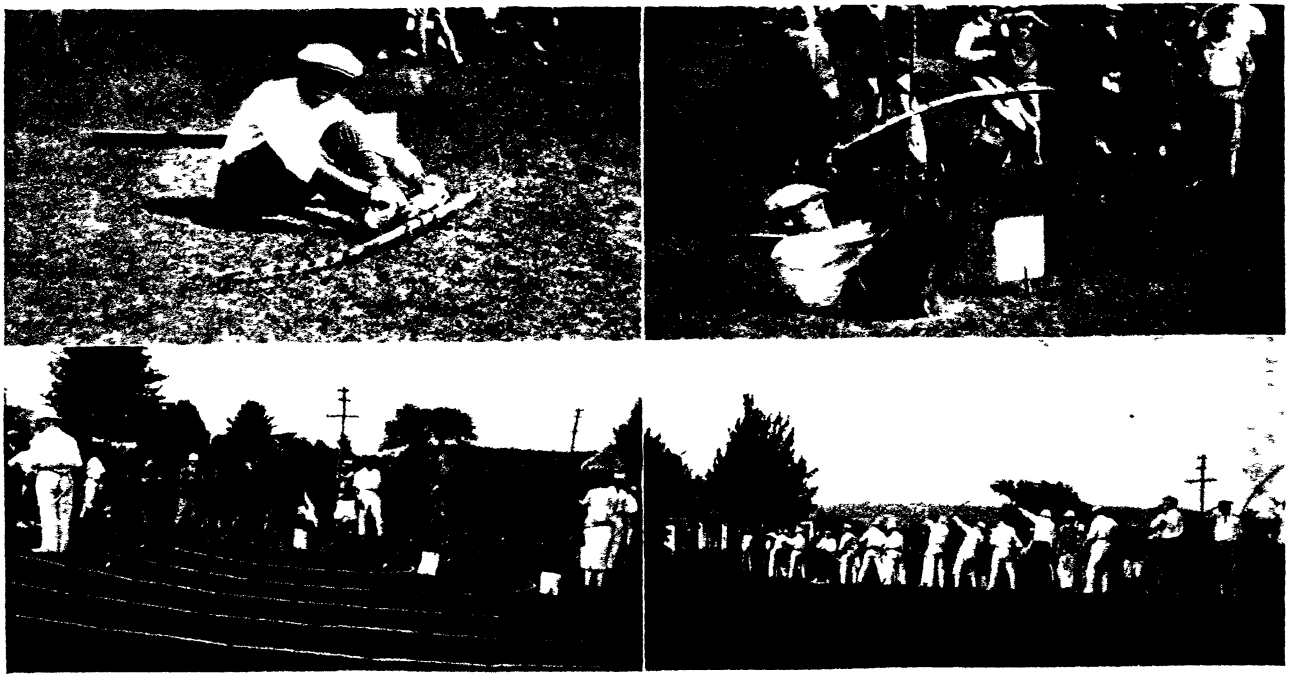
Mrs. Bryant established the woman's record of 251 yards and four-tenths foot in 1913 with a man's yew bow, of fair weight only, and a thirty-inch arrow, which I think was made of spruce, of about 250 grains. It had two tiny vanes of celluloid, if I remember correctly, and a light pile not more than an eighth of an inch thick. With this same equipment her husband made his splendid shots, which practically equalled Maxson's record, of 289 yards twenty-eight inches, and 286 yards six inches in 1916 and 1919.

Shepherdson used about the same sort of thing to make 274 yards thirty-four inches in 1920.

In 1923 Prof. Charles D. Curtis appeared in a tournament for the first time and won the flight shoot with the good distance of 273 yards thirty-two and one-half inches. Professor Curtis was born in Iowa and near his home in the days of his childhood was a tribe of Sac and Fox Indians. One of their chieftains taught him how to shoot a strong bow by resting it against the feet while lying on the back.

Although the professor shot in the regular way at Chicago it occurred to him on returning home to use a stronger bow against the feet and thereby determine whether an arrow could be driven much over 300 yards. At present he is superintendent of the city schools of Pembina, North Dakota, a town just across the border from Canada which lies in an absolutely flat plain of vast extent, just the sort of surroundings to suggest flight shooting.

If Curtis had used a bow of enormous strength against his feet the aspects of the case would have been different, but, in fact, he used a bow of only seventy-five pounds which many



CURTIS—FLIGHT SHOOTING AT ROME, 1925
CLOUT-SHOOTING AT ROME, 1925

men could easily shoot by hand. He himself could not draw a very heavy bow because of an injured shoulder.

His shots were so remarkable, excelling all others since the days of Troward, that I asked him to put them in the form of an affidavit, thus silencing all skepticism forever. In this document, which is now in my possession, he gives these figures: Nov. 11, 1923, no wind, 341 yards 27 inches and 327 yards. Apr. 5, 1924, 341 yards 10 inches. Not dated, 333 yards 15 inches, 325 yards 18 inches, and several over 320 yards. Arrows thirty and thirty-one-inch bamboo and bow, osage orange five feet three inches weighing seventy-five pounds at twenty-eight inch draw.

When Professor Curtis decided to make the 2,000 mile journey to attend the tournament at Deerfield in 1924 he wrote to President Taylor asking if it would be in accordance with the rules of flight shooting if he used what other writers have called the pedominal method. Before answering the question a circular was sent to all the members of the Executive Committee asking for an expression of opinion. It was unanimously agreed that inasmuch as the constitution provided no directions to the contrary an archer might shoot in any manner he chose provided that he used no drawing force but that of his own bodily power.

All the archers watched with intense interest when the time came for him to shoot. He spread a little mat on the ground, sat on it, fastened the bow to his feet by a pair of straps passed through leather loops, very much like a shawl strap, held the string with both hands, straightened out his legs at forty-five degrees and away flew the shaft for 304 yards six and one-half inches. I believe he had previously broken the bow which shot 341 yards.

The constitution provides that the winner of the shoot may try three extra arrows in an attempt to better his distance. While Curtis was shooting these one went somewhat out of line, and, as I have said in the chapter on Tournaments, came,

unobserved, over the roof of the academy and struck the back of the arm of Joseph G. Stevens, Jr., the son of the president of a bank in Greenfield near by, thus giving him the distinction of being one of the few living Americans who have been shot with the full force of an arrow driven from a heavy bow. I speak of it at length because of the rarity of such incidents and because it gives some insight into the probable effect of arrows at the longest ranges in ancient warfare.

In writing from Africa of their hunting Dr. Pope says that an arrow carries death to the end of its course and Mr. White says that it will kill a buck even at extreme range. No one can doubt that these great hunters know exactly what they are talking about and yet one wonders if to get such lethal results it be not necessary to use very heavy hunting arrows which would have great momentum. I raise the question because I saw Curtis's arrow hit the bare arm of Joe Stevens, a boy of about thirteen. It was shot in the strongest manner possible, it was tipped with a sharp bullet jacket and yet it penetrated little, if any, more than an inch. I pulled the arrow out of the wound myself and know whereof I speak. I presume that a sharp-edged broadhead would have done much greater damage.

The evening before the flight shoot Dr. Crouch shot an arrow 306 yards in the ordinary way. This wonderful shot, which I think is the longest ever made in America in the regular style, was carefully measured by four of the gentlemen who saw it, to whom I have spoken on the subject, and there is no doubt of its authenticity. The exact length was a few inches greater but I forget that detail. He used an eighty-five pound jointed Shepherdson yew and a twenty-eight-inch Norway pine arrow, barrelled and weighing 270 grains.

In the regular event Crouch was second to Curtis with 293 yards made in the regular way. Both of these great flights therefore beat Maxson's old record which had stood for thirty-four years.

Although Curtis won the match, as he had acted in good faith and with perfect sportsmanship from the first, it was proven by this contest that the two styles of archery should be held as distinct events, because there is no evident limit to the weight of a bow that a strong man can pull with the whole lifting strength of his body. Accordingly the two classes of Regular and Special style were suggested and after the tournament of 1925 were incorporated into the constitution.

Every record in flight shooting was destined to be broken in this tournament of 1924 as Miss Katherine Howe, a splendidly athletic young woman who had recently graduated from college, borrowed the equipment of one of the men, I think Shepherdson, and shot 255 yards eleven and one-half inches, thus supplanting the mark which Mrs. Bryant made in 1913 and which at that time everyone thought would stand almost forever.

In the tournament of 1925 G. A. Mang won with a bow and arrow of his own make, casting 259 yards thirty-four inches.

In the Special, or pedominal, style Dr. Crouch used a yew bow made by Shepherdson which weighed a full 150 pounds. I tried to pull it with my hands and could scarcely budge the string but Dr. Crouch is such a splendid athlete that he drew the cord nearly to the full, holding it in the ordinary manner.

While he made 311 yards six inches and thereby set a new record, neither he nor Shepherdson was satisfied that the full capabilities of the instrument had been demonstrated. A light flight arrow was used and the effect was too suggestive of hitting a pea with a baseball bat. It seemed as though either a short but light arrow should be used in a trough, as with the Oriental bows, or else a full length arrow should be made heavier. In the former case there is a suggestive approach to the crossbow, which is against the spirit of archery.

Shepherdson and Crouch resolved to sound this problem to the depths. Accordingly when they returned home after the tournament they made a series of arrows which began with

the light one of about 270 grains and increased a shilling apiece until the heaviest was a ten-shilling arrow. Like most experiments in archery the result was wholly unexpected. The flight of 311 yards was not bettered by any of the arrows, the lightest arrow flew the furthest and the others fell a little shorter in direct proportion to their weight. Why it is that a beautifully made bow of 150 pounds would not shoot appreciably further than one of eighty-five pounds made by the same bowyer Heaven only knows. It reminds me of a remark that Duff made when I first began to shoot. I wanted him to make me an enormously heavy bow to shoot with the feet but he said that if he did so it would "kill the cast." Apparently he was right.

The really interesting thing about this shoot was that Curtis's bow weighed about half as much as Crouch's and yet his best arrow flew only a yard less, he also breaking his record of the year before.

On this same line of thought, Mrs. Frentz won the ladies' flight with 239 yards five inches, using a yew bow made by her husband which I do not think weighed more than thirty-four pounds.

There is no department of archery which offers more fascinating opportunities for scientific research than flight shooting. Every experimenter has his pet theories which he longs to test. As a result of much observation of others and many trials of my own I feel that a few fundamental facts are proven beyond dispute.

First among them stands the incontrovertible statement that a short bow casts further, for the same weight, than a long one. This led, in Asia, to the extreme of discarding wood as the chief component of a bow and to the development of the little but powerful composite bow. If we adhere to the type of the English longbow we should try to find one of a length not greatly over five feet which will stand a draw of at least twenty-eight inches. Yew wood may do this for a time but

sooner or later it will break. Osage orange is probably the best for the purpose with Paraguayan ironwood or hickory backed greenheart running rather poor seconds.

That light arrows are better than heavy ones is also certain to an undetermined limit. It is largely a question of spine. A thin short arrow has much more spine than a thin long one of the same materials and that is why those of the Turks fly so well. Even the longer Turkish arrows have a good spine because they are made of stiff bamboo, which I think is our best wood for flight arrows. Whether the thin shaft of birch or spruce made by our eastern fletchers is as good or better admits of unending dispute. Curtis's arrows were of bamboo but the seven other ladies and gentlemen who have made our records used the solid wood.

No doubt you have already thought of the very best thing of all, so go ahead and try it.

XIII

COMPOSITE BOWS

In writing a technical book like this it is not easy to bear constantly in mind the fact that many of the readers have no previous knowledge of archery and are now getting their information and creating their mental pictures for the first time. Such neophytes may have already glanced back to the glossary to learn what a composite bow is, but, for those who have not, I will at once say that it is a bow made of more than one substance.

Wood has very distinct limitations, of which the chief is its liability to break if it be bent too far. Any physicist will quickly demonstrate to you that the shorter a bow is for a given weight, or strength of draw, the more rapidly it will regain its original form when released from the full draw and, therefore, the better will be its cast. Some woods, to be sure, like rattan or grape-vines, are so flexible that they can be wrapped around the arm and, if you made a bow of them, it could be as short as would permit the string to be drawn for the length of the arrow. Yet nobody would expect such a thing to shoot. It would be the *reductio ab absurdum* of the search for flexibility at the expense of strength. Practically, it has been found that a full twenty-eight-inch draw, with a bow approximately as thick as it is wide, needs a length of nearly six feet. If the bow is to be made shorter, it must be proportionally broader and thinner, a principle widely adopted by the North American Indians, yet such a wooden bow is neither so sweet to shoot nor so good in cast. If then, a bow could be made of another material than wood, which would be as resilient and strong and yet far more flexible and elastic, it could be shorter and have a greater cast.

Furthermore a bow attains its potential as it is bent from its shape while at rest, thus, while an ordinary wooden bow, such as we use, has its maximum power within the limits of safety when it is drawn twenty-eight inches, yet if it be bent still further, and do not break under the strain, its cast increases very rapidly.

To take advantage of this many bowyers reflex the two limbs of a grafted bow by setting them with a slight backward tilt where they are joined at the grip, thus putting the bow in a state of greater stress than normal when it is braced. It is a good principle and a sound one but, in practice, the limits of fragility remain the same and therefore the degree of reflexion can at best be but slight. If, however, our bow of substances other than wood, which we have already been able to make very short, could also be reflexed to an enormous degree it would, on that count too, have its cast enormously increased.

These then are the reasons which led the alert Oriental mind of antiquity to devise the composite bow. It is essentially Asiatic and as the oldest historical records of that continent that we can depend on are the Assyrian sculptures in Mesopotamia let us study them to see if the composite bow already existed. Thinking that trained Assyriologists might have considered the question I once asked the late Professor Hilprecht and was told flatly that the composite bow was not invented till long afterward. About a year ago I wrote to Professor Olmstead, of the University of Illinois, who had just published a history of the Assyrian Empire. He replied, courteously, that he had taken the letter to a convention of Orientalists who had given it earnest thought and that, while the matter was new to them, they agreed with me that the Assyrian bow was composite. Professor Gordon of the University of Pennsylvania said the same thing in a recent personal interview.

I think the bow was composite because it is very short, bends in a half circle and is about the same size from end to end.

The baffling point is that in sculptures of the bow at rest it is shown as two straight limbs with an angle at the centre. Longman claims, in *Badminton*, that a bow of this shape could assume the round contour when drawn only if it were hinged at the grip. I used to think so too but after more extended study I have changed my mind. In the best pictures there is always some angle showing at the grip even in full drawn bows and possibly the stiffness of the graphic arts of that time exaggerated the angle when at rest. If the bow were hinged it would be bent backward when at rest but the nocks clearly show that this was not the case.

The modern composite bows from all parts of Asia are so reflexed that, as I have said before, most of them turn backward so far that they look like the letter C.

I have seen a great many of these bows and have owned eight. Recently I have learned through Major Farley, British Champion, of an East Indian who still makes them, so I hope to obtain more from him. The Major says that some weigh as high as 100 pounds. He also says that the Scindes shoot an arrow with them which has no feathers and which therefore turns sideways in its flight and knocks a bird down with a side blow, to obtain which effect the archer nocks his shaft at less than a right angle to the string.

I have five Chinese bows, two from my classmate Dr. Cadbury, Professor of Medicine at the Canton Christian College, Canton, another much handsomer one that was given to Ambassador Rockwood as an official present from the Chinese government, and two from James Clarke of Ardmore, Pa.

Somehow there always seems to be something wrong with what a Chinaman makes, unless it be his silks and pottery, for while his workmanship is exquisitely exact, some peculiar error, which strikes our occidental minds as of childish simplicity but which his conservative habits force him to repeat because his forefathers did it, is sure to spoil the whole thing. So with the bow; the reflex principle is correct and the ma-

THE ASSYRIAN BOW

terials are good but it shoots with a cast that deserves nothing but contempt. Primarily it is too long, six feet two inches from end to end, thus losing every advantage that might be gained from shortness. In this respect it is therefore no better than a wooden bow. The last twelve inches of each end are formed of heavy wood, probably birch, which bends not at all and adds immensely to its initial inertia.

As one of my bows was broken I dissected it to learn what it can teach of the methods of composite construction. The handle is about five inches long, the limbs two feet and the stiff ends make up the total of slightly over six feet.

Inasmuch as several attempts by modern Americans to make composite bows have been only partially successful, I determined to saw a limb into cross-sections at every inch and thus show the cunningly joined materials in their correct proportions.

The centre cut is a seven-eighths-inch circle. Measured with a steel scale the components are: Whalebone, thirteen sixty-fourths, bamboo, nine sixty-fourths, hardwood, perhaps mulberry, twenty-three sixty-fourths, sinew thirteen sixty-fourths. These are very exact but it would do as well to say: Whalebone, three-sixteenths, bamboo, one-eighth, wood, three-eighths, sinew, three-sixteenths.

The next inch shows the relative proportions the same but reduced to a total diameter of thirteen-sixteenths. The second inch from the centre shows the round handle merging into the flat limb, although the proportion of hardwood is still enough to give considerable stiffening. The third inch shows the flexible bamboo relatively thicker and the bamboo tapering away, while, at the fourth inch, it has completely disappeared and the bamboo occupies the whole ligneous field. Here the circular outline has changed to a perfect ellipse with a major axis of exactly one inch and a minor axis of five-eighths.

From this point on I have omitted twelve sections because they are exactly like the last one. This part is the true cast-

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ing limb and it is in its excessive length that the weakness of the bow lies. If these arms were short and strong the power of the weapon would be tripled.

So far, the general curve of the uncut bow is an almost perfect arc of a circle, about as much as an English bow when strung, though you must always remember that the curve at rest is toward the back in a reflexed bow, but, from now on, the back becomes rounder and then more pointed until it assumes a triangular shape. When this form is attained the bow bends much more sharply into the rigid wooden end, making in a general way, although the line is curved, an angle of about forty-five degrees.

I am sure that almost everyone who has given serious thought to the structure of an Oriental bow has wondered how the joint between the composite limb and solid wooden head was made. Such an enormous strain comes at that point that an extraordinarily strong yet slightly flexible union is required.

These sections show the method very clearly, a wedge-splice, very much like that on a footed arrow, but firmly supported by the whalebone for six and one-half inches and by the sinew for thirteen inches. I have, therefore, begun showing the sections again at the nineteenth inch from the centre of the grip, where the tip of the wedge of hardwood first appears in the bamboo. The succeeding sections speak for themselves and require but little comment. The bamboo finally ends at the same place as the horn does and, just there, the hardwood forms an exact right angled triangle. Here is where a bone string-rest is bound on the bow, by sinews passing around the outside of it, and, just beyond, the wood is shouldered down to the almost square shape which it maintains, though with slight narrowing, to the end, at the same time the sinews gradually thinning away.

So much then for the details of this piece of exquisite workmanship whose only fault lies in its length and the weight of its head.

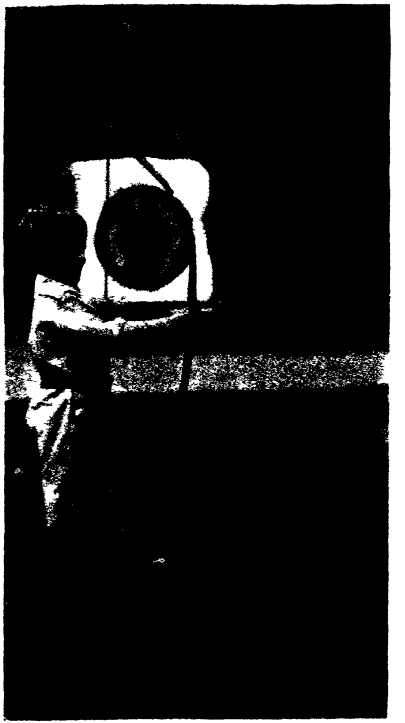
When our class of 1899 had its twentieth reunion at Princeton I asked my friend Walter Erdman, who was a missionary in Korea, to keep his eye wide open in case he might chance to espy a good reflex bow in that ancient and primitive country. In 1924 we met again, at our twenty-fifth reunion and, though I must confess that I had forgotten the request, he had not, for he had brought with him the most curious reflex bow I ever saw, the fourth of my little collection. He told me that for the whole five years he had had the quest in mind but during that time had never heard of a bow until, just a few days before sailing, word was brought to him that there was still an aged archer living some distance back in the country. Erdman visited him, found that he shot with this very bow, bought it, with three arrows, and brought them to me

It is a weapon of crude workmanship, with none of the beauty of the Chinese ones, and yet it is a better bow. It is forty-seven inches from nock to nock, and the nocks are about as near the end as they could be. The limbs are of the same length, as in all composite bows that I have seen.

The grip is of leather, four and one-half inches wide, and a piece of thick brown felt, two and three-fourths inches wide, is glued over that, leaving seven-eighths of an inch of leather protruding on each side.

The first foot of each limb, beyond the grip, is bellied with two pieces of horn, the first piece being about seven inches and the second piece about five inches. The union of the ends of these slabs of horn, scraped so thin as to be transparent, is made by thinning them still further to a wedge exactly one and one-half inches long and gluing them together with the first one on top. To reinforce the bow at this point and presumably to hold down the horn a piece of bamboo exactly one inch long is bound tightly to it with string.

The second, and shorter, piece of horn is bound down in the same way at its further end and beyond that nothing shows on the belly but wood. It is a hardwood which looks to me



DR ELMER WITH COMPOSITE BOW MADE BY DR POPE 1921
INGO SIMON AT LE TOUQUET, 1913
JONATHAN ELMER SHOWING CHINESE BOW, 1925

like teak, though I am only guessing, and four inches from the end it has been more strongly curved and set, I suppose by the action of heat. The string-rest is glued on this angle, not tied on as in the other bow, and instead of being made of bone is a little pad of leather covered with red plush.

The sinews forming the back extend the whole length of the bow and are not covered with anything. At their widest part, about four inches from the end of the grip, the limbs are one and one-fourth inches wide and from there they taper to seven-eighths just before the string-rest. There is no ornamentation except a little silk and leather covering the nocks.

The weight of this little bow for a twenty-eight-inch draw is only thirty-six pounds but two or three inches more jump it up to forty-eight. As the arrows are thirty-three inches long it is a fairly strong weapon, but its cast is not much over 150 yards.

When the Centennial Exposition was held in Philadelphia, in 1876, one of the main buildings was built in permanent construction and has been used ever since as a museum. I remembered that in one of the show cases were three reflex bows from India so, after I had dissected my Chinese bow and learned the principles of its construction, I visited Memorial Hall, as the museum is called, and sketched and measured the bows.

They are all much shorter than the Chinese, varying from thirty-six inches, or less than half its length, to forty inches.

One of them, which to my eye looks like the best weapon, is so reflexed that in outline it is exactly like a crab with his arms in front, as in eating. None of the Oriental bows shown in *Badminton* is reflexed nearly as much as this one except the Persian bow whose ends actually overlap.

Here I would like to say that my own observations lead me to believe that the degree of reflexion and general build of these bows does not form nearly so accurate a guide to the country of their origin as the books would have us believe.

For example, while the Manchu bow that I have described as being given to Minister Rockwell came from the royal family and therefore probably was of Manchu design, two others were bought in Canton, which is in the south of China. To be sure they might have come down from the north just as easily as they afterward came to America but there is no proof of it. However, I once saw and handled a beautiful little reflex bow from Pekin, that an American soldier had brought back from the Boxer rebellion, and it was as much like a Turkish bow that I saw last summer, except for ornamentation, as two peas in a pod. This Turkish bow was given in the Tournament of 1924 as a prize for the flight shoot and was won by Professor Curtis. It was light in structure but shaped exactly like the superb bow which is illustrated. Certainly the Chinese bow of that shape is not the kind usually mentioned.

The crab-shaped bow of the Centennial came from Delhi, India, but so did the other two, and they are of the shape given in *Badminton* as Indian but which is also the shape both of the Turkish bow now owned by Professor Curtis and another very much more powerful, but broken, one which Mr. Trowbridge gave as second prize to Dr. P. W. Crouch. Then my Korean bow is a thing in a class by itself but of more the crab shape than any other, except that it has short arms like the bows usually called Persian. I suppose an expert could tell by the ornamental designs painted on the bows but otherwise I think the bowyers largely followed their own fancies.

In principle, however, they are all the same. When I looked at those Indian bows, although they were clothed in birch bark elaborately painted, I was sure that if I had X-ray eyes I would see the same arrangements of the materials that are disclosed in the cross-sections I made. Yes, if any American who is handy with tools will follow those ideas but make his measurements such as I am about to give he will sooner

or later turn out a good composite bow. There is one great difference in the belly, that *Badminton* mentions, namely that the horn is made in strips laid side by side.

The measurements of the crab bow are: Handle, four inches, arm, ten inches, elbow and thickened piece, five inches, wood end, four inches. Greatest width, one and seven-eighths inches.

The other two bows have arms straight with the handle and ends at right angles. Their measurements are: (1) Handle, three and one-half inches, arm, nine and one-half inches, elbow and wooden end (the elbow being very short), six and one-half inches. (2) Same handle, arm, nine inches, end, ten inches. You see there is great latitude allowed to the bowyers.

By far the best and most perfectly preserved bow of this kind that I have seen is owned by Mr. David E. Kornhouser, of Fairview, N. J., near Philadelphia. He very kindly had it photographed especially for this book showing the side view of the whole bow, the belly of the arms, with their beautiful painting, and part of the ornamentation in detail.

I have had this bow in my hands many times and though neither of us has thought it wise to string it, or even bend it very far, lest it crack from great age, I am sure from the amount of pressure I did exert that its weight must be enormous.

The measurements are as follows:

Length over all—fifty inches.

Width of handle at widest part—fifteenth-sixteenths inches.

Thickness of handle at widest part—one and one-fourth inches.

Circumference of handle at widest part—three and three-fourths inches.

Length of arm from end of handle ornamentation to end of tip on belly side—twenty-three inches.

Depth of rib at elbow—five-eighths inch.

Total thickness of elbow, with rib and belly—seven-eighths inch.

Length of rib—five and one-half inches.

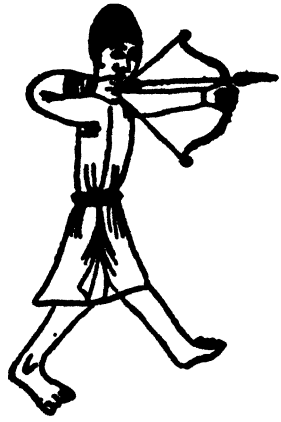
Length of whole end piece, from end of nock to beginning of arm—three and three-fourths inches.

Distance from nock to tip—one and one-eighth inches.

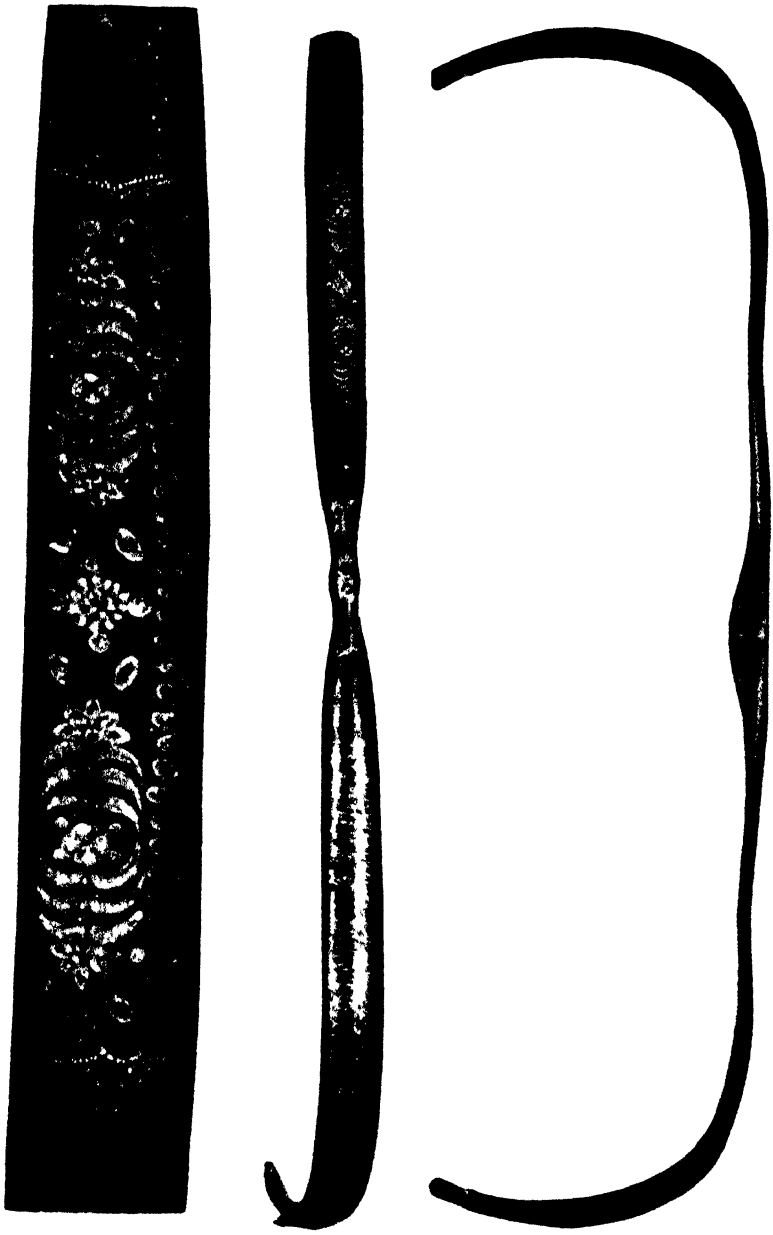
Width of arm—one and three-fourths inches.

Thickness of arm—one-half inch scant.

Width of end—nine-sixteenths inch.



From Arabic Treatise on Archery in National Library at Paris. Note that the finger draw is used.



THREE VIEWS OF A TURKISH COMPOSITE BOW

XIV

THE BEST AMERICAN SCORES

It has been the good fortune of very few archers to make their best scores at the large tournaments, so that the records of these events do not give a fair idea of what many of the contestants are capable of doing when every circumstance is favorable. Furthermore, some of the best archers have been so situated that they have never been able to do more than shoot by themselves or in the company of a few friends.

This article is written for the purpose of rescuing from oblivion the best American scores that have been made under any conditions. I had originally intended to include English scores in these tables but my sources of information were too meagre for me to carry out the plan with real justice.

Some of the scores can be vouched for by no one but the archer himself, but many were made in club contests or before witnesses in other ways. Of necessity the lists are incomplete. Without doubt there are many fine scores that I do not know anything about, and I also suspect that some of the scores which I have recorded are really not the best that were made by the archer in question; yet I have made a careful search of such data as are at my disposal and I feel safe in asserting that on the whole the tabulated results form a pretty good index of the best that is in American archery.

A single glance at the records will suffice to show that two men stand out preëminently among those who are still living, Professor Rendtorff and Dr. Crouch. The scores made by both are of such superlative character that there may be some skeptics who doubt their authenticity. I therefore requested them to take their formal oaths to the correctness of their chief scores and I have the documents in my possession:

Single American Rounds over 525

Dr. P. W. Crouch, Boston, Mass.	30-212, 30-228, 30-244	90-684	Peep-sight used. May 31, 1925, with Shepherdson.
E. J. Rendtorff, Lake Forest, Ill.	30-224, 30-228, 30-230	90-682	June 2, 1913, at Lake Forest with Prof. Bross Thomas.
L. W. Maxson, Washington, D.C. (Died July 2, 1916)	30-204, 30-226, 30-240	90-670	Reported by Dr. Weston. Particulars unknown.
Dr. R. P. Elmer, Wayne, Pa.	29-191, 30-222, 30-242	89-655	Private practice, Sept. 17, 1917.
W. H. Palmer, Jr., St. Davids, Pa.	30-200, 30-222, 30-228	90-650	Aug. 3, 1925. Private practice.
W. A. Clark, Cincinnati, O. (Died Oct. 20, 1913)		90-646	Club contest, Highland Archers Wyoming, O. Score shown Elmer by Clark.
J. B. Siders, Los Angeles, Cal.	30-182, 30-220, 30-234	90-636	Reported by Weston, Christian Science Monitor, Jan. 14, 1914.
M. Sorber, Pittsburgh		90-630	About 1913. Scored by Hertig.
S. G. McMeen, Pasadena, Cal.	29-187, 29-197, 30-246	88-630	Aug. 26, 1918. Private practice.
Arthur Young, San Francisco.	30-190, 30-198, 30-238	90-626	Scored by Pope, Mar. 25, 1917.
F. C. Havens, Oakland, Cal.	28-184, 30-212, 30-230	88-626	Reported by Weston, Spalding's Guide, 2nd Ed.
W. J. Holmes, Pittsburgh.	30-180, 30-210, 29-233	89-623	Scored by Hertig, Nov. 22, 1913.
C. C. Beach, Battle Creek, Mich. (Deceased.)	30-198, 30-208, 30-216	90-622	1908. Private practice. Reported by Beach to Weston for Spalding's Guide.
A. Shepherdson, Melrose, Mass.	30-186, 30-208, 30-228	90-622	Peep-sight used. July 30, 1925.

G. P. Bryant, Boston.	30-186, 30-200, 30-232	90-618	American Record from 1912 to 1925. Tournament 1912.
H. W. Bishop, Chicago.	30-176, 30-206, 30-236	90-618	Reported Forest and Stream, Dec. 1912.
J. S. Jiles, Pittsburgh.	30-170, 30-212, 30-230	90-612	June 1, 1924. Private practice.
H. S. Taylor, Greenfield, Mass.		90-612	Club contest, Chicago Archers. Scored by Pendry.
R. Lagai, Rome, N. Y.	29-173, 30-204, 30-234	89-611	Club practice, Aug. 5, 1924.
Dr. O. L. Hertig, Pittsburgh.	30-172, 30-214, 30-220	90-606	Mail Match contest, Oct. 1913.
Miss C. M. Wesson, Cotuit, Mass.	30-186, 30-186, 30-222	90-594	Reported by letter for American Archery. July 21, 1915.
W. H. Perdue, Canton, O.	29-175, 30-208, 30-210	89-593	July 29, 1924. Private practice.
E. E. Jones, Chicago.	30-182, 29-185, 30-220	89-587	Sept. 5, 1924. Club practice.
A. P. Knight, Rome, N. Y.	28-168, 30-190, 30-228	88-586	June 18, 1924. Club practice.
Dr. J. W. Doughty, Sedro Woolley, Wash.	24-156, 30-202, 28-222	82-582	Nov. 11, 1922. Private practice.
Jay Plowe, Los Angeles, Cal.	29-177, 30-202, 30-200	89-579	Nov. 26, 1925.
W. D. Douthitt, Pittsburgh.		89-579	Scored by Hertig about 1913.
G. L. Nichols, Los Angeles.		88-578	Reported by Weston. Practice at Chicago.
A. R. Clark.	29-157, 30-206, 30-204	89-577	Reported by Weston.
J. Flohr, Peru, Ill.	27-145, 30-202, 30-230	87-577	Nov. 16, 1924. Private practice. Peep-sight used.
I. V. Cole, Seattle.	30-168, 30-204, 30-204	90-576	July 7, 1924. Private practice.
S. E. Hale, Sarasota, Fla.		576	Oct. 15, 1925.

Mrs. M. C. Howell, Cincinnati.	28-174, 30-190, 30-210	88-574	July 25, 1883. Reported by letter of May 28, 1917, from Mrs. Howell.
C. E. Dallin, Arlington Heights, Mass.		88-574	Newton Archers, Oct. 10, 1914. Scored by L. C. Smith.
R. H. Boyd, Sewickley, Pa	30-158, 30-180, 30-232	90-570	Peep-sight used. April 15, 1925. Private practice.
J. Neild, Greenfield, Mass.	28-166, 30-180, 30-220	88-566	Aug. 2, 1924. Private practice.
Dr. C. S. Case, Chicago.	27-175, 30-192, 29-199	86-566	Reported by Weston.
B. P. Gray, Newton Centre, Mass.	29-155, 30-198, 30-212	89-565	About 1912. Reported by Weston.
J. Duff, Jersey City.		90-562	Aug. 21, 1916. Private practice. Scored by Leport of Kansas City.
F. I. Peckham Boston.	29-165, 29-179, 30-218	88-562	Newton Archers. July 9, 1914. Scored by L. C. Smith.
A. L. Brush, Coscob, Vt.	30-152, 30-190, 30-216	90-558	Aug. 15, 1923. Private practice.
F. E. Canfield, Chicago. (Deceased.)		87-555	Reported by Weston.
E. R. Welch, St. Petersburg, Fla.	28-170, 30-188, 30-196	88-554	June 4, 1924. Club practice.
Mrs. B. P. Gray, Newton Centre.	29-147, 30-196, 30-210	89-553	Private practice. 26 golds. Score by B. P. Gray, about 1915.
S. W. Wilder, Boston.		88-552	Club contest, Newton Archers. About 1913.
J. A. Rose, Crawfordsville, Ind.		86-550	One of the old timers. Reported by Weston.
Dr. H. G. Goldberg, Philadelphia.	29-159, 30-184, 30-206	89-549	Cynwyd Club contest. July 27. Scored by Dr. Corson.
Dr. S. T. Pope, San Francisco.	29-157, 29-185, 30-196	88-538	Scored by Arthur Young. May 24, 1925.

F. N. Clay, Newark, N. J.	30-148, 28-184, 30-200	86-538	Private practice about 1913.
Dr. B. L. Rawlins, Chicago.	28-158, 29-173, 30-206	87-537	July 9, 1924. Club practice.
G. A. Mang, Buffalo.	28-180, 28-154, 30-194	86-528	June 25, 1925. Private practice.
Mrs. E. E. Trout, Wayne, Pa.	26-150, 30-186, 30-192	86-528	1914. Scored by E. E. Trout.

Double American Rounds over 1040

E. J. Rendtorff,	30-200, 30-246, 30-234	90-680	1913. Private practice.
	30-208, 30-225, 30-234	90-668	1913. Private practice.
		180-1348	
Dr. P. W. Crouch,	30-190, 30-216, 30-226	90-632	May 30, 1925. Scored
	30-212, 30-228, 30-244	90-684	by Shepherdson.
			Peep-sight.
		180-1316	
L. W. Maxson,	30-204, 30-210, 30-218	90-648	Public exhibition at
	30-210, 30-216, 30-242	90-666	Washington Grove,
			Md., July 11, 1890.
		180-1314	
R. P. Elmer,	29-191, 30-222, 30-242	89-655	Sept. 17 and 18, 1917.
	30-194, 30-200, 30-242	90-636	Private practice.
		179-1291	
W. H. Palmer, Jr.,	30-206, 30-206, 30-222	90-634	June 13, 1925. Private
	30-194, 30-200, 30-232	90-626	practice.
		180-1260	
W. A. Clark,		180-1248	Club contest. Wyoming Archers.
S. G. McMeen,		89-611	Aug. 10 and 13, 1918.
		90-626	
		179-1237	
R. Lagai,	29-173, 30-204, 30-234	89-611	Rome Archers Club
	28-168, 30-202, 30-240	88-610	practice. Aug. 5 and
			6, 1924.
		177-1221	

H. S. Taylor,		90-612 90-608 180-1220	
G. P. Bryant,		90-610 87-601 177-1211	1912. Newton Archers club practice.
W. J. Holmes,	30-180, 30-210, 29-233 29-169, 30-204, 30-214	89-623 89-587 178-1210	Club contest. Nov. 22, 1913.
H. W. Bishop,	29-177, 30-192, 30-224 30-178, 30-200, 30-230	89-593 90-608 179-1201	Private practice. Jan. 11, 1914. Temperature 30.
A. Shepherdson,	30-186, 30-208, 30-228 30-178, 30-176, 30-222	90-622 90-576 180-1198	Both rounds same afternoon. July 30, 1925. Scored by Crouch. Peep-sight used.
J. S. Jiles,	30-176, 30-202, 30-224 29-169, 30-208, 30-214	90-602 89-591 178-1193	Oct. 11, 1924. Private practice.
C. C. Beach,	30-172, 29-191, 30-222 28-160, 30-188, 30-242	89-585 88-590 177-1175	
A. P. Knight,	30-170, 29-173, 30-218 28-168, 30-190, 30-228	89-561 88-586 177-1147	June 16, 1924. Club practice.
S. E. Hale,		576 571 1147	Oct. 15, 1925. Oct. 20, 1925.
Dr. O. L. Hertig,	30-172, 30-214, 30-220	90-540 90-606 180-1146	Oct. 1913.

W. K. Perdue,	29-161, 30-182, 30-198 29-175, 30-208, 30-210	89-541 89-593 178-1134	July 24 and 29, 1924. Private practice.
R. Williams,		177-1129	Ohio State Championship, 1883. Probably exceeded in private.
J. Plowe,	29-161, 30-186, 30-198 29-177, 30-202, 30-200	89-545 89-579 178-1124	Nov. 21, 1925. Nov. 26, 1925.
J. Duff,		90-556 90-562 180-1118	Aug. 1916. Scored by Leport and Jiles.
Dr. C. S. Case,	27-175, 30-192, 29-199 29-169, 29-181, 30-192	86-566 88-542 174-1108	Private practice.
J. Flohr,	27-145, 30-202, 30-230 25-129, 30-202, 29-199	87-577 84-530 171-1107	Both shot Nov. 16, 1924.
A. L. Brush,	29-161, 30-194, 30-190 30-152, 30-190, 30-216	89-545 90-558 179-1103	Aug. 15, 1923. Private practice.
Miss C. M. Wesson,		554 546 1100	Club meet of Scottish-American Archers, July, 1915. Invitation.
E. E. Jones,	28-158, 30-184, 30-212 29-137, 30-174, 30-206	88-554 89-517 177-1071	Both rounds on Oct. 2, 1924. Private practice.
C. S. Upson,		172-1067	Ohio State Tournament, 1883.

Mrs. B. P. Gray,	28-162, 30-164, 30-170	88-496	Private practice.
	29-147, 30-196, 30-210	89-553	Scored by Mr. Gray.
		177-1049	
Mrs. E. E. Trout,	26-150, 30-186, 30-192	86-528	
	29-155, 30-158, 30-206	89-519	
		175-1047	

30 Arrows at 40 Yards

Dr. I. V. Cole, Seattle, Wash. 6-54, 6-54, 6-50, 6-50, 6-50=30-258

S. G. McMeen and P. W. Crouch each have 30-246.

Single York Rounds above 550

P. W. Crouch,	60-300, 48-272, 24-160	132-732	May 31st, 1915. Sworn to by Crouch and witnessed by Shepherdson.
E. J. Rendtorff,	68-336, 48-234, 24-154	140-724	Private practice 1913. Sworn to, 1925.
R. Williams,	59-293, 45-239, 24-176	128-708	Aug. 9th, 1885. Ohio.
G. P. Bryant,	61-293, 45-251, 24-158	130-702	July, 1912. Club contest.
H. S. Taylor,	57-257, 44-252, 24-156	125-665	July, 1911. Club contest, Chicago Archers.
J. W. Doughty,		123-635	July, 1913. Private practice.
W. A. Clark,	63-247, 48-204, 24-136	135-587	Oct. 31st, 1883. Cincinnati.
O. L. Hertig,	55-253, 44-204, 23-149	122-596	Oct. 4th, 1913, with Holmes.
W. J. Holmes,	53-253, 42-196, 24-144	119-593	Oct. 4th, 1913, with Hertig.
R. P. Elmer,	49-201, 42-226, 24-152	115-579	Aug., 1911. Private practice.
W. H. Palmer, Jr.,	52-212, 44-218, 24-148	120-576	June 30th, 1923. Private practice.

W. H. Wills,	41-217, 42-208, 24-146	117-571	His best shooting was about 1913.
H. B. Richardson,	46-190, 46-238, 24-138	116-566	National Tournament, 1910.

Double York Rounds over 1000

E. J. Rendtorff,	68-308, 47-237, 24-156	141-701	Private practice, 1913.
	68-336, 48-234, 24-154	140-724	
		279-1423	
P. W. Crouch,	59-307, 48-252, 24-126	131-685	May 23 and 31, 1925.
	60-300, 48-272, 24-160	132-732	Practice with Shepherdson.
		263-1417	
R. Williams,	59-293, 45-239, 24-176	128-708	Aug. 9 and 10, 1885.
	62-274, 45-229, 24-152	131-655	
		259-1363	
G. P. Bryant,	57-269, 47-235, 24-142	128-646	Club contests of Newton Archers, 1912.
	61-293, 45-251, 24-158	130-702	
		258-1348	
H. S. Taylor,	56-260, 44-204, 23-147	123-611	Club contests Chicago Archers, 1911.
		117-591	
		240-1202	
W. A. Clark,		250-1192	Club contest, Highland Archers, Wyoming, O.
O. L. Hertig,	55-243, 44-204, 23-149	122-596	Both rounds same afternoon, Oct. 4, 1913 with Holmes.
	57-245, 43-199, 24-134	124-578	
		246-1174	
W. J. Holmes,	53-253, 42-196, 24-144	119-593	Oct. 4 and Sept. 27, 1913.
	45-183, 42-204, 24-144	111-531	
		230-1124	
H. B. Richardson,	50-210, 43-217, 22-117	115-545	American Record.
	46-190, 46-238, 24-138	116-566	National Tournament, 1910.
		231-1111	

J. W. Doughty,	51-237, 41-191, 21-111 49-203, 42-212, 22-120	113-539 113-535 226-1074	July 26 and 27, 1913, with Will Thompson.
W. H. Thompson,	41-173, 44-226, 23-121 50-194, 43-217, 24-132	108-520 117-543 225-1063	October, 1882.
R. P. Elmer,	42-206, 42-196, 21-111 52-228, 39-169, 23-129	105-513 114-526 219-1039	National Tournament, 1922.

Team Rounds above 550

E. J. Rendtorff		96-678	Private practice.
H. S. Taylor,		96-638	Mail match in 1883 with Walworth of New York.
L. W. Maxson,	24-170, 24-156, 24-162, 24-142	96-630	Reported by Weston.
W. A. Clark,	24-176, 24-148, 24-146, 24-148	96-618	Nov. 25, 1897. Spalding's Guide.
J. S. Jiles,		95-617	Oct. 1, 1925, with Hertig.
P. W. Crouch,		96-616	Sept. 20, 1925.
R. P. Elmer,	24-154, 24-133, 24-160, 24-168	93-615	Aug. 9, 1912. Scored by A. C. Hale.
A. W. Houston,		94-604	Aug. 1883. Not at State Meeting as formerly reported.
W. J. Holmes,		95-593	Club contest 1913.
R. Lagai,		93-585	1924, U.S. Record.
O. L. Hertig,		95-581	Club contest 1913.
M. Sorber,		94-578	Club contest 1913.
W. D. Douthitt,		94-574	Club contest 1913.

A. E. Spink, Chicago.	24-156, 24-154, 24-148, 24-122	96-560	About 1910. Reported by Weston.
C. S. Upson, Cincinnati.	24-156, 24-134, 24-134, 23-133	95-557	1883. Archery and Tennis News.
Dr. H. E. Jones	24-130, 24-144, 24-134, 24-148	96-556	Before 1914. Dr. Jones was very deaf and usually shot alone, but sometimes with Barnes, the bowyer.
H. W. Bishop,	23-131, 24-140, 24-142, 23-139	94-552	Reported by Weston.

144 Arrows at 60 Yards

E. J. Rendtorff,	144-1006	
J. S. Jiles,	144-912	Oct. 1, 1925.
O. L. Hertig,	143-867	1913.
Rev. Rimington, (England)	142-840	

Double Team Round

J. S. Jiles,	191-1211	Oct. 1, 1925.

The best of the ladies have been Mrs. Howell and Miss Wesson.

Mrs. M. C. Howell, of Cincinnati, in response to a request, sent her best scores in a letter dated May 28th, 1917. I wish particularly to emphasize the facts that she permitted herself *no* practice arrows before shooting and in every way adhered strictly to the customs which prevailed at the national tournaments and which were much more severe than at present.

Double National Round.

June 26, 1883. Practice,	85-477, 46-258	131-735
Ohio State Meeting. 1904,	88-436, 47-283	135-719
National Tournament. 1883,	85-413, 47-277	132-690
Practice,	82-402, 44-278	126-680

Single National Round.			
Practice. June 14th, 1884,		47-291, 24-148	71-439
Practice. June 12th, 1884,		47-261, 24-144	71-405
Practice. June 3rd, 1884,		45-249, 24-146	69-395
Double Columbia Round.			
"My best practice score." Shot in one afternoon. June 30th, 1884,		46-312, 48-358, 48-378	142-1048
National Tournament, 1896,		24-150, 24-150, 24-192	72-492
		24-140, 24-166, 24-192	72-498
			144-990
Practice. Sept. 29th, 1898,		24-134, 24-148, 24-190	72-472
		24-156, 24-168, 24-184	72-508
			144-980
Single Columbia Round.			
Practice. Aug. 31st, 1883,		23-147, 24-180, 24-182	71-509
Practice. Aug. 10th, 1895,		24-138, 24-176, 24-194	72-508
Practice. July 28th, 1883,		24-166, 23-163, 24-176	71-505
National Tournament, 1895,		22-144, 24-178, 24-182	70-504

Note:—It is obvious that one or both of the single rounds which made up the double Columbia of 1048 must have been greater than the scores here given.

If Mrs. Howell had chosen to add together the single Nationals of June 12th and 14th the result would have been a double of 142–844.

Single American Round. (Given above.)			
Ladies' Team Round.			
National Tournament.	1896	24-146, 24-168, 24-138, 24-180	96-632
National Tournament.	1895	24-150, 24-158, 24-164, 24-160	96-632

Miss Cynthia M. Wesson, of Springfield and Cotuit, Mass.:

Writing under date of May 9th, 1916, Miss Wesson gives her best practice scores as follows:

Single National Round		
July 17th, 1915,	48-314, 23-171, 71-485.	24 golds.

Single Columbia Round
July 18th, 1915, 24-170, 24-182, 24-208, 72-560. 37 golds.
Single American Round. (Given above.)

The best performance of a child which I have is a Single National Round which was shot in a club contest of the Chicago Archers by Miss Mary Williams, now Mrs. Belcher, a daughter of Dr. Carver Williams and grand-niece of H. C. Carver, who was one of the founders of the N. A. A., when she was only twelve years old.

43-251, 22-130 65-381

In addition to recording the highest score for each round it is sometimes well to note a series of especially meritorious performances or the best score that an archer may have made at particular distances.

C. C. Beach, Battle Creek, Mich. (dec.):

Best 30 arrows at 60 yards	30-198
Best 30 arrows at 50 yards	30-216
Best 30 arrows at 40 yards	30-242
Hypothetical American Round	90-656

George Phillips Bryant:

In answer to a letter asking for his best scores, Mr. Bryant said: "I enclose a record of what I consider the best shooting I ever did. York Rounds shot consecutively, July, 1912."

100 yards	*80 yards*	*60 yards*	*Total*
56-246	45-251	24-152	125-649
56-216	44-246	24-150	124-612
52-206	45-255	24-152	121-613
55-225	48-284	24-128	127-637
57-269	47-235	24-142	128-646
61-293	45-251	24-158	130-702

"My bow broke in the last end of the last York, which settled this run of scores."

Mr. Gray, who saw all of these splendid York Rounds shot, told me that the arrows seemed to fly down the range as though they were tied to an invisible wire. It is my own opinion that if Bryant had not had the hard luck to break his bow just before the tournament and his best arrows during the first American Round and especially if he had not insisted in shooting in a hurricane after all the others had stopped he would have placed the record for the York Round in this country sky high.

Best 24 arrows at 60 yards	23-167
Best 30 arrows at 60 yards	30-206
Best 30 arrows at 50 yards	30-224
Best 30 arrows at 40 yards	30-238
Hypothetical American Round	90-668

Dr. E. I. Cole, St. Petersburg, Fla.—30 arrows at 20 yards, 30–262.

Dr. Paul W. Crouch, Boston, Mass.:

Dr. Crouch was born in Binghampton, N. Y., but went to school in Boston, where he was prominent in every kind of athletics and holds the city record for strike-outs in an interscholastic baseball game. He is twenty-seven years old, and a graduate of and instructor in the Dental School of Harvard University. His extraordinary rise to the pinnacle of toxophilitic skill occurred in the spring and summer of this year (1925) and was due both to his native strength, brains, technical exactitude and athletic ability and also to the careful coaching of Shepherdson, who furnished his weapons. Later in the summer Crouch made his own arrows and used them when he established the American Round record. The most remarkable feat in the history of archery, except Ford's 809 York, was Crouch's making both the Single York and Single American practice records in the same afternoon. His wonderful work began with the very first round in March and I think that the scores I give represent every round he shot.

AMERICAN ROUND

Date		*60 yards*	*50 yards*	*40 yards*	*Total*	
March	28	30-176	30-188	30-204	90-568	
April	4	30-174	30-184	30-232	90-590	
"	11	30-188	30-196	30-226	90-610	
"	18	30-194	30-196	30-214	90-604	
"	25	29-201	30-220	30-224	89-645	
"	26	30-200	29-201	30-228	89-629	
"	26	30-210	30-190	30-220	90-620	
May	3	30-194	29-205	30-216	89-615	
"	3	30-194	30-200	30-234	90-624	
"	10	30-192	29-187	30-216	89-595	
"	10	30-168	30-204	30-204	90-576	
"	30	30-190	30-216	30-226	90-632	
"	31	30-212	30-228	30-244	90-684	
June	7	30-208	30-218	30-222	90-648	
"	23	30-200	30-222	30-236	90-658	
July	2	30-198	30-212	30-192	90-602	(E. A. A. Tour.)
"	3	30-178	30-196	30-214	90-588	(E. A. A. Tour.)
"	19	29-203	30-220	30-232	89-655	
"	19	30-194	30-208	30-246	90-648	
August	19	30-190	30-222	30-214	90-626	(N. A. A. Tour.)
"	20	29-171	30-192	30-218	89-581	(N. A. A. Tour.)

Now everyone who aspires to become a champion and at the same time to break a few records can see exactly how much practice is required. Evidently about a round a week will do it.

The average score for the 21 rounds was 619, only 5 arrows were missed out of 1890, and the greatest run of rounds without a miss was seven.

When Arthur Young began to shoot at the targets he put 700 before his eyes as the ultimate possibility of achievement in the Single American, a goal which he ceased to strive for when he finally concentrated all of his efforts on hunting. The question of its possibility comes fairly near a solution when Crouch gets within 16 points of it and Rendtorff 18. Two more rounds of 44 instead of 40, at 60 yards, a 48 at 50 and a 52 at 40, all of which are within the bounds of possibility, would have done it. The remarkable thing about Crouch's

big score is that it was within two points of being his best hypothetical score. Once he made 246 at 40. By ends it reads:

60— 44, 44, 44, 40, 40. 212
50— 44, 46, 44, 46, 48. 228
40— 48, 48, 50, 50, 48. 244

YORK ROUND

Date		*100 yards*	*80 yards*	*60 yards*	*Total*	
April	4	49-215	42-246	24-144	115-605	
"	18	57-265	46-254	24-156	127-675	
"	26	55-301	46-230	24-138	125-669	
May	3	56-230	45-257	24-136	129-623	
"	18	57-253	46-246	24-160	127-659	
"	23	59-307	48-252	24-126	131-685	
"	31	60-300	48-272	24-160	132-732	
June	17	54-238	43-199	24-134	121-571	
July	1	47-171	42-212	24-146	113-529	(E. A. A. Tour.)
"	2	35-135	41-229	24-138	100-502	(E. A. A. Tour.)
"	19	43-207	39-207	24-148	106-562	
"	25	47-201	38-200	24-156	109-557	
"	30	52-232	42-192	24-146	118-570	
August	18	41-157	33-153	24-140	98-450	(N. A. A. Tour.)
"	19	41-155	37-187	22-120	100-462	(N. A. A. Tour.)

Average practice scores..... 626
Average tournament scores..... 486
Average all scores..... 590

	Total arrows	*Hits*	*Average Hits*
100 yards	1080	753	50
80 yards	720	636	42.4
60 yards	360	358	Practically perfect.

Dr. R. P. Elmer:

I have never shot a really good York Round. In fact I made a better score in the first year of my shooting than I have ever made since. The only consistently good string of Americans that I ever shot was in September, 1917. The book *American Archery* was all written and about to go to print. As I had nothing really worth while of my own to put in it I tried my best to shoot a few Americans over 600 and did better than I had expected. I used a five-foot ten-

inch Barnes yew backed yew and McChesney's arrows, 403 grains.

September	6	30-180	30-214	30-222	90-616
"	7	29-187	30-224	30-216	89-627
"	11	30-196	30-208	30-224	90-628
"	11	30-196	30-222	30-216	90-634
"	14	30-200	30-218	30-218	90-636
"	17	29-191	30-222	30-242	89-655
"	18	30-194	30-200	30-242	90-636
"	19	30-196	30-194	30-222	90-612

Average 630.5. Two arrows missed out of 720.

Best 60–200, best 50–224, best 40–242. Hypothetical American 666.

The best round I have ever shot in a match was at the Cynwyd Country Club September 17th, 1916, using a Barnes self-yew, forty-two pounds. 30–196, 30–216, 30–228, 90–640.

Once I made eleven golds in succession at forty yards and twice I have made ten. I have made 242 at forty yards three times but never got above that.

Louis W. Maxson, Washington, D. C. (dec.):

At Washington Grove, Maryland, on July 11th, 1890, in an exhibition before a great crowd of picnickers, Mr. Maxson shot three American Rounds without stopping which, considering the fact that there was no interruption to the shooting, have never been beaten.

30-186, 30-202, 30-242	90-630
30-204, 30-210, 30-234	90-648
30-210, 30-216, 30-240	90-666
Triple Round Record	270-1944

Samuel G. McMeen, Pasadena, Calif.: In August, 1918, he made a run of eleven Americans of over 600 as follows: 89–611, 89–607, 90–600, 89–611, 90–626, 90–610, 89–617, 90–608, 88–630, 88–602, 90–608.

William H. Palmer, Jr., St. Davids, Pa.:

During the past summer Palmer has made his best string of Americans.

1925	June	13	30-206	30-206	30-222	90-634
"	July	19	30-194	30-214	30-232	90-640
"	"	22	30-194	30-200	30-232	90-626
"	"	23	30-190	30-210	30-210	90-610
"	"	24	30-182	30-206	30-222	90-610
"	"	25	30-184	30-202	30-216	90-602
"	Aug.	3	30-200	30-222	30-228	90-650

Not an arrow missed! Average 624.6. Perhaps I should say that Palmer made scores at the Eastern Tournament, which came between the first two in the list, which were not up to this level. With that exception they were shot successively.

Edmund J. Rendtorff, Lake Forest, Ill.:

When I wrote to Prof. Rendtorff for his sworn statement for this book I also asked him for some of his best scores and in reply received the following letter:

June 15, 1925.

MY DEAR DR. ELMER:

Enclosed please find my sworn voucher relative to my best American and York Rounds.

I have not shot an arrow for about ten years, and have very little archery tackle left. Two years ago last October the house in which I lived burned down. I had my arrows and other archery equipment in a steel trunk in the attic of that building. The arrows were all badly charred. The bows were kept in the basement and were saved.

On looking through an old scrap-book I just found the following scores which may interest you:

21 golds out of 30 arrows at 40 yards.
96 arrows at 40 yards with score of 96–750.
6 golds to end at 40, 50 and 60 yards.
Best end at 100 yards, 999977 6–50 (pure luck).
Consecutive hits at 100 yards, 52.

144 arrows at 60 yards, 144–1006
144 arrows at 80 yards, 144– 824
96 arrows at 80 yards, 96– 568
Four best York Rounds: 139– 699
139– 701
140– 722
140– 724

Team round, 96–678. Consider this the best shooting I have ever done. Had great luck the first half of this round. The last half nearly killed me from nervous strain. Was all in at the end.

Consecutive American Rounds without a miss:

90–630	90–668	90–650	90–658
90–642	90–630	90–638	90–660
90–680	90–664	90–674	90–666

Average 655. (Computed by Elmer, but the "pure luck" quotation above is of course by Rendtorff himself.)

Is Mr. Whitman, the old arrow-maker, still living? He made the best arrows that I was ever able to secure. Good arrows is one of the great secrets of record scores.

Sincerely,
E. J. RENDTORFF.

Homer S. Taylor, Greenfield, Mass. (formerly of Chicago):

Mr. Taylor was present at the first National Tournament in 1879, though only as a spectator. The next year he began competitive shooting and from then till the present time, with a lapse of a few years in the late '80's, he has always been one of the best shots in the country. It seems to me to be well worth recording that on July 25th of this summer, with almost no practice, he shot an American of 29–149, 30–180, 30–188, 89–517.

He was at the peak of his powers in 1911 when he consistently shot York Rounds of more than 600. He also made forty-eight hits at eighty, which is no easy thing to do as is proven by the fact that Crouch did it only twice in fifteen rounds. I have never been able to do it.

Maurice Thompson, Crawfordsville, Ind. (dec):

He shares with Williams and Clark the honor of making 24–176 with twenty-four arrows at sixty yards.

With thirty arrows at sixty yards he made 30–216 and at forty yards 30–244.

Will H. Thompson, Seattle, Wash. (dec.):

Best hypothetical American: 30–198, 30–204, 30–236, 90–638.

With thirty arrows at twenty yards he missed the gold only once.

RECORDS OF THE EASTERN ARCHERY ASSOCIATION

YORK ROUND

Year	*Name*	*Single York*	*Double York*
1879	Not shot.		
1880	L. L. Peddinghaus, Brooklyn, N. Y.	59-201; 70-318	129-519
1881	Andrew S. Brownell, Watertown, Mass.	Not known.	
1882	D. A. Nash, Brooklyn, N. Y.	87-393; 81-395	168-788
1883 to 1890	No information.		
1891	Louis W. Maxson, Washington		160-666
1892	L. W. Maxson		191-799
1893	"	81-333; 78-320	165-653
1894	No meeting.		
1895	C. E. McNabb, Wash.	76-326; 57-261	133-587
1896	D. F. McGowan, Wash.	No scores recorded.	
1897	L. W. Maxson	84-342; 70-330	154-672
1898	"	80-346; 72-320	152-666
1899	"	91-383; 99-429	190-812
1900	A. R. Clark	95-431; 83-373	178-804
1901	"	72-294; 77-335	149-629
1902	No match.		
1903	Wallace Bryant, Boston	88-350; 84-374	172-724
1904 to 1910	No contests.		
1911	Wallace Bryant	97-443	Not shot
1912	G. Phillips Bryant, Boston	101-467	Not shot
1913	Not shot.		
1914	James S. Jiles, Pgh.	Not recorded	154-722

Year	*Name*	*Single York*	*Double York*
1915	Cyrus E. Dallin, Arlington Heights, Mass.	91-417	Not shot
1916	James Duff, Jersey City, N. J.	90-394; 81-365	171-759
1917	War. No match.		
1918	War. No match.		
1919	Homer S. Taylor, Greenfield, Mass.	91-415	Not shot
1920	" "	Not recorded	182-780
1921	Dr. R. P. Elmer, Wayne, Pa.	96-468	Not shot
1922	J. S. Jiles	Not recorded	156-660
1923	Dr. R. P. Elmer	106-512	Not shot
1924	Rudolph Lagai, Brooklyn and Rome, N. Y.	69-337; 86-406	155-743
1925	Dr. Paul W. Crouch, Boston	113-529; 100-502	213-1031

AMERICAN ROUND

Year	*Name*	*Single American*	*Double American*
1879	E. R. Dwight, Watertown	Not recorded	122-556
1880	L. L. Peddinghaus	83-448; 83-409	166-852
1881	Mr. Baker	.....	.....
1882	Dr. H. T. Elliot, New York	74-372; 76-402	150-774
1883 to 1890	No information.		
1891	L. W. Maxson	.....	172-1034
1892	"	.....	176-1080
1893	"	88-532; 87-499	175-1031
1894	No match.		
1895	C. E. McNabb	81-483; 78-404	159-887
1896	L. W. Maxson	Not recorded.	.....
1897	"	82-476; 84-480	166-956
1898	"	84-412; 76-386	160-798
1899	"	84-428; 81-413	165-841
1900	A. R. Clark	88-542; 86-556	174-1098
1901	"	Not recorded.	160-866
1902	No match.		
1903	Wallace Bryant	87-525; 89-567	176-1092
1904 to 1910	No matches.		
1911	G. P. Bryant	88-464	Not shot
1912	"	88-550	Not shot
1913	Dr. R. P. Elmer	88-528; 86-504	174-1032
1914	James Duff	Not recorded	165-963
1915	C. E. Dallin	87-471	Not shot
1916	A. Shepherdson, Melrose, Mass.	83-483; 80-446	163-929
1917	War. No match.		
1918	War. No match.		
1919	Arthur Young, San Francisco	88-562	Not shot

Year	*Name*	*Single American*	*Double American*
1920	H. S. Taylor	Not recorded	172-1008
1921	Dr. R. P. Elmer	87-561	Not shot
1922	J. S. Jiles	Not recorded	177-1077
1923	Dr. R. P. Elmer	89-519; 89-555	178-1074
1924	Rudolph Lagai	90-558; 86-508	176-1066
1925	Dr. P. W. Crouch	90-602; 90-588	180-1190

COLUMBIA ROUND

Year	*Name*	*Single Columbia*	*Double Columbia*
1879	Miss Silsbee, Watertown	Not recorded	86-406
1880	Miss Ager, Jamaica Plain, Mass	52-240; 56-286	108-526
1881	Mrs. Baker.		
1882	Mrs. D. A. Nash, Brooklyn	60-318; 52-202	112-520
1883 to 1890	No matches.		
1891	Miss M. Hinman, Washington	.....	120-550
1892	Miss M. L. Williams, Wash	.....	128-682
1893	Mrs. J. S. Barker, "	67-381; 64-318	131-699
1894	No match.		
1895	Miss E. C. Cooke, Wash	68-378; 64-350	132-728
1896	Mrs. J. S. Barker, "	Not recorded.	
1897	Miss E. C. Cooke, "	66-362; 66-346	132-708
1898	" "	64-294; 66-338	130-632
1899	" "	65-319; 62-332	127-651
1900	" "	67-315; 63-315	130-630
1901	Mrs. E. S. Barber, "	55-273; 59-265	87-423
1902	No match.		
1903	Miss E. C. Cooke	Not recorded.	
1904 to 1910	No matches.		
1911	Not shot.		
1912	Mrs. Witwer-Taylor, Chicago	71-449	Not shot
1913 and 1914	No women entered.		
1915	Mrs. Burton Payne Gray, Boston	Not recorded	139-797
1916	Miss Cynthia M. Wesson, Cotuit, Mass.	67-347; 70-398	137-745
1917 and 1918	War. No matches.		
1919	Not shot.		
1920	Dorothy D. Smith, Newton Centre, Mass.	Not recorded	134-722
1921	Dorothy D. Smith, Newton Centre, Mass.	462	Not shot
1922	Dorothy D. Smith, Newton Centre, Mass.	Not recorded	132-752
1923	Dorothy D. Smith, Newton Centre, Mass.	68-402; 70-428	138-830

Year	*Name*	*Single Columbia*	*Double Columbia*
1924	Dorothy D. Smith, Newton Centre, Mass.	70-382; 68-402	138-784
1925	Dorothy D. Smith, Newton Centre, Mass.	71-425; 70-426	141-851

NATIONAL ROUND

		Single National	*Double National*
1879	Not shot.		
1880	Miss Ager	35-141; 35-131	70-272
1881	Probably Miss Morse.		
1882	Mrs. A. H. Gibbes, Newark, N. J.	41-153; 43-185	84-338
1883 to 1890	No information.		
1891	Miss M. L. Williams		79-323
1892	"		89-367
1893	Mrs. J. S. Barker	52-216; 51-203	103-419
1894	No match.		
1895	Miss E. C. Cooke	51-227; 57-277	108-504
1896	Mrs. J. S. Barker	Not recorded.	
1897	Not shot.		
1898	Miss E. C. Cooke	46-206; 50-228	96-434
1899	"	51-239; 48-238	99-477
1900	"	53-195; 47-195	100-390
1901	Mrs. E. S. Barber	45-207; 42-216	87-423
1902	No match.		
1903	Miss E. C. Cooke	Not recorded.	
1904 to 1910	No matches.		
1911	Miss Helen Hutchinson, Boston	65-323	Not shot
1912	" "	48-210	Not shot
1913 and 1914	No women entered.		
1915	Mrs. B. P. Gray	Not recorded	116-558
1916	"	23-247; 58-310	111-557
1917 and 1918	War. No match.		
1919	Not shot.		
1920	Miss D. D. Smith	Not recorded	118-510
1921	"	300	Not recorded
1922	"	Not recorded	117-545
1923	"	63-343; 69-337	132-680
1924	"	58-276; 61-311	119-587
1925	"	53-253; 59-237	112-490

ENGLISH RECORDS

List of ladies and gentlemen who have won the championship of Great Britain from the first tournament in 1844 to the present time.

Year	Place	Ladies	Hits	Score	Gentlemen	Hits	Score
1844	York	None shot.			Rev. J. Higginson	53	221
1845	"	Miss Thelwall	48	186	Peter Muir	135	537
1846	"	None shot.			Mr. Hubback	117	519
1847	Derby	Miss Wylde	65	245	Peter Muir	153	631
1848	"	Miss J. Barrow	47	167	E. Maitland	135	581
1849	"	Miss Temple	55	189	Horace A. Ford	176	702
1850	Edinburgh	Mrs. Calvert	47	161	"	193	699
1851	Leamington	Miss Villiers	108	504	"	193	861
1852	"	Miss Brindley	84	336	"	188	788
1853	"	Mrs. Horniblow	89	365	"	202	934
1854	Shrewsbury	Mrs. Davison	109	489	"	284	1074
1855	"	"	115	491	"	179	809
1856	Cheltenham	Mrs. Horniblow	109	487	"	213	985
1857	"	Miss H. Chetwynd	128	634	"	245	1251
1858	Exeter	Mrs. Horniblow	101	457	"	214	1076
1859	"	Miss Turner	122	630	"	205	951
1860	Bath	Mrs. E. Lister	112	550	George Edwards	188	886
1861	Liverpool	Mrs. Atkinson	113	575	"	175	745
1862	Worcester	Mrs. Horniblow	128	660	"	194	902
1863	Oxford	"	116	478	Peter Muir	179	845
1864	Alexandra Palace	Miss Betham	129	693	George Edwards	189	897
1865	Clifton	"	124	606	E. A. Holmes	174	788
1866	Norwich	"	130	662	George Edwards	192	900
1867	Brighton	Mrs. Lister	130	696	Horace A. Ford	215	1037
1868	Hereford	Miss Betham	128	672	Rev. Wm. Rimington	187	807
1869	Birmingham	Mrs. Horniblow	123	629	"	191	909
1870	Bath	"	134	700	E. A. Holmes	183	807
1871	Cheltenham	"	138	746	Capt. C. H. Fisher	205	955
1872	"	"	136	660	"	175	771
1873	Leamington	"	142	764	Major C. H. Fisher	198	896
1874	Winchester	Mrs. Pond	132	644	"	193	873
1875	Richmond (Surrey)	Miss Hollins	133	693	G. E. S. Fryer	196	876
1876	Sandown Park	Mrs. W. Butt	138	752	H. H. Palairet	181	773
1877	Doncaster	"	126	676	Rev. W. Rimington	163	703
1878	Tunbridge Wells	Mrs. Marshall	132	692	H. H. Palairet	202	932
1879	Cheltenham	"	130	708	R. Walters	187	729
1880	Shrewsbury	Mrs. Horniblow	133	593	H. H. Palairet	195	897
1881	Sutton Coldfield	Miss Legh	139	763	"	191	849
1882	Leamington	Mrs. Piers Legh	134	750	"	195	885
1883	Cheltenham	"	138	712	C. J. Longman	193	869
1884	Windsor	"	135	701	C. E. Nesham	206	902
1885	Great Malvern	"	135	749	"	211	917
1886	Bath	Miss Legh	136	726	"	202	1022
1887	Cheltenham	"	141	773	Major C. H. Fisher	199	849
1888	York	"	136	732	C. E. Nesham	173	630
1889	Oxford	"	128	690	Mr. Gregson	196	882
1890	Southampton	"	138	798	C. E. Nesham	207	921
1891	Worcester	"	138	796	F. L. Govett	188	818
1892	Eastbourne	"	140	804	G. E. S. Fryer	202	880
1893	York	Mrs. C. Bowly	139	779	Mr. Gregson	173	666
1894	Cheltenham	"	133	623	Rev. E. W. Hussey	185	787
1895	Hurlingham	Miss Legh	138	790	G. E. S. Fryer	184	872
1896	Bournemouth	Miss B. Oakeley	123	559	"	187	815
1897	Great Malvern	Mrs. C. Bowly	131	711	"	173	719
1898	Oxford	Miss Legh	143	825	C. J. Parry Keene	190	998
1899	Brighton	"	137	767	Rev. Eyre W. Hussey	184	948

Year	*Place*	*Ladies*	*Hits Score*	*Gentlemen*	*Hits Score*
1900	Edgbaston	"	132–658	R. Brooks-King	190–804
1901	Cheltenham	Mrs. C. Bowly	123–645	Rev. Eyre W. Hussey	158–758
1902	Clifton	Miss Legh	137–813	R. Brooks-King	181–767
1903	Edinburgh	"	142–802	"	189–767
1904	Great Malvern	"	143–841	J. Penrose	202–814
1905	Southampton	"	141–807	J. H. Bridges	184–838
1906	Oxford	"	137–779	R. Brooks-King	173–779
1907	York	"	143–809	H. P. Nesham	193–865
1908	Oxford	"	138–798	Henry B. Richardson	201–871
				R. Brooks-King	192–870
1909	Great Malvern	"	141–789	W. Dod	195–891
1910	Clifton	Mrs. Wadworth	139–753	R. Brooks-King	193–889
1911	Brighton	Miss Q. Newall	141–803	W. Dod	199–885
1912	Cheltenham	"	136–716	R. Brooks-King	187–829
1913	Edgbaston	Miss Legh	135–703	"	183–857
1914	Cambridge	Mrs. Harold Armitage	137–723	H. P. Nesham	189–787
1915	WAR.				
1916	"				
1917	"				
1918	"				
1919	Great Malvern	Miss Hyde	125–579	T. H. Langford-Sainsbury	145–639
1920	Bath	Mrs. R. Sandford	135–697	C. K. Philips	185–809
1921	Cheltenham	Miss Legh	129–583	W. Inderwick	146–614
1922		Miss Legh	120–584	Maj. G. A. E. Chapman, D. S. O.	174–738
1923		Mrs. Boddam-Whetham	121–523	R. Brooks-King	168–688
1924	Oxford	Mrs. Shillito	118–580	W. Inderwick	188–880
1925	Worcester	Miss N. E. Wallace	125–615	Maj. J. J. B. Farley	163–717

That the score of 1,000 in the Double York Round is not an easy one to obtain is shown by the fact that in the five great public meetings of England only seven men have been successful in accomplishing the feat. In all it has been made eighteen times as follows:

GRAND NATIONAL

1854	H. A. Ford.....	234-1074	
1857	H. A. Ford.....	245-1251	(World's Record.)
1858	H. A. Ford.....	214-1076	
1867	H. A. Ford.....	215-1037	
1886	C. E. Nesham.....	202-1022	

LEAMINGTON

1856	H. A. Ford.....	244-1162
1857	H. A. Ford.....	230-1026
1858	H. A. Ford.....	230-1128
1861	H. A. Ford.....	212-1014
1868	H. A. Ford.....	219-1087
1869	H. A. Ford.....	220-1030

GRAND WESTERN

1870	C. H. Fisher.....	225-1033
1872	C. H. Fisher.....	218-1060

CRYSTAL PALACE

1882	H. H. Palairet.....	221-1025
1893	F. A. Govett.....	214-1004
1901	C. E. Nesham.....	217-1027

SOUTHERN COUNTIES

1905	J. B. Keysworth.....	216-1016
1912	H. P. Nesham.....	223-1067

In addition to these it might be added that at the Autumn Handicap Meeting of the Royal Toxophilite Society at Regents Park, which in those days was a very large affair, the mark was reached twice, as follows:

1881	H. H. Palairet.....	210-1062
1883	C. E. Nesham.....	220-1010

HIGHEST OFFICIAL AMERICAN RECORDS

Made in Annual Tournaments of the National Archery Association

	Hits Score	*Place*	*Date*
Single York Round			
Henry B. Richardson.....	116-566	Chicago	1910
Double York Round			
Henry B. Richardson.....	231-1111	Chicago	1910
Single American Round			
Paul W. Crouch.....	90-626	Rome	1925
Double American Round			
Paul W. Crouch.....	179-1207	Rome	1925
Men's Team Round. Individual			
Rudolph Lagai.....	93-585	Deerfield	1924
Men's Team			
Keystone Team: Jiles.....	333-1727	Deerfield	1924
Palmer			
Hertig			

	Hits—Score or Distance	*Place*	*Date*
Flight Shoot for Men			
Regular Style			
Paul W. Crouch	293 yds.	Deerfield	1924
Special Style			
Paul W. Crouch	311 yds. 6 in.	Rome	1925
Single National Round			
Mrs. M. C. Howell	68-398	Dayton	1895
Double National Round			
Mrs. M. C. Howell	132-756	Dayton	1895
Single Columbia Round			
Miss Cynthia M. Wesson	72-510	Chicago	1915
Double Columbia Round			
Miss Cynthia M. Wesson	144-998	Chicago	1915
Women's Team Round. Individual			
Mrs. M. C. Howell	91-507	Dayton	1893
Women's Team			
Newton Archers: Miss Smith, Miss Ives, Miss Shepherdson, Mrs. Frentz	323-1549	Rome	1925
Flight Shoot for Women			
Miss Katherine Howe	255 yds. 11½ in.	Deerfield	1924

RECORDS OF THE NATIONAL ARCHERY ASSOCIATION OF THE UNITED STATES

DOUBLE YORK ROUND

		100 yards	*80 yards*	*60 yards*	*Total*
1879	Will H. Thompson	70-236	63-233	39-155	172-624
1880	L. L. Peddinghaus	55-221	56-274	41-211	152-708
1881	F. H. Walworth	67-261	64-262	42-240	173-763
1882	Homer S. Taylor	55-151	67-275	46-252	168-678a
1883	Robert Williams, Jr.	76-300	79-371	44-236	199-907
1884	Will H. Thompson	63-237	68-314	43-209	174-760
1885	Robert Williams, Jr.	91-357	78-360	46-278	215-995
1886	William A. Clark	43-195	72-298	43-225	158-718
1887	William A. Clark	42-134	64-244	43-201	149-579
1888	Will H. Thompson	66-244	71-309	38-180	175-733b
1889	Louis W. Maxson	66-220	68-308	46-238	180-766
1890	Louis W. Maxson	62-252	59-231	45-235	166-718

a. Mr. Taylor won by points, Mr. D. A. Nash making 167 hits, 713 score.
b. Mr. Thompson won by points, Mr. Maxson making 171 hits, 739 score.

		100 yards	80 yards	60 yards	Total
1891	Louis W. Maxson.....	53-197	66-304	44-218	163-719
1892	Louis W. Maxson.....	58-216	72-310	42-196	172-722
1893	Louis W. Maxson.....	59-241	60-220	45-253	164-714
1894	Louis W. Maxson.....	58-202	57-213	38-184	153-599
1895	W. R. Robinson.....	61-283	67-241	41-225	169-749
1896	D. F. McGowan.....	43-161	38-132	37-159	118-462
1897	William A. Clark.....	59-221	59-223	41-189	159-633
1898	Louis W. Maxson.....	61-241	63-259	35-277	159-677
1899	M. C. Howell.....	51-185	53-215	34-170	138-590
1900	A. R. Clark.....	59-213	76-342	45-205	180-758
1901	Will H. Thompson.....	61-237	57-229	45-215	163-681
1902	Robert Williams, Jr.....	56-212	56-228	38-172	150-612
1903	Wallace Bryant.....	50-212	66-240	41-201	157-653
1904	George Phillips Bryant..	79-281	67-293	46-246	192-820
1905	George Phillips Bryant..	72-274	59-259	41-183	172-716
1906	Henry B. Richardson....	81-331	79-367	41-193	201-891
1907	Henry B. Richardson....	73-307	66-312	45-241	184-860
1908	Will H. Thompson.....	88-362	78-368	45-243	211-973
1909	George Phillips Bryant..	102-402	80-330	45-243	227-975
1910	Henry B. Richardson....	96-400	89-445	46-265	231-1111
1911	Homer S. Taylor.....	78-338	63-259	40-228	181-835
1912	George Phillips Bryant..	105-435	78-374	47-285	230-1094
1913	Dr. J. W. Doughty.....	66-282	66-254	46-266	178-802c
1914	Dr. Robert P. Elmer....	58-238	58-270	46-256	162-764
1915	Herman L. Walker.....	49-183	60-262	43-221	152-666
1916	Dr. Robert P. Elmer....	90-390	74-364	46-266	210-1020
1917	No tournament.				
1918	No tournament.				
1919	Dr. Robert P. Elmer....	91-359	79-379	48-278	218-1016
1920	Dr. Robert P. Elmer....	68-278	68-276	48-258	184-812
1921	James S. Jiles.....	66-234	70-272	47-261	183-767
1922	Dr. Robert P. Elmer....	94-434	81-365	44-240	219-1039
1923	William H. Palmer, Jr...	53-207	67-295	45-251	165-753
1924	James S. Jiles.....	69-279	73-379	45-231	187-889
1925	Dr. Robert P. Elmer....	85-365	77-377	44-234	206-976

c. Dr. Doughty won by points, Mr. G. P. Bryant making 176 hits, 832 score.

DOUBLE AMERICAN ROUND

		60 yards	50 yards	40 yards	Total
1883	Col. Robert Williams, Jr.	56-290	60-392	60-404	176-1086
1884	Col. Robert Williams, Jr.	57-301	50-356	59-367	176-1024
1885	Col. Robert Williams, Jr.	57-295	60-356	60-404	177-1055
1886	William A. Clark.....	59-213	60-388	60-396	179-1097

		60 yards	*50 yards*	*40 yards*	*Total*
1887	William A. Clark.....	54-266	60-342	60-384	174- 992
1888	Louis W. Maxson.....	59-277	56-280	60-404	175- 961
1889	J. T. Shawan.....	52-256	59-315	60-380	171- 951
1890	Louis W. Maxson.....	51-255	59-341	60-400	170- 996
1891	Louis W. Maxson.....	54-244	60-362	60-402	174-1008
1892	Louis W. Maxson.....	57-287	60-354	60-400	177-1041
1893	Louis W. Maxson.....	60-324	57-323	58-336	175- 983
1894	J. Benckenstein.....	50-240	60-292	59-339	169- 871
1895	Louis W. Maxson.....	53-287	59-325	60-402	172-1014
1896	Louis W. Maxson.....	54-272	56-306	60-364	170- 942
1897	William A. Clark.....	48-208	54-284	57-299	159- 791
1898	J. L. Taylor.....	50-246	57-315	58-324	165- 885
1899	William L. Clark.....	46-234	57-265	56-312	159- 811
1900	A. R. Clark.....	58-312	60-338	59-375	177-1025
1901	C. S. Woodruff.....	51-275	48-248	60-330	159- 853
1902	Col. Robert Williams, Jr.	50-286	55-283	59-361	164- 930
1903	Col. Robert Williams, Jr.	53-251	58-298	59-345	170- 878
1904	George Phillips Bryant..	56-270	60-366	60-412	176-1048
1905	C. C. Beach.....	56-280	58-354	60-372	174-1006
1906	Henry B. Richardson....	59-331	59-341	60-380	178-1052
1907	Col. Robert Williams, Jr.	56-296	59-333	60-380	175-1009
1908	Col. Robert Williams, Jr.	52-282	58-336	59-389	169-1007
1909	George Phillips Bryant..	56-322	60-380	60-416	176-1118
1910	Henry B. Richardson....	59-291	58-362	60-406	177-1059
1911	Dr. Robert P. Elmer....	56-262	59-361	60-418	175-1041
1912	George Phillips Bryant..	58-338	59-373	60-442	177-1153
1913	Dr. Robert P. Elmer....	54-248	57-329	59-423	170-1000
1914	Dr. Robert P. Elmer....	56-312	60-332	60-408	176-1052
1915	Dr. Robert P. Elmer....	57-299	60-364	60-412	177-1075
1916	Dr. Robert P. Elmer....	54-306	59-359	60-400	173-1065
1917	No tournament.				
1918	No tournament.				
1919	Dr. Robert P. Elmer....	60-322	59-389	60-436	179-1147
1920	Dr. Robert P. Elmer....	55-287	60-388	60-432	175-1107
1921	Dr. Robert P. Elmer....	59-321	58-340	60-416	177-1077
1922	Dr. Robert P. Elmer....	59-315	59-329	60-408	178-1052
1923	William H. Palmer, Jr...	57-335	59-355	60-416	176-1106
1924	Rudolph Lagai.....	59-315	60-388	60-380	179-1083
1925	Dr. Paul W. Crouch....	59-361	60-414	60-432	179-1207

Rank of the Winners of the Double York Round

In ranking the winners of the various rounds it is not easy to agree on the fairest basis. Some might contend that the average of all scores should be taken, but this seems unfair to the

man who enters his first tournament with practically no skill at all and then, through increased interest, rises to the top in later years. Similarly the percentage of wins to the number of tournaments participated in might lead to injustice; for example, it is doubtful if Dr. Doughty, who won his first and only York Round because of the now obsolete system of scoring by points, thus getting 100%, should take precedence over G. P. Bryant, who made a higher score on that occasion and who won four of the eight tournaments in which he competed, thus getting a rating of fifty per cent.

Dr. Weston thought that the fairest comparison might be made through the average of the winning scores and I have followed his lead. In making the computations fractions have been partially disregarded and the scores brought to the nearest figure which would be possible in actual shooting.

	Times Winner	*Ave. Winning Scores*	*Best Score*	*Ave. All Scores*	*No. Contests*	*Per-cent. Wins*
1. Richardson.....	3	207-955	231-1111	164-704	8	37.5
2. Elmer.....	6	200-938	219-1039	185-827	12	50
3. G. P. Bryant...	4	205-901	230-1094	185-815	8	50
4. Williams.....	3	188-838	215- 995	166-716	14	21.4
5. Jiles.....	2	186-828	187- 889	154-644	12	16.6
6. Doughty.....	1	178-802	178- 802	178-802	1	100
7. Walworth.....	1	173-763	173- 763	159-677	2	50
8. A. R. Clark (a).	1	180-758	180- 758	164-702	2	50
9. Taylor.....	2	179-757	181- 835	162-690	19	10.5
10. Thompson.....	5	178-754	211- 973	162-680	18	27.8
11. Palmer.....	1	165-753	181- 755	141-585	7	14.3
12. Robinson.....	1	169-749	169- 749	155-629	2	50
13. Peddinghaus....	1	152-708	152- 708	123-537	2	50
14. Maxson.....	7	166-702	180- 766	136-564	17	41
15. Walker.....	1	152-666	152- 666			
16. W. Bryant (b)..	1	167-653	183- 797	127-587	7	14.3
17. W. A. Clark....	3	155-643	158- 718	125-507	15	20
18. Howell.....	1	138-590	138- 590	118-492	10	10
19. McGowan.....	1	118-462	146- 544	106-410	10	10

a. Clark was present in 1914 but stopped after the 1st 100 yards owing to the sun, as he had recently been sun-struck in India.

b. Bryant shot only one York Round in 1921.

RANK OF THE WINNERS OF THE DOUBLE AMERICAN ROUND

	Times Winner	*Ave. Winning Scores*	*Best Score*	*Ave. All Scores*	*No. Contests*	*Per-cent. Wins*
1. Crouch	1	179-1207	179-1207	157- 925	2	50
2. Palmer	1	176-1106	176-1106	169- 908	7	14.3
3. Bryant	3	176-1102	177-1153	169- 991	7	43
4. Lagai	1	179-1083	179-1083	175- 961	2	33.3
5. Elmer	9	176-1068	179-1147	176-1070	12	75
6. Richardson	2	177-1055	177-1059	178- 846	8	25
7. A. R. Clark	1	177-1025	177-1025	164- 622	4	25
8. Williams	6	174-1008	176-1086	169- 919	11	54.5
9. Beach	1	174-1006	174-1006	163- 886	11	9
10. Maxson	7	174- 992	177-1041	161- 855	19	36.8
11. Shawan	1	171- 951	171- 951	162- 862	4	25
12. W. A. Clark	4	168- 898	179-1097	159- 827	23	17.4
13. J. L. Taylor	1	165- 885	165- 885	151- 749	7	14.3
14. Benckenstein	1	169- 871	169- 871	139- 657	8	12.5
15. Woodruff	1	159- 853	171- 933	160- 820	6	16.6

It is also very interesting to compare the standing of the champions since 1883, when the American Round was introduced, on the basis which is in use to-day, of adding the totals of both major rounds and their hits. If that system had always been in force the results would have been different in some years but I do not think there is anything to be gained by searching out those hypothetical cases. I have therefore computed only the best scores of the men who actually held the championship.

1.	1912	G. P. Bryant	2654
2.	1910	Richardson	2578
3.	1919	Elmer	2560
4.	1925	Crouch	2496
5.	1883	Williams	2368
6.	1924	Jiles	2258
7.	1923	Palmer	2200
8.	1886	W. A. Clark	2152
9.	1900	A. R. Clark	2140
10.	1911	Taylor	2124
11.	1892	Maxson	2112
12.	1895	Robinson	2052
13.	1913	Doughty	1992
14.	1915	Walker	1802
15.	1899	Howell	1696
16.	1896	McGowan	1512

To show the maximum ever attained in competition if we add the two world records, we get:

York (Ford)	1496
American (Crouch)	1386
	2882

CHAMPIONS, MEN

1879 to 1910. The winner of the Double York Round.

The new constitution authorized in 1910 provided for two equal championships, beginning in 1911, which were won as follows:

	York Round Championship		*American Round Championship*	
1911	Homer S. Taylor.....	181- 835	R. P. Elmer.....	175-1041
1912	G. P. Bryant.....	230-1094	G. P. Bryant.....	177-1153
1913	J. W. Doughty.....	178- 802	R. P. Elmer.....	170-1000
1914	R. P. Elmer.....	162- 764	R. P. Elmer.....	176-1052

This indecisive method gave general dissatisfaction and the new constitution adopted in 1914 introduced the present mode of selection.

1915	R. P. Elmer.....	2012
1916	R. P. Elmer.....	2468
1917	R. P. Elmer.....	By default of tournament
1918	R. P. Elmer.....	By default of tournament
1919	R. P. Elmer.....	2560
1920	R. P. Elmer.....	2278
1921	J. S. Jiles.....	2160
1922	R. P. Elmer.....	2488
1923	W. H. Palmer, Jr.....	2200
1924	J. S. Jiles.....	2258
1925	P. W. Crouch.....	2496

FLIGHT SHOOT FOR MEN

		Yards	*Inches*
1882	J. Wilkinson, Chicago.....	213	
1883	No contest.		
1884	No contest.		
1885	W. P. Webb, Eaton, Ohio.....	234	
1886	J. J. Watrous, Cincinnati, Ohio.....	210	
1887	L. W. Maxson, Washington, D. C.....	226	
1888	L. W. Maxson, Washington, D. C.....	233	
1889	L. W. Maxson, Washington, D. C.....	266	
1890	L. W. Maxson, Washington, D. C.....	268	18
1891	L. W. Maxson, Washington, D. C.....	290	
1892	L. W. Maxson, Washington, D. C.....	213	
1893	C. J. Strong, Cincinnati, Ohio.....	285	18
1894	L. W. Maxson, Washington, D. C.....	253	

		Yards	*Inches*
1895	G. Benckenstein, Wyoming, Ohio	247	
1896	L. W. Maxson, Washington, D. C.	250	
1897	L. W. Maxson, Washington, D. C.	240	
1898	L. W. Maxson, Washington, D. C.	247	
1899	L. W. Maxson, Washington, D. C.	224	
1900	L. W. Maxson, Washington, D. C.	251	
1901	R. E. Taylor, Cincinnati, Ohio	230	
1902	A. E. Whitman, Melrose, Mass.	244	
1903	L. W. Maxson, Washington, D. C.	246	
1904	L. W. Maxson, Washington, D. C.	259	
1905	Wallace Bryant, Boston, Mass.	241	
1906	Homer S. Taylor, Chicago, Ill.	230	
1907	Henry B. Richardson, Boston, Mass.	218	
1908	J. M. Challis, Atchison, Kansas	232	
1909	Z. E. Jackson, Atchison, Kansas	245	
1910	Homer W. Bishop, Chicago	213	8
1911	Dr. Robert P. Elmer, Wayne, Pa.	270	9
1912	George Phillips Bryant, Boston, Mass.	229	24
1913	Dr. Robert P. Elmer, Wayne, Pa.	260	12
1914	James S. Jiles, Pittsburgh, Pa.	234	¾
1915	No contest, on account of rain.		
1916	George Phillips Bryant, Boston, Mass.	289	28
1917	No tournament.		
1918	No tournament.		
1919	George Phillips Bryant, Melrose, Mass.	286	6
1920	Abner Shepherdson, Melrose, Mass.	274	34
1921	Dr. Saxton T. Pope, San Francisco, Calif.		
1922	Dr. Robert P. Elmer, Wayne, Pa.	269	8
1923	Prof. Charles D. Curtis, Pembina, North Dakota	273	32½
1924	Prof. Charles D. Curtis (Using hands and feet.)	304	6¼
	Dr. Paul W. Crouch (Second place) (Regular style.)	293	
1925	G. A. Mang, Buffalo, N. Y. (Regular style.)	259	34
	Dr. P. W. Crouch (Special stvle.)	311	6

TEAM CONTEST FOR MEN

(4 a side)

Single American Round

1879	Wabash Merry Bowmen, Crawfordsville, Ind.	302-1508
1880	Marietta Archers, Marietta, Ohio	314-1640
1881	College Hills Archery Club, Cincinnati, Ohio	315-1611

Team Round

1882	College Hills Archery Club, Cincinnati, Ohio	309-1435
1883	Highland Archery Club, Wyoming, Ohio	294-1332
1884	Battle Creek Archery Club, Battle Creek, Mich	315-1428
1885	Highland Archery Club, Wyoming, Ohio	327-1509
1886	Highland Archery Club, Wyoming, Ohio	285-1283
1887	Brooklyn Archery Club, Brooklyn, N. Y.	301-1349
1888	Highland Archery Club, Wyoming, Ohio	316-1636
1889	Walnut Hills Archery Club, Cincinnati, Ohio	291-1367
1890	Walnut Hills Archery Club, Cincinnati, Ohio	314-1486
1891	Walnut Hills Archery Club, Cincinnati, Ohio	283-1307
1892	Walnut Hills Archery Club, Cincinnati, Ohio	311-1367
1893	Walnut Hills Archery Club, Cincinnati, Ohio	297-1383
1894	Potomac Archers, Washington, D. C. No other team present.	
1895	Walnut Hills Archery Club, Cincinnati, Ohio	286-1294
1896	Potomac Archers, Washington, D. C.	252-1086
1897	Potomac Archers, Washington, D. C.	297-1335
1898	Highland Archery Club, Wyoming, Ohio	284-1314
1899	Highland Archery Club, Wyoming, Ohio	275-1181
1900	Highland Archery Club, Wyoming, Ohio	306-1334
1901	Potomac Archers, Washington, D. C.	296-1314
1902	Potomac Archers, Washington, D. C.	287-1343
1903	Potomac Archers, Washington, D. C.	284-1242
1904	Potomac Archers, Washington, D. C.	300-1334
1905	Chicago Archery Club	309-1367
1906	Boston Archers	327-1591
1907	Chicago Archery Club	350-1680
1908	Chicago Archery Club	318-1528
1909	Boston Archers	300-1436
1910	Chicago Archery Club	330-1506
1911	Chicago Archery Club	318-1528
1912	Boston Archers	324-1618
1913	Boston Archers	328-1538
1914	Wayne Archers, Wayne, Pa	320-1578
1915	Stopped by rain at end of first half with the Wayne Archers in the lead.	
1916	Keystone Archers	342-1582
1917	No tournament.	
1918	No tournament.	
1919	Newton Archers, Newton Centre, Mass.	312-1422
1920	Pittsburgh Archers	292-1368
1921	Pittsburgh Archers	299-1393
1922	Wayne Archers	329-1691
1923	Keystone Archers	299-1501
1924	Keystone Archers	333-1727
1925	Rome Archers, Rome, N. Y.	325-1583

DOUBLE NATIONAL ROUND

		60 yards	*50 yards*	*Total*
1881	Mrs. A. H. Gibbs	61-233	36-160	97-393
1882	Mrs. A. H. Gibbs	63-251	38-198	101-449
1883	Mrs. M. C. Howell	85-413	47-277	132-690
1884	Mrs. H. Hall	46-204	42-212	88-416
1885	Mrs. M. C. Howell	75-353	46-252	121-605
1886	Mrs. M. C. Howell	82-386	44-238	126-624
1887	Mrs. A. M. Phillips	83-385	48-246	131-631
1888	Mrs. A. M. Phillips	82-424	42-258	124-682
1889	Mrs. A. M. Phillips	89-481	44-232	133-713
1890	Mrs. M. C. Howell	79-353	46-226	125-579
1891	Mrs. M. C. Howell	59-221	45-243	104-464
1892	Mrs. M. C. Howell	79-353	48-272	127-625
1893	Mrs. M. C. Howell	84-380	45-247	129-627
1894	Mrs. A. Kern	67-343	45-237	112-580
1895	Mrs. M. C. Howell	86-474	46-282	132-756
1896	Mrs. M. C. Howell	81-361	45-249	126-610
1897	Mrs. J. S. Barker	70-294	42-226	112-520
1898	Mrs. M. C. Howell	88-428	44-210	130-638
1899	Mrs. M. C. Howell	84-426	46-242	130-668
1900	Mrs. M. C. Howell	81-387	44-268	125-665
1901	Mrs. C. S. Woodruff	34-146	33-145	67-291
1902	Mrs. M. C. Howell	82-366	44-238	126-604
1903	Mrs. M. C. Howell	87-381	48-272	135-653
1904	Mrs. M. C. Howell	87-417	43-203	130-620
1905	Mrs. M. C. Howell	80-366	44-204	124-570
1906	Miss E. C. Cooke	48-180	34-122	82-302
1907	Mrs. M. C. Howell	78-386	45-233	123-619
1908	Miss H. A. Case	60-248	32-150	92-398
1909	Miss H. A. Case	79-343	46-234	125-577
1910	Miss J. V. Sullivan	71-399	44-230	115-629
1911	Mrs. J. H. Taylor	53-197	41-199	94-396
1912	Mrs. J. H. Taylor	66-304	46-220	112-524
1913	Mrs. P. S. Fletcher	63-271	30-106	93-377
1914	Mrs. B. P. Gray	81-387	46-238	127-625
1915	Miss C. M. Wesson	85-455	45-253	130-708
1916	Miss C. M. Wesson	80-356	44-226	124-582
1917	No tournament.			
1918	No tournament.			
1919	Miss D. D. Smith	80-360	42-194	122-554
1920	Miss C. M. Wesson	80-332	45-203	125-535
1921	Miss D. D. Smith	78-316	40-214	118-530
1922	Miss D. D. Smith	74-316	46-236	120-552
1923	Miss N. L. Peirce	51-229	30-122	81-351

		60 yards	*50 yards*	*Total*
1924	Miss D. D. Smith	78-338	43-237	121-575
1925	Miss D. D. Smith	82-358	44-238	126-596

DOUBLE COLUMBIA ROUND

		50 yards	*40 yards*	*30 yards*	*Total*
1879	Mrs. S. Brown	28-132	36-152	46-264	110-548
1880	Mrs. T. Davis	30-112	37-203	47-283	114-598
1883	Mrs. M. C. Howell	46-272	48-316	48-352	142-940
1885	Mrs. M. C. Howell	46-232	48-276	48-334	142-842
1886	Mrs. M. C. Howell	47-283	48-284	48-326	143-893
1887	Mrs. A. M. Phillips	46-286	48-318	48-376	142-980
1888	Mrs. A. M. Phillips	45-255	48-300	48-346	141-901
1889	Mrs. A. M. Phillips	47-267	48-320	48-358	143-945
1890	Mrs. M. C. Howell	48-292	48-320	48-354	144-966
1891	Mrs. M. C. Howell	42-224	47-259	48-330	137-813
1892	Mrs. M. C. Howell	44-206	48-282	48-330	140-818
1893	Mrs. M. C. Howell	45-233	48-302	48-344	141-879
1894	Mrs. A. Kern	39-169	38-212	47-291	124-666
1895	Mrs. M. C. Howell	45-281	48-332	48-356	141-969
1896	Mrs. M. C. Howell	48-290	48-316	48-384	144-990
1897	Mrs. J. S. Barker	42-190	45-237	48-320	135-747
1898	Mrs. M. C. Howell	45-247	45-305	48-362	140-914
1899	Mrs. M. C. Howell	45-251	48-292	48-342	141-885
1900	Mrs. M. C. Howell	47-265	47-303	48-340	142-908
1901	Mrs. C. S. Woodruff	37-177	42-198	40-252	119-627
1902	Mrs. M. C. Howell	45-215	48-282	48-352	141-849
1903	Mrs. M. C. Howell	45-233	47-303	48-276	140-862
1904	Mrs. M. C. Howell	45-245	48-274	48-348	141-867
1905	Mrs. M. C. Howell	47-253	47-305	48-352	142-910
1906	Miss E. C. Cooke	32-146	33-141	47-249	112-536
1907	Mrs. M. C. Howell	47-257	48-322	48-352	143-931
1908	Miss Harriet A. Case	29-127	38-182	45-237	112-546
1909	Miss Harriet A. Case	37-171	47-241	48-320	132-732
1910	Miss L. M. Witwer	36-168	46-268	45-297	127-733
1911	Mrs. J. H. Taylor	38-168	45-231	48-332	131-731a
1912	Mrs. J. H. Taylor	39-181	45-261	47-345	131-787
1913	Mrs. Louis C. Smith	29-107	40-204	47-263	116-574b
1914	Mrs. Burton Payne Gray	47-239	48-258	48-342	143-839
1915	Miss Cynthia M. Wesson	48-294	48-328	48-356	144-998
1916	Miss Cynthia M. Wesson	43-191	48-302	48-354	139-847
1917	No tournament.				
1918	No tournament.				

a. Same as Miss Witwer, married during the interim.

b. Mrs. Smith won by points, Mrs. P. S. Fletcher making 114-586.

		50 yards	*40 yards*	*30 yards*	*Total*
1919	Miss Dorothy D. Smith.	44-244	46-246	47-321	137-811
1920	Miss Cynthia M. Wesson	43-233	48-302	48-326	139-861
1921	Mrs. Louis C. Smith....	41-195	47-271	47-309	135-775
1922	Miss Dorothy D. Smith.	45-219	48-278	47-307	140-804
1923	Miss Norma L. Peirce...	31-149	42-218	43-227	116-594
1924	Miss D. D. Smith.....	43-221	46-262	47-301	136-784
1925	Miss D. D. Smith.....	42-226	45-265	48-334	135-825

Rank of the Winners of the Double National Round

	Times Winner	*Av. Winning Scores*	*Highest Winning Score*
1. Mrs. A. M. Phillips.....	3	127-675	133-713
2. Miss J. V. Sullivan.....	1	115-629	115-629
3. Mrs. B. P. Gray.....	1	127-625	127-625
4. Miss C. M. Wesson.....	3	126-606	130-708
5. Mrs. M. C. Howell.....	17	122-606	132-756
6. Mrs. C. S. Woodruff.....	1	126-604	126-604
7. Mrs. A. Kern.....	1	112-580	112-580
8. Miss Dorothy D. Smith.....	3	122-562	126-596
9. Mrs. J. S. Barker.....	1	112-520	112-520
10. Miss H. A. Case.....	2	109-487	125-577
11. Mrs. J. H. Taylor.....	2	102-460	112-524
12. Mrs. A. H. Gibbs.....	2	99-421	101-449
13. Mrs. H. Hall.....	1	88-416	88-416
14. Mrs. P. S. Fletcher.....	1	93-377	93-377
15. Miss Norma Peirce.....	1	81-351	81-351
16. Miss E. C. Cooke.....	1	82-302	82-302

Rank of the Winners of the Double Columbia Round

	Times Winner	*Av. Winning Scores*	*Highest Winning Scores*
1. Mrs. A. M. Phillips.....	3	142-942	142-980
2. Miss Cynthia M. Wesson.....	3	140-902	144-998
3. Mrs. M. C. Howell.....	17	142-896	144-990
4. Mrs. B. P. Gray.....	1	143-839	143-839
5. Miss Dorothy D. Smith.....	4	138-806	135-825
6. Mrs. J. H. Taylor.....	3	130-750	131-787
7. Mrs. J. S. Barker.....	1	135-747	135-747
8. Mrs. Louis C. Smith.....	2	125-675	135-775
9. Mrs. A. Kern.....	1	126-666	126-666
10. Miss H. A. Case.....	2	123-629	123-629
11. Mrs. C. S. Woodruff.....	1	119-627	119-627
12. Mrs. T. Davis.....	1	114-598	114-598
13. Miss Norma L. Peirce.....	1	116-594	116-594
14. Mrs. S. Brown.....	1	110-548	110-548

CHAMPIONS, WOMEN

1879–1880. The Winner of the Double Columbia Round.

1881–1910. The Winner of the Double National Round.

By the constitution authorized to take effect in 1911 there were created two championships of equal rank, the National and the Columbia.

	National		*Columbia*	
1911	Mrs. J. H. Taylor.....	94-396	Mrs. J. H. Taylor.....	131-731
1912	Mrs. J. H. Taylor.....	112-524	Mrs. J. H. Taylor.....	131-787
1913	Mrs. P. S. Fletcher...	93-377	Mrs. Louis C. Smith..	116-574
1914	Mrs. B. P. Gray.....	127-625	Mrs. B. P. Gray.....	143-839

A new constitution was adopted in 1914 which created a single champion by adding the hits and scores of both rounds.

1915	Miss C. M. Wesson.....	1980
1916	Miss C. M. Wesson.....	1692
1917	Miss C. M. Wesson.....	By default of tournament
1918	Miss C. M. Wesson.....	By default of tournament
1919	Miss D. D. Smith.....	1624
1920	Miss C. M. Wesson.....	1660
1921	Miss D. D. Smith.....	1536
1922	Miss D. D. Smith.....	1616
1923	Miss N. L. Peirce.....	1142
1924	Miss D. D. Smith.....	1616
1925	Miss D. D. Smith.....	1682

FLIGHT SHOOT FOR WOMEN

		Yards	*Inches*
1882	Mrs. Frye, Williamsport, Pa.....	162	
1883	No contest.		
1884	No contest.		
1885	No contest.		
1886	Mrs. A. M. Phillips, Battle Creek, Mich.....	183	
1887	Mrs. A. M. Phillips, Battle Creek, Mich.....	175	24
1888	Miss E. C. Cooke, Washington, D. C.....	180	
1889	Mrs. A. Kern, Dayton, Ohio.....	210	12
1890	Mrs. A. Kern, Dayton, Ohio.....	189	6
1891	Miss E. C. Cooke, Washington, D. C.....	211	12
1892	Mrs. J. G. Graf, Walnut Hills, Ohio.....	151	
1893	Miss M. E. Strong, Cincinnati, Ohio.....	187	
1894	Miss E. C. Cooke, Washington, D. C.....	178	6

		Yards	*Inches*
1895	Mrs. J. S. Barker, Washington, D. C.	197	
1896	Miss E. C. Cooke, Washington, D. C.	182	
1897	Miss E. C. Cooke, Washington, D. C.	172	
1898	No contest.		
1899	Mrs. A. Kern, Dayton, Ohio	211	
1900	Mrs. M. C. Howell, Norwood, Ohio	141	
1901	Miss Georgie Clark, Wyoming, Ohio	195	
1902	Miss E. C. Cooke, Washington, D. C.	190	
1903	Miss Mabel Taylor, Cincinnati, Ohio	174	
1904	Miss Mabel Taylor, Cincinnati, Ohio	219	
1905	No contest.		
1906	Mrs. E. W. Frentz, Melrose, Mass.	197	
1907	Mrs. Amelia Barbe, Chicago	147	
1908	Mrs. W. G. Valentine, Chicago	139	
1909	Mrs. E. W. Frentz, Melrose, Mass.	188	
1910	Miss L. M. Witwer, Chicago	162	
1911	Miss F. M. Patrick, Oak Park, Ill.	189	
1912	Mrs. G. P. Bryant, Melrose, Mass.	229	24
1913	Mrs. G. P. Bryant, Melrose, Mass.	251	4/10
1914	Mrs. E. W. Frentz, Melrose, Mass.	220	29½
1915	No contest, on account of rain.		
1916	Miss Cynthia M. Wesson, Cotuit, Mass.	204	33
1917	No tournament.		
1918	No tournament.		
1919	Miss Stella M. Ives, Roslindale, Mass.	202	24
1920	Miss Cynthia M. Wesson, Cotuit, Mass.	210	
1921	Miss Stella M. Ives, Roslindale, Mass.		
1922	Mrs. E. W. Frentz, Melrose, Mass.		
1923	Miss Norma L. Peirce, Boston, Mass. Approximately	200	
1924	Miss Katherine Howe, Dorset, Vt.	255	11½
1925	Mrs. E. W. Frentz, Melrose, Mass.	239	5

TEAM CONTEST FOR WOMEN
(4 a side)

72 Arrows at 40 Yards

1882a	College Hills Archery Club, Cincinnati, Ohio	182- 874
1883	Highland Archers, Wyoming, Ohio	238-1076

96 Arrows at 50 Yards

1884	No contest.	
1885	Highland Archers, Wyoming, Ohio	291-1321
1886a	Highland Archers, Wyoming, Ohio	167- 751
1887	Robin Hood Archery Club, Dayton, Kentucky	279-1229
1888	Robin Hood Archery Club, Dayton, Kentucky	263-1169

a. Three on a side.

1889	Robin Hood Archery Club, Dayton, Kentucky	222- 876
1890	Walnut Hills Archery Club, Cincinnati, Ohio	268-1192
1891	Walnut Hills Archery Club, Cincinnati, Ohio	238-1070
1892	No contest.	
1893	Walnut Hills Archery Club. No other team present.	
1894	Potomac Archers, Washington, D. C. No other team present.	
1895	No contest.	
1896	Potomac Archers, Washington, D. C.	199- 833
1897	Potomac Archers, Washington, D. C.	218- 932
1898	Walnut Hills Archery Club, Cincinnati, Ohio	231-1033
1899	Walnut Hills Archery Club. No other team present.	
1900	Walnut Hills Archery Club, Cincinnati, Ohio	216- 938
1901	Highland Archers, Wyoming, Ohio	196- 864
1902	No contest.	
1903	Cincinnati Archery Association	285-1307
1904	Cincinnati Archery Association	260-1144
1905	Chicago Archery Club	162- 616
1906	Boston Archers	172- 688
1907	Chicago Archery Club	225- 819
1908	Chicago Archery Club	147- 513
1909	Chicago Archery Club	277-1295
1910	Chicago Archery Club	315-1517
1911	Chicago Archery Club	201- 861
1912	Boston Archers	248-1078
1913	Newton Archers, Newton Centre, Mass.	231-1083
1914	Wayne Archers, Wayne, Pa.	295-1405
1915	No contest.	
1916	Wayne Archers, Wayne, Pa.	250-1088
1917	No tournament.	
1918	No tournament.	
1919	Newton Archers, Newton Centre, Mass.	282-1250
1920	Boston Archers	265-1181
1921	Newton Archers, Newton Centre, Mass.	320-1504
1922	Newton Archers, Newton Centre, Mass.	325-1525
1923	Contested by individuals only, no regular teams.	
1924	Newton Archers, Newton Centre, Mass.	309-1419
1925	Newton Archers, Newton Centre, Mass.	323-1549

The following tables show the places where the Annual Tournaments of the National Archery Association have been held and the number of contestants in each.

		Men	*Women*	*Total*
1879	Chicago	69	20	89
1880	Buffalo, N. Y.	35	11	46

		Men	*Women*	*Total*
1881	Brooklyn, N. Y.	57	19	76
1882	Chicago	31	13	44
1883	Cincinnati	42	27	69
1884	Pullman, Ill.	15	1	16
1885	Eaton, Ohio	22	17	39
1886	Chautauqua, N. Y.	11	12	23
1887	Washington, D. C.	28	18	46
1888	Dayton, Ohio	35	21	56
1889	Dayton, Ohio	27	24	51
1890	Norwood, Ohio	23	15	38
1891	Natural Bridge, Va.	16	12	28
1892	Fortress Monroe, Va.	18	5	23
1893	Dayton, Ohio	24	8	32
1894	Washington, D. C.	11	7	18
1895	Dayton, Ohio	20	4	24
1896	White Sulphur Springs, Va.	6	5	11
1897	Washington, D. C.	6	5	11
1898	Wyoming, Ohio	13	6	19
1899	Norwood, Ohio	10	6	16
1900	Cincinnati	13	6	19
1901	Cincinnati	14	7	21
1902	Mountain Lake Park, Md.	13	5	18
1903	Niagara Falls, N. Y.	15	6	21
1904	St. Louis	22	6	28
1905	Chicago	34	7	41
1906	Boston	14	5	19
1907	Chicago	26	10	36
1908	Chicago	25	8	33
1909	Chicago	20	16	36
1910	Chicago	23	16	39
1911	Chicago	17	15	32
1912	Boston	19	12	31
1913	Boston	25	10	35
1914	Haverford, Pa.	34	18	52
1915	Chicago	19	8	27
1916	Jersey City, N. J.	18	9	27
1917	No tournament on account of the war.			
1918	No tournament on account of the war.			
1919	Boston	26	14	40
1920	Wayne, Pa.	19	11	30
1921	Boston	28	18	46
1922	Cooperstown, N. Y.	28	16	44
1923	Chicago	22	8	30
1924	Deerfield, Mass.	39	15	54
1925	Rome, N. Y.	46	16	62

XV

THE LANGUAGE OF ARCHERY

In gathering the material for this book it was impressed upon me more strongly than ever before that archery has a distinct linguistic idiom of its own. So, too, have most other pastimes of great antiquity and wide geographical distribution; for example golf has made such words as stymie and niblick, which were wholly unknown to our American fathers, part of our current speech.

Many peculiarly toxophilitic words and phrases occur in the writings of acknowledged masters of the English tongue, such as Roger Ascham, Bishop Latimer and Shakespeare, and yet, to my astonishment, I find that standard works like the Century and Oxford dictionaries either do not contain some of them at all or else have given an interpretation of their significance which, to an archer, is obviously incorrect.

Therefore I think it well to write a glossary of all the words and phrases I can find, so far as they pertain strictly to archery, with the dual intention of affording instruction to the student of shooting and of doing a small bit to save for our noble old language some of its elements in their early purity. When I began the list I supposed that it might amount to a few score of definitions but to my surprise I find that the number has grown to 552.

Another line of investigation is opened up by the study of these words, which to me at least is very fascinating. It is found by tracing back through the different languages of the Indo-European group of peoples, to which all of us who are of the white race belong, the fundamental words of archery, which I have accepted as being *bow* and *arrow*, or other words with the same meaning, and thus determining not only the already known antiquity of the weapons themselves but, to a

greater or less extent, showing the probable channels through which their use descended to us and in a general way indicating our own racial ancestry.

Within this decade Prof. Harold H. Bender, of Princeton, has applied a general principle of this sort to our most ancient words of all kinds with such skill that he has succeeded through purely philological means in establishing the fact that the early home of our white race was in the vast primeval forests which might be said to pivot on modern Lithuania, shady depths in which a pigmented skin was of no advantage. Through just what branches of this great stock we have received our weapons I will try to indicate.

Let us take first the word *bow* which, with the pronunciation of "bough," means a bending of the body, or the rounded end of a ship, or, with the sound of "bo," may be applied as well to a loop of ribbon as to our archers' weapon. We therefore see at once that the name of the implement is associated with its most obvious characteristic, the graceful deviation from straightness.

This idea may be traced through almost all European and related languages to the most ancient forms of Indo-European speech. We can think of nothing more likely to arise in the human mind nor with greater need for verbal expression than the thought of the bending of the body, accompanying almost every movement, so that from this primordial concept would easily be derived the name of an object which so easily suggested it.

Looking backward, the modern word *bow* shows its first change in some of the early English forms where we find it spelled with the letter *g*. Here let us remind ourselves of a fact which cannot be put too strongly, that languages were spoken for many centuries before they were crystallized by the application of writing and during all that time they were in a state of flux that produced changes in a way that is hard for us who live in an age of standardization to appreciate.

One sort of dialectic alteration which assumed the proportions of a general rule was that in the south of England the hard sounds of Anglo-Saxon were smoothed down and softened while in the more rugged districts of the north, including Scotland, where Scandinavian influences were stronger, the change was much less.

Thus, at the same period in various English dialects we find the forms, *bowe, boghe* and *boge,* with the final *e* sounded as a separate syllable. Along with this the cognate verb meaning *to bend* appears as *bowen, buwen, bogen,* and *bugen,* the final *en* marking the infinitive, as in German.

Beyond this time we encounter the direct ancestor of these in the Anglo-Saxon *boga.* It was in practically this form that the word existed in all of the Nordic languages of that time, with trivial differences that show in the accepted spellings but would convey very little change in sound. Thus we find Old Saxon—*bogo,* Old Frisian—*boga,* Danish—*boog,* Middle Low German—*boge,* Middle High German—*boge,* Modern German —*bogen,* Icelandic—*bogi* and Old Swedish—*boghi.* One must remember that in Danish two *o's* merely lengthen the sound of *o* and do not change it as in English. Of those tongues the Old Frisian was more like Anglo-Saxon than any of the others and even to-day a scholar with a knowledge of Chaucerian English can understand some phrases of the native dialect of the Frisian islanders.

These words might be classified as Teutonic, but even the Celtic words, which owed their common ancestry with those of the previous group to a very remote period, did not differ very much. Dr. Austin O'Malley, formerly professor of comparative philology at Notre Dame University and Rev. Robert E. Williams, pastor of the Welsh Presbyterian Church of Philadelphia, give me the Irish and Welsh as *bogha,* with the *gh* practically silent, and *bwa,* where *w* is really double *u* and sounds like a long vowel. Indeed, as these gentlemen pronounced the words they sounded so much like our ordinary

bow that there was no more difference than would be heard in the voices of many British or Irish country folk speaking English with a touch of brogue.

To get back to the original root we can most easily follow the verb, knowing that the noun runs closely parallel. Beyond the Anglo-Saxon we find Old High German—*piocan.* Even to-day a German sounds his *b's* so much like our *p's* that it is often hard for us to tell which he is using. In Latin the allied verb is *fugere,* meaning to run away but originating in the idea of turning aside. Here the softening of the initial sound to *f* may appear to make the derivation far fetched but it must be remembered that such a change is not at all infrequent. For example in Welsh *bryn* becomes *vryn* if it is used last instead of first and in Irish and Scottish Gaelic *p* and *f* are quite freely interchangeable; thus members of the same family may spell their patronymic MacFarlan or MacParlan with perfect indifference.

In Sanscrit the word *bhuj,* meaning again *to bend,* marks the last stage to which the written page may take us, for that language is the oldest of our group of tongues that had a known alphabet. Beyond this the world's greatest philologists have worked out a hypothetical root from which all the rest are descended which they say is BHUGH, meaning to bend, or turn aside.

In spite of its formidable appearance this word *bhugh,* when sounded, as it probably was, with a guttural *gh,* is so nearly like the word of to-day that I believe any of us would know what was meant if it were spoken in an ordinary English sentence instead of *bow* by some Briton with decided dialectic inflections. Aside from archery just think what a multitude of words like *bay*—a bending of the shore-line, *buck*—a bending of a horse's back, *buckle*—a bending of a strap, and so on, almost without end, come from that same root BHUGH.

Now when we look up *arrow* we meet with some big surprises, at least they were so to me. I had supposed that

arrow was the only English word there had ever been for the slender missile of the bow, except such applied words as *bolt* and *shaft*, but almost at once I found this was not so and that our Anglo-Saxon forefathers used others quite as frequently, if not oftener.

Arrow in old English was spelled *arow, aro, aru, arw, aruwe, arewe, arwe* and possibly in other ways, but one need not stand aghast at that array of names because in the spoken tongue they sound almost exactly alike, particularly as the differences are all vocalic and English is celebrated for the looseness of its vowel sounds.

Just why the feminine, rather than the masculine, form of the Anglo-Saxon word should have persisted into the modern tongue I do not know, unless we ascribe it to the insinuating pertinacity of that sex in general. Such is the fact, however, for, while the Anglo-Saxon feminine was *arwe* (pronounced *arroo*), the masculine and neuter were *earh*. Even then there is not so much difference as one would think between the two, for if the *rh* of *earh* is given the rich and ancient roll that fletcher Duff puts on the end of his native Edinbu*rgh* the resemblance to the other forms is striking.

But the queer thing is that one cannot go on and find a lot of words like *arrow* scattered through the languages of Europe, as was true of *bow*, because the only thing at all like it is the Icelandic *ör*. In fact we shall even see, later on, that the ancestor of *arrow* was a word that meant *bow* which became entirely changed in significance because of the disposition that people have always shown to cut a word short.

What, then, was the great Indo-European synonym for the *arrow* of English speech? From what I can discover I think there is little doubt that it is a word which now lingers on in a feeble way only as a dialectic form in Sussex. The word is *streale*, and to-day, in that locality, it is the same as when in general use in early English. I venture, offhand, to say that there is not an archer in this country who would have known

what that meant and yet our forefathers used it as often as *arrow.*

With this word, as with *bow,* we can freely wander in etymological paths all over Nordic Europe. Here is the whole family of sisters and cousins:

Anglo-Saxon—*strala.*

Middle Dutch—*straal.*

Middle Low German—*strale.*

Old High German—*strala.*

Middle High German—*strale,* from which is derived the Italian *strale.*

German—*strahl*—an arrow or a beam of light.

Icelandic—*strjal* (pronounced *streal*).

Swedish—*strole.*

Danish—*straale,* a beam of light, jet of water, flash of lightning.

Old Bulgarian—*striela.*

Russian—*strielitz,* an archer; which gave the name of *Strjeltsi,* or *Strelitz,* to the celebrated body of troops raised by Ivan the Terrible.

There is still a third English word meaning arrow which is given in the dictionary, although I know of no instance of its use in modern times and I think it may be considered as being wholly obsolete. I shall never forget how astonished I was, while reading the Maunciple's Tale, in Chaucer, to come across the line, "His bowe he bent and in it sette a *flo.*" It sent me to the dictionary and there I found two other quotations, the first of which, from the Ballad of Robyn and Gandelyn, is very nearly the same:

"Robyn bent his jolie bowe,
Therein he set a flo."

The second was: "He schote him to strenge dethe with wel kene flo." All three of these are many centuries old and I doubt very much if a trace of the word remains to-day in any

British dialect, unless it be the Scotch word *foyler*, which will be discussed later, or the proper name *Flower*. The Anglo-Saxon was *flan*, as shown in the sentence, "Thurh flanes flyht" (Through arrow's flight), but I know of no analogs in other languages, unless it be connected with the idea of speed and therefore with such words as *flee* in English and *fliehen* in German.

For those who are interested, a number which I fear is painfully small, I will give a couple of Anglo-Saxon quotations showing *arwe*, or *arewe*, and *flan* in their original settings:

"Sume scotedon adunward mid arewan,"—Some shot downwards with arrows.

"Dha sona mid dhan dhe se strael on flyge waes, dha com swidhe mycel windes blaed, dhaet seo strael weardh eft gecyrred, and dhe tone ilcan mon, dhe heo aer from sended waes, he sceat." This was kindly translated for me by Dr. Bender as follows: "Then soon when the arrow was in flight, then came a very great wind's blast, so that the arrow was turned back, and then to the same man, that it before was sent from, it shot."

The Latin word for bow, as everyone knows, was *arcus*. This is supposed to have come from an early Indo-European root ARK, meaning to keep off, or defend, although there are some eminent philologists who do not agree with that derivation. At any rate that stem seems to have had some collateral diffusion because in Gothic, which is one of the earliest of the Teutonic group of languages the arrow is called *arwazna*, which literally means "something belonging to the bow." The longer Gothic forms of words were much simplified in the later tongues spoken by kindred peoples and, inasmuch as we have seen that nearly all of them used *boga*, or something nearly like it, to mean bow, the original meaning of *arwazna* became lost and the word itself was clipped of its termination, for ease in speaking, until it was reduced to the simple form of *arwe*, or arrow.

The Irish and Welsh words for arrow, *saighead* and *saeth*, are either cognate to, or descended from the Latin *sagitta*, thus indicating philologically what we already know historically, that the English inherited their archery from Teutonic sources rather than from the Celts and aboriginal British.

A discussion of this sort, which is either fascinating or tedious according to one's tastes, might be prolonged indefinitely by taking up one after another the different words of archery, but for a book of this sort enough has been said. Regarding the glossary which follows I would say that I strongly urge all archers to learn the words and to use them with freedom. It should be our duty to see that these expressions which are our rightful inheritance should not be ousted by those of the rifle range or the golf-links.

Aim.

1. To properly direct an arrow by sight.
2. The mark toward which an arrow is directed.
3. The direction in which an arrow is shot.

Allow. To aim an arrow to windward to compensate for the drift.

Allowance. The change of aim to compensate for windage.

Arbalist. A cross-bow.

Archer. One who shoots a bow.

Archer's rood. A measure of seven and one-half yards.

Archery.

1. The use of the bow and arrow.
2. The practice, art or skill of archers.
3. The art of shooting with a bow and arrow.
4. Archers collectively.

> "That venison free, and Bordeaux wine,
> Might serve the archery to dine."
>
> —SCOTT, *Lady of the Lake.*

5. Adjectively: pertaining to the use of the bow and arrow.
6. In old law, a service of keeping a bow for the lord's defense.

(N. B. Never use archery to mean tackle, *e. g.*, "The store stocks archery.")

Armguard. A piece of leather, or other stiff material, worn on the forearm to protect it from injury by the bowstring. Also called *Bracer.*

Arming. The material wrapped about a bow handle.

Arrow. The usual missile of a bow.

Arrow-guide. A grooved piece of horn, or similar material, fastened to the bow, or wrist, to guide a short arrow which is drawn past the bow.

Arrow-head. The tip, or pile, of an arrow, particularly when fashioned for slaughter.

Arrow-horn. A V-shaped piece of horn, fibre or similar material, inserted in the posterior end of an arrow and containing the nock. Modern arrows are sometimes fitted with ferrules made of aluminum or hollow fibre to which the name may probably be extended. (See *Nock* 3.)

Arrow-hound. A modern slang word originated about 1921 by Dr. O. L. Hertig of Pittsburgh. It has wide usage.

1. That one of the archers shooting at the same target who is elected to pick up missed arrows.
2. An archer with a peculiar faculty for finding lost arrows.

Arrow-mark. A mark on an arrow to indicate ownership.

Arrow-plate. A thin piece of hard material, set in a bow where the arrow crosses it, to prevent wear.

Arrow-rest. A small projection at the top of a bow-handle to rest the arrow on.

Arrow-smith. A maker of metal arrow-heads.

Arrow-stand. A vase, or support, on the ground for holding arrows.

Arrow-stave. A slender rod of wood ready for further shaping to form a stele.

Artillery.

1. Bows and arrows.
2. All projectiles and machines for shooting.

Ascham (as-kam).

1. A tall, narrow cabinet for bows, arrows and other tackle.
2. A portable case for bows and arrows.

At home. An arrow is said to be at home when it falls upon, or not short of, the mark.

Back.

1. The flat side of a bow.
2. To glue a strip of wood or other elastic material on to what would otherwise be a self-bow, thus making a new and stronger back.

Backed-bow. A bow whose back and belly are of different strips of wood glued together. Rawhide, or other animal tissue, is sometimes used for backing.

Backing. Material from which the back of a backed bow is made.

Balloon-feather. A vane of parabolic outline.

Barbs.

1. The two sharp points, projecting backward, of an arrow-head.
2. As an anatomical part of a feather; the thin, obliquely set plates which, collectively, form a vane.

Barbed arrow. An arrow designed for slaughter, having barbs so that it cannot be withdrawn.

Barrelled arrow. An arrow that is larger in the middle than at the ends.

Battle-bow. Obviously, a bow for battle. A powerful bow.

> "Out of him came forth the battle-bow."
>
> —Zechariah 10: 4.

Bearded arrow. Same as barbed arrow.

Bearing arrow.

1. An arrow which possesses a steady flight.
2. An arrow carried as a badge of authority.

Belly. The round side of a bow.

Bend.

1. To string a bow, not to draw it.
2. The space between the bent bow and its string.

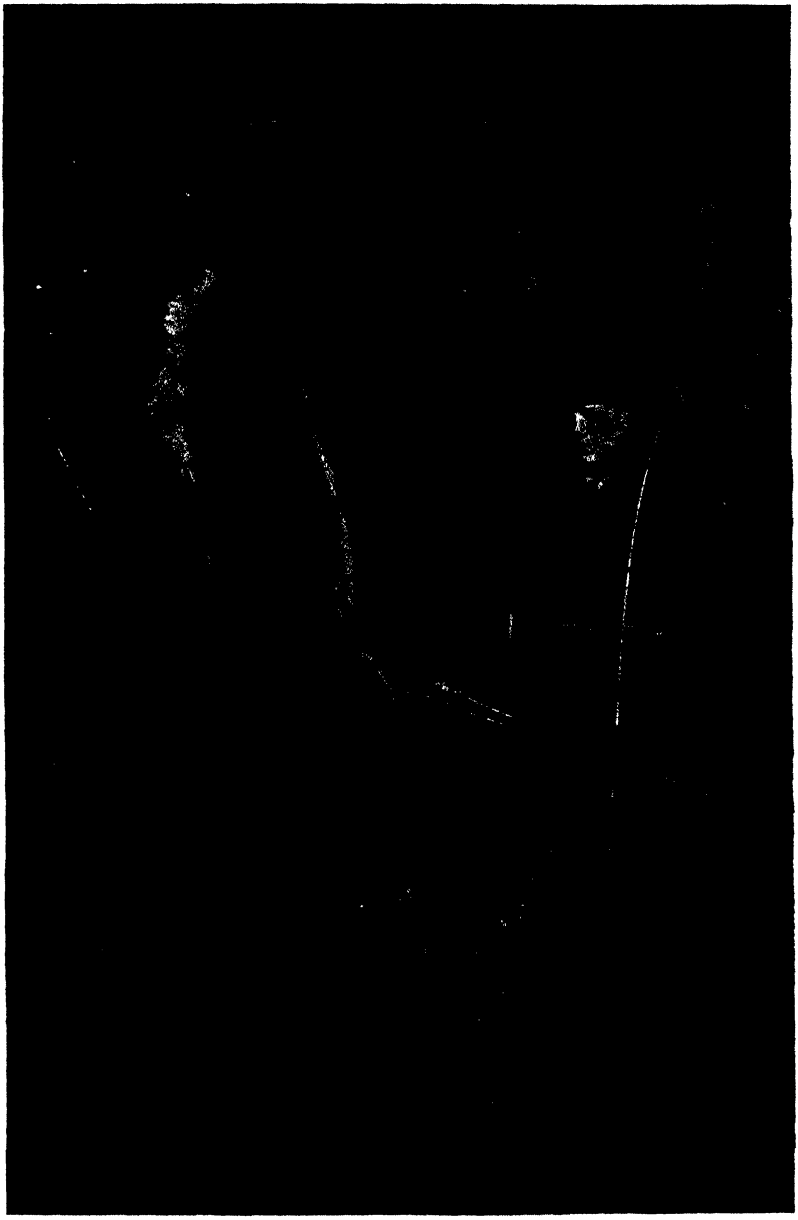
Bending. The lower loop of the string. (Ascham.)

Benn. A pink silk sash given as the chief prize at the Papingo Shooting at Kilwinning, Scotland.

Black.

1. A hit in the black ring, counting three.
2. The fourth ring of the target, even if it be not colored as in clout shooting.
3. A dark spot seen and used as a mark in roving.

Blazon. A square target formerly used in Flanders. It is divided into 50 squares, the middle one counting 26 and the next in value being in the corners. Beside each number is a square that counts nothing. To my mind it defeats the main purposes of scientific archery but at very close ranges, such as the Flemish shoot, it might have



MRS. PHILIP ROUNSEVELLE

The only living woman known to have killed an animal with a bow and arrow

about as much interest as a dart board. For indoor shooting or as a sort of gaming device it might be interesting.

Blue.

1. A hit in the blue ring, counting five.
2. The third ring of the target, even if it be not colored, as in clout-shooting.

Bobtailed arrow. An arrow which increases in thickness from the pile to the nock.

Bolt. A short, thick arrow, used in a crossbow.

Bonarro. A word coined in 1924 by the California By-Products Company, of San Francisco, to denote a roving game of their invention.

Bone. The hard, resinous layer of coniferous woods.

Bought. A twist, or turn, in the grain of wood. "In knots and many boughtes."—Spenser, "Faerie Queen."

Bow.

1. A weapon consisting of a strong strip of elastic wood, or other elastic material, with a string stretched between its ends, used for shooting arrows.
2. A measure of six feet, used principally in clout-shooting and roving.

Bow-arm. The arm which supports the bow.

Bow-boy. A bow-boy is a young bow-man.

"Alas, poor Romeo! he is already dead; stabbed with a white wench's black eye; shot through the ear with a love song; the very pin of his heart cleft with the blind bow-boy's butt-shaft."—Romeo and Juliet, Act 2, Scene 4.

Bow-cord. The string joining the two ends of the bow.

Bow-hand. The hand which holds the bow.

Bowman. An archer.

Bow-ribbon. A loop of ribbon fastening the eye of the string to the bow-horn when the bow is unbraced.

Bow-shot. The distance a bow will shoot an arrow. Used as a rough measure.

Bowstave. See *Stave*.

Bowstring. Same as Bow-cord.

Bow-tire. Loss of cast in a bow from being drawn too long.

Bowyer. A maker of bows.

Brace. To bend a bow.

Bracer. Same as *Armguard.*

Brash. Brittle. Same as *Frush.* (Local U. S. Compare Icelandic *Breyskr*—weak.)

Break.

1. To fracture, or become fractured.
2. An open fracture, as opposed to a chrysal.

Breast. The part of the arrow at about the same distance from the nock as the string is from the bow.

Breasted arrow. Properly, an arrow heaviest at the breast. Often used synonymously with barrelled arrow.

Broad arrow.

1. An arrow with a wide flat head and large barbs, used for slaughter. In a general way it is the typical arrow of the weather vanes and commercial art.
2. An heraldic design stamped on the clothing of English convicts and used in blazonry, somewhat resembling an arrow-head.

Bullet-arrow. An arrow with a cavity in the end for throwing a bullet or small stone. It is often tied to the bow with a string and is used for very small game.

Bull's-eye. The gold.

Butt. An artificial embankment, usually made of sod or straw, on which a mark is placed.

Butt-arrow. An arrow used in shooting at short butts, the same as a target arrow.

Butt-mark. A four-inch disc of paper pinned to a butt as a mark.

Butt-shaft. Same as *Butt-arrow.*

Butt shooter. An archer who shoots at the butts.

Butt shooting. Shooting at butt-marks or pricks placed on butts.

Butty. An archer's shooting companion. So called yet by the Woodmen of Arden. It may be the original of the "Buddy" of the World War.

Carriage bow. A name used by Ford for a jointed bow.

Carry the shot. Same as *Win the cast.*

Cast.

1. The coefficients of resilience of a bow.
2. Any lateral warping in a bow or arrow.
3. The right of shooting first by winning the last shot; which is called *Getting the cast.* It is analogous to the phrase *Winning the honor,* which is used in other games but should not be employed in archery.
4. A tilt in the back of a bow out of the perpendicular to the plane passing through the string and the longitudinal centre of the bow.

Check.

1. Same as Shake 1.
2. Same as Gizzen 2.

Chest. Same as Breast.

Chested arrow. An arrow whose diameter increases toward the nock, or at least to near the feathers.

Chrysal (kris-al). A transverse fault found in the belly of a bow caused by compression. The word is not found in *Toxophilus* and Roberts suggests that it may be like the word crysalis, quoting Ascham's remark "that frets are very similar to a canker, creeping and increasing." It is also called a fret or a pinch.

Close-backing. Bow-backing which is glued firmly on to the belly so as to make a solid whole.

Cloth-yard. A measure of 27 inches probably introduced into England by Flemish weavers.

Clout.

1. A small cloth, or other white object, placed on the ground as a mark in long distance shooting.
2. In modern times a straw-bossed, white-faced target with a black spot in the centre. It is 30 inches in diameter and is set on the ground at an angle of 60 degrees.

Clout-pin. A stick on which is fastened the clout.

Clout-shoot. A definite round of clout-shooting as described earlier in this book.

Clout-shooting. Shooting at a clout. The distances are always long, being usually 180 yards for men and 120

yards for women. They may be increased by intervals of 20 yards up to the full cast of a bow.

Cock-feather. The vane that stands at right angles to the nock.

Coffin. Diminutive of coffer. An old name for a long box to hold bundles of arrows.

Come. A bow is said to come when it bends too much in one place.

Come compass. A bow is said to come compass when it forms an arc of a circle when drawn.

Come round and come round compass. Same as come compass.

Composite bow. A bow of three layers, usually with a sinew back, wood centre and horn belly. Same as compound bow.

Compound bow. Same as composite bow.

Cord. Same as bow-cord.

Creep. To let the arrow slide forward on the hand a little just before loosing.

Crest. Colored rings painted about the shaft of an arrow near the feathers for identification. Sometimes called a mark.

Crested head. Same as Shouldered head.

Crib. A stand for arrows which holds each one so that it will not touch the others.

Crush. Same as chrysal.

Crown clods. Ornaments of sod, usually shaped like urns, on top of a butt.

Crossbow. A missive weapon formed by a bow fixed athwart a stock in which there is a groove or barrel to direct the missile, a notch or catch to hold the string when the bow is bent, and a trigger to release it. (*Cent. Dict.*)

Cull. An article spoiled in the making.

Crow-bill. A horn pile.

Cut the gold. An expression signifying the apparent dropping across the gold of an arrow which falls short but is in good line.

Cut the mark. Similar to cut the gold but used for any object aimed at, as in rovers or hunting.

Damp-sap. A bluish line between the heart and sap-wood in yew.

Dead loose. A sluggish release.

Dead shaft. An arrow of dull, heavy flight.

Direction. Same as Line of aim.

Direct vision. The formation of the sight image on the macula lutea. Whatever is seen most clearly is in direct vision.

Double end. A shoot from one mark to another and back again.

Double round. Two identical rounds shot in succession and the results added.

Double targets. Targets at both ends of the range.

Down wind. A wind blowing from the archer to the target.

Draw.

1. To pull the bowstring back, as in shooting.
2. The distance the string is pulled.
3. The strength of the bow as determined by drawing it.

Draw a feather. To strip the web from the shaft of a feather.

Drawing arm. The arm that draws the string. Also called shaft arm.

Drawing fingers. The first three fingers of the drawing hand.

Drawing hand. The hand of the drawing arm. The right hand in right-handed archers and the left in left-handed. Also called shaft hand.

Drawing point. The place to which the nock of an arrow is drawn when shooting.

Draw through a bow. To draw so far that the pile passes the belly.

Drift. Same as Windage.

Elevation. The relative height of the pile to the nock in aiming an arrow.

Elbow. The part of the arm of a reflex bow which bends suddenly, like a human elbow.

End.
1. In England, three arrows shot consecutively.
2. In America, six arrows shot consecutively.
3. In France, one arrow shot at a target.
4. The place where a mark is fixed.

Eye. The upper loop of a string.

Face.
1. Same as Belly.
2. The painted front of a target.

Fast. An exclamation used as a warning of danger, as is "Fore" in golf.

Fault. A flaw in the wood of a bow.

Feather.
1. As ordinarily used.
2. The finished vane of an arrow.
3. A layer of the grain in yew or similar woods.
4. The feathered end, or string end, of an arrow. (*Cent. Dict.*)
5. To fletch an arrow, or fit it with feathers.

Feather in. To imbed an arrow in its mark as far as the feathers. Still used colloquially in parts of the United States, as, "The sheriff feathered into the crowd with his gun."

Ferrule bow. A jointed bow with a union like that of a fishing rod.

Field arrow. A strong roving arrow.

Field captain. The presiding officer of a tournament.

Finger stall. A leather thimble to protect a drawing finger.

Finger-tip. Same as finger-stall.

Fire a bow. An incorrect expression often used. There is no fire about a bow.

Fire-arrow. An arrow with some blazing substance tied to the head. Used to set fire to buildings or ships of an enemy and for signals.

Fire-shaft. Same as fire-arrow.

Fish.
1. The V- or W-shaped point of a yew bow.
2. To make a fish-joint.

Fish-joint. Same as Fish 1.

Fish-tail. A staggering arrow.

Fistmele. A measure of six inches. It is believed by many to be the correct distance between the string and the bent bow and is found by placing the fist upright upon the inside of the bow-handle and raising the thumb. In old English law bows were required to be strung at least this high.

Five points. Standing, nocking, drawing, holding and loosing. (Ascham.)

Fletch. To feather an arrow.

Fletcher.

1. A maker of arrows.
2. One who feathers arrows.
3. A maker of bows and arrows. (*Cent. Dict.*)

Flick. To give a sudden jump out of the line of correct flight; said of an arrow.

Flirt. Same as Flick.

Flight.

1. The manner of flying of an arrow.
2. The extreme distance a given arrow will fly from a given bow.
3. Same as Flight Shot.
4. A great number of arrows loosed at once, as in war.
5. Same as Flight arrow.

Flight arrow. A light arrow for flight shooting.

Flight bow. A strong bow to shoot the greatest distance.

Flight shot. A shot for great distance without regard to aim.

Flight shoot. A specified competition in flight shooting.

Flight shooting. Shooting as far as possible.

Flo, or Flone. Obsolete English words for an arrow.

Flower. A maker of flos, or arrows. Persisting to-day as a proper name.

Fluted arrow. An arrow which is scored in lines. Still used in Belgium. Fluting is done to prevent warping.

Fishing arrow. An arrow used for shooting fish, usually having a long slender barbed head.

Follow the string. An expression denoting the permanent setting, or curving, of a bow from being bent and drawn.

Foot.

1. A piece of hardwood spliced on the anterior end of a shaft and forming an integral part of it. Also called piling, footing and piecing.
2. To put such a piece on an arrow.
3. With the Royal Archers a foot is an arrow which strikes the leg of a clout stand.
4. With the Woodmen of Arden a foot is an arrow within 12 inches of the clout.

Footed arrow. An arrow whose anterior portion is formed of a piece of hardwood spliced on the main part of the shaft.

Footing.

Same as Foot, 1 and 2.

3. The manner of placing one's own feet in shooting.

Forehand. Same as Overhand.

Forehand shaft. An arrow shot by aiming, or sighting, above the bow-hand. "A' would have carried you a forehand shaft a fourteen and fourteen and a half."—Shakespeare.

Fork. An arrow-head.

"King Lear. The bow is bent and drawn; make from the shaft.

"Earl of Kent. Let it fall rather, though the fork invade the region of my heart."—Shakespeare.

Fore shaft. In savage arrows a slender piece affixed to the main shaft which carries the head but is not drawn back on the bow.

Forked pile. A two pronged pile.

"And shot they with the round the square or forked pile."

Foyler. On the authority of James Duff this word is in traditional use among Scottish fletchers to mean a maker of arrows, the word fletcher being more properly restricted to the featherer of arrows. I can find no mention of it in any of the Scottish or English dialectic dictionaries but its resemblance to the German *Pfeil* (arrow) and Old English *Flo* seems to me more than coincidental.

Free backing. Bow-backing that is not glued on so as to form an integral part of the bow, such as the plaited sinew backing.

Fret. A fault in the wood of a bow, such as a chrysal or corroded spot.

Frush. Brittle. (Dialectic for Northern England and Scotland.) "O wae betide the frush saugh wand."—Scott, "Minstrelsy."

Gadding arrow. An arrow that does not follow a true course.

Gall. A tumor in a tree.

Game.

1. Archery.
2. The number of points necessary to win, as in rovers or pricking.

Garland. A wreath used as a target. A smaller mark was sometimes placed within it.

Get the cast. See Cast, 3.

Gizzen.

1. Same as Shake. (Scotch.) "The wood o't was gizzened and frush." Service. *Dr. Duguid.*
2. To crack, or check, longitudinally in seasoning.

Grafted bow. One whose two limbs are spliced at the grip.

Gold.

1. The bull's-eye of an English target.
2. A hit in the bull's-eye, counting 9.
3. The second ring of some French targets.

Grease box. A small box of grease carried by some archers to make their finger-stalls slippery. (I think it is a bad custom.)

Green.

1. The range or shooting ground.
2. Sometimes the petticoat.
3. Sometimes a hit in the petticoat.
4. A hit in the ground, or miss.

Grip.

1. The handle of a bow.
2. The manner of grasping a bow.

Gone.

1. An arrow is gone when it flies above the target.
2. An arrow is said to be gone, when it may, from its

flight, be judged to fall wide of, or far from the mark. (Roberts' *English Bowman.*)

Half-bow. A measure of three feet.

Hand-bow. A bow as distinguished from a crossbow.

Handle. The part of the bow which is grasped in the hand.

Hang on the string. Said of the fingers when they do not loose smoothly.

Hard to stand in a bow. An arrow is so spoken of when it flies from the bow steadily and without flirting. (Roberts' *English Bowman.*)

Hard handled bow. A bow which does not bend at the grip.

Head. Same as Arrow-head.

Head-maker.

1. An arrowsmith.
2. On the continent a maker of horn or other arrow-heads.

He! He! This exclamation is said to have been an archer's word of call, handed down from very ancient days. (Roberts' *English Bowman.*) Allowing for the ancient pronunciation of the letter " e " it seems to me that this is nothing more nor less than the " Hey, Bill," that we have known and used all our lives.

Heat. To temper wood by fire.

Heart wood. The dark wood forming the centre of a log as distinguished from the sap-wood.

Hen feathers. The two vanes that lie at an angle of 60 degrees to the nock.

High bearded. Said of an arrow-head with high barbs.

High braced. Same as High strung.

High feathered. Having long, deep feathers.

High ridged head. Same as Shouldered head.

High strung. When there is more than a fistmele between the cord and the bow-handle.

Hinged bow. A jointed bow whose limbs are connected by a hinge.

Hit.
1. A stroke in the target or mark.
2. To strike the target or mark.

Holding. Keeping an arrow fully drawn for a moment before it is loosed.

Home. An arrow is home when fully drawn.

Horn. A bow-tip.

Horse archer. A mounted archer.

Horn spoon.
1. The petticoat.
2. A prize for a hit in the petticoat.
"It was a custom of ancient standing and merriment that an horn-spoon should be worn by whoever last shot his arrow into the sous or petticoat." (Roberts' *English Bowman.*)
3. Any hit in the petticoat.

Hoyle. A short roving mark.

Hoyle shooting. Shooting at Hoyles.

Hunting arrow. An arrow designed for slaughter.

Hunting bow. A short, powerful bow used for hunting.

Inches.
1. A certain style of butt-shooting described earlier in this book.
2. The distances around a butt-mark within which an arrow must fall.

Indirect vision. Formation of the sight image at some part of the retina other than the macula lutea. (*Cent. Dict.*)

In game. In good shooting cue.

Jointed bow. A bow whose limbs are separate but may be joined at will by a socket or hinge.

Keeping a length. Shooting with consistently correct elevation at a given distance.

Keeping compass. Same as Keeping a length.

Kick. The jar to the hand caused by a discharging bow due to a faulty construction of the weapon.

Knot gall. Same as Gall.

Lady Paramount. One of the women archers who is appointed to act as captain over the others during a match.

Lamellæ. The layers of the grain in wood.

Laminated bow. One made of several strips of wood glued together.

Lapping. A wrapping of string, or thread, around a bow to strengthen it or around a string to protect it from abrasion. Also called serving, whipping and wrapping.

Lay the body in the bow. An old English expression which suggests that drawing should be done with the shoulders as well as the arms.

Length. A distance to be shot.

Let fly. To release an arrow.

Laying a bow straight. A phrase used by the bowyers to signify bringing a bow straight by means of heat or force. (Roberts' *English Bowman.*)

Limb. Half a bow; called upper limb and lower limb.

Line of aim. The vertical plane of an imaginary line from the archer's eye to the centre of the target or mark. Also called Direction.

Lip. To set a piece of wood in a bow where a chrysal or other flaw has been cut out.

Lipping. The piece of wood thus inserted.

Livery arrow. The kind of arrow regularly and commonly supplied to English soldiers.

Longbow. The name commonly given to the bow drawn by hand and discharging a long, feathered arrow, as distinguished from crossbows of all kinds; especially to bows having a length of five feet or over, as the bow of war and of the chase of the middle ages of Europe, those of some savage tribes, those of Japan, etc. (*Cent. Dict.*)

Long-out. A distant mark in roving.

Low bend. A stringing of the bow less than a fistmele.

Low braced. Having the string less than a fistmele from the grip.

Low feathered. Having short, shallow feathers.

Low strung. Same as Low-braced.

Lurch. On page 111, in describing the Paper Game, Hansard says, "Seven the game. No lurch." I do not know what it means.

Mark.

1. Any object shot at.
2. Specifically a butt-mark.
3. To signal results in clout-shooting.
4. The crest of an arrow, or an archer's individual sign to designate any article that is his.

Marker. A man who stands near a butt or clout to signal to the archers the results of their shots.

Marking. A space around a butt-mark in which the arrows count.

Master-of-the-Green. A title used in America for the first time at the N. A. A. tournament of 1914 to designate the man who had charge of laying out the grounds and attending to the physical side of the meeting. It is not a regular office, but the term is often confused, by mistake, with that of field captain.

Meeting. A large and formal archery contest.

Nock.

1. The groove for the string in the tip of a bow.
2. The slot in the end of an arrow.
3. The piece of hard material at the end of an arrow which contains the slot for the string. Also called Arrow Horn.
4. To slip the eye of the string into the nock.
5. To fit an arrow to the string.

Nocking point. The exact place on the string where the arrow should be nocked; often marked with thread or ink.

Noose. The loop at the lower end of a string.

Over-arrow. An arrow which flies over the mark.

Overbowed. Using a bow beyond one's strength.

Overdrawn. Drawn too far; said of either the bow or arrow.

Overhand. An archer is said to shoot overhand when he looks at his mark over his bow-hand.

Overhand shaft. An arrow shot overhand. Same as Forehand shaft.

Over shot. Same as Over arrow.

Overshot. Defeated.

Overstrung. Said of a bow whose string is drawn too tight.

Pair.

1. Two arrows, in the usual meaning of the word. While Roberts gives the following definition, as applied to archery, yet, notwithstanding, the use of the word to mean two is very common in all writings on toxophily.
2. Three arrows. "On which account, in archery, three arrows are called a pair; that, if one is broke, lost or injured, the archer may have two (the number used at a time) left of equal weight." (Roberts' *English Bowman*, p. 154.)
3. To weigh arrows in a balance, one against the other.

Paper game. Shooting at a sort of paper target as described in the article on butt-shooting in this book.

Party. Five ends of two arrows in Scottish clout-shooting at the rings.

Penny. A measure of weight for arrows equal to 7¼ grains.

Pedominal archery. A rare term for shooting with the bow held by the feet.

Peep-sight. Same as Sight.

Pepingoe. A Scotch spelling of popinjay.

Petticoat.

1. The rim of the target outside of the white ring. It has no regular value, although sometimes temporary values are assigned to it for special events. For example, prizes in the nature of jokes may be awarded for most hits in the petticoat.
2. A hit in the petticoat.

Pieced bow. A laminated bow.

Piecing.

1. Same as Foot 1.
2. To glue a new piece on a broken arrow.
3. The new part so added.

Pile. A ferrule covering the anterior end of an arrow. It may be sharp or blunt and made of any hard substance. Also called head, tip and point.

Pin.

1. A tiny knot in yew wood, appearing on the surface as a black spot.
2. The peg which fastens a clout or butt-mark.

Pin hole. The exact centre of the target.

Pinch. Same as Chrysal.

Pitch pocket. A small lacuna of dried sap, or pitch, occurring in yew wood and causing a separation of the fibres.

Play in the hand. Said of a bow which bends at the grip.

Point.

1. Same as Pile.
2. A unit of scoring.
3. A unit of a specified total, based on the highest score or greatest number of hits at given distances.
4. A measure in piecing an arrow.

Point blank.

1. Aim taken at a distance where the point of aim and the centre of the target coincide.
2. Aim taken at a distance so short that the arrow flies in a trajectory that is practically flat.

Point of aim. An object so situated that if the tip of a fully drawn arrow be brought into the imaginary line between it and the eye, that arrow when loosed, if all other factors be perfect, will hit the centre of the target.

Popinjay. A figure of a bird on the top of a pole, used as a mark. Same as Pepingoe.

Pouch of arrows. Three arrows; so called by the United Bowmen of Philadelphia, 1830.

Preference. One limb is said to have the preference of the other by bending most. (Roberts' *English Bowman.*)

Prick. A small mark on a butt.

Pricks. The place where the pricks, or marks, are placed. (Roberts' *English Bowman.*)

Prick height. Breast high, or four and one-half feet above the ground.

Pricking. Same as Prick Shooting.

Prick-shooting. Shooting at a prick.

Prick-wand. A stick stuck in the ground to be shot at.

Prince's Lengths. The three distances of the York Round. So called because the Prince of Wales prescribed them in 1792 as new distances to be shot for a bugle which he presented.

Prince's Reckoning. The present ring values of 1, 3, 5, 7, 9; prescribed by Prince George on the same occasion.

Quartering wind. A wind blowing obliquely across the range.

Quiver.

1. A portable receptacle for arrows, carried attached to the person by a strap or hook.
2. The coming to rest of an arrow in what it hits. For example, "The arrow quivered in a tree," means that it stopped there, not that it trembled.

Raise. To leave extra wood around a flaw in a bow.

Range.

1. A shooting ground.
2. A length or distance to be shot.
3. The extreme distance a bow will shoot. Same as Cast 1.

Range finder. A device for finding the point of aim. Usually a card or stick held at arm's length and marked with the distances above or below the gold.

Range pegs. Pegs which mark the position of the targets at the different distances to be shot.

Reflexed bow. A bow the backs of whose two limbs form a concave, obtuse angle, when unstrung.

Rood. Same as Archers' Rood.

Round. A prescribed number of shots at prescribed distances. The best known rounds, and practically the only ones in use, are the following:

American Round.	30 arrows at	60 yards
Used first in 1883 N. A. A. Tournament.	30 arrows at	50 yards
	30 arrows at	40 yards

Columbia Round.	24 arrows at	50 yards
Used in first N. A. A. Tourna-	24 arrows at	40 yards
ment, 1879.	24 arrows at	30 yards
French Round.		
Twenty arrows at fifty metres, shot one at a time.		
Hereford Round.	48 arrows at	80 yards
Used early in last century at	24 arrows at	60 yards
Herefordshire Bow Meeting.		
Junior Round.	24 arrows at	40 yards
Originated in America since	24 arrows at	30 yards
the War.	24 arrows at	20 yards
Metropolitan Round for Men.	30 arrows at	100 yards
Originated 1926 by the Metro-	30 arrows at	80 yards
politan Archery Association, of	30 arrows at	60 yards
New York.	30 arrows at	50 yards
	30 arrows at	40 yards
Metropolitan Round for Women.	30 arrows at	60 yards
	30 arrows at	50 yards
	30 arrows at	40 yards
	30 arrows at	30 yards
National Round.	48 arrows at	60 yards
Used first in 1849 at Derby,	24 arrows at	50 yards
Eng., at Grand National.		
Ohio Round.	96 arrows at	60 yards
Shot as a men's team round in 1882 at meeting of Ohio State Association but used by English women in first G. N. in 1844.		
Potomac Round.	24 arrows at	80 yards
Originated by Potomac Archers	24 arrows at	70 yards
later than 1884.	24 arrows at	60 yards
St. George's Round.	36 arrows at	100 yards
	36 arrows at	80 yards
	36 arrows at	60 yards
St. Leonard's Round.	36 arrows at	80 yards
Used by the Queen's Royal St.	39 arrows at	60 yards
L. Archers, near Hastings.		
Originally it was	75 arrows at	60 yards

Team Round for Men. Same as Ohio Round.	
Team Round for Women. First used 1885, Cincinnati, Ohio State Meeting.	96 arrows at 50 yards
Union Round. First used in 1887. Ohio State Meeting.	72 arrows at 80 yards 48 arrows at 60 yards
York Round. Originated about 1834 by the West Berks Club, but named from being used at first Grand National at York in 1844.	72 arrows at 100 yards 48 arrows at 80 yards 24 arrows at 60 yards

Rovers.

1. An archery pastime which consists in shooting at one mark after another, each mark being at a distance from the last. It may be played over a prescribed course.
2. The marks shot at are also called rovers.
3. Roving arrows.

"Mer. I fear thou hast not arrows for the purpose.
"Cup. O yes, here be of all sorts—flights, rovers and butt-shafts."—Shakespeare.

Rovers mark. A mark shot at in rovers.

Roving. Playing rovers, not simply roaming.

Roving arrow. An arrow used in rovers, either a flight arrow for the long shots, or a strong, heavy one.

Roving bow. A strong bow for the long shots at rovers.

Roving pile. A blunt pile for a roving arrow.

Run on the bow. A feather is said to run on the bow when it is placed so far out of its proper line as to rub against the bow in shooting. (Roberts' *English Bowman.*)

Rush-grown arrow. A bob-tailed arrow. (Ascham.)

Saddle-backed feather. One cut with a depression in the middle like a saddle. I have never seen one and cannot imagine any advantage in them.

Sagittal. Shaped like, or resembling, an arrow-head.

Sagittary. Pertaining to an arrow or to archery.

Sap-wood. The light colored wood next to the bark.

Score-card. A card ruled for convenience in keeping scores.

Score.

1. Twenty yards.
2. The tally.
3. To hit a definite value, as, to score a blue.

Scudding shaft. An arrow that skims upon the wind. (Roberts' *English Bowman.*)

Secure a pin. To raise the wood around a pin in yew.

Self-arrow. An arrow made of a single piece of wood, not footed.

Self-bow.

1. A bow made of a single piece of wood.
2. A bow made of two pieces of wood joined at the middle but not backed. This should properly be either a jointed or a grafted bow.

Serving. Same as Lapping.

Set the shaft in the bow. To draw it so far that the tip catches in the belly.

Setting. Straightening an arrow by heat.

Shaft.

1. The wooden part of an arrow, also called stele.
2. An arrow.
3. The quill of a feather.

Shaft arm. The drawing arm.

Shaft hand. The drawing hand.

Shaftment, shaftmond and shaftman. (All the same word, from Anglo-Saxon *sceaft*—a shaft and *mund*—a hand.)

1. A span; a measure of about six inches.

"Therefore let your bow have a good big bend, a shaftment and two fingers at least for those I have spoken of." (Ascham.)

2. That part of an arrow occupied by the feathers. (Roberts' *English Bowman.*)

Shake. A longitudinal crack in wood.

Sharp loose. A quick release.

Sheaf-arrow. An arrow with glued feathers and an iron head. (*L'Art d'Archerie.*) A war-arrow.

Sheaf of arrows. Twenty-four arrows in a case; used in military archery.

Shilling. A measure of weight for arrows of eighty-seven and one-half grains.

Shoot.

1. To discharge an arrow from a bow.
2. An arrow shot. "Shoot me a shoot, the old man said."
3. A match or sometimes a round, such as flight-shoot, wand-shoot.

Shoot down the butts. To begin at the farthest end at the shortest butt.

Shoot in a bow. The old English way of saying, "Shoot a bow."

Shooting glove.

1. Any glove for the drawing hand, usually having the tips of the drawing fingers reinforced.
2. Formerly in Scotland, a large glove with a pocket in the back for extra strings.

Shooting line. The line beyond which the archers must not stand while shooting at marks. Never say "Firing line."

Short out. A near mark in roving.

Shoulder. The wide part of an arrow-head suggesting the human shoulders.

"I call that the shoulder in a head which a man's finger shall feel before it comes to the point." (Ascham.)

Shouldered arrow. Same as Silver-spoon arrow.

Shouldered head. See definition of Shoulder.

Side wind. A wind blowing at right angles to the line of aim.

Silver-spoon arrow. A pile having a circular prominency forming the base of the stopping, which is conical. (Roberts.)

Sight.

1. To aim.
2. An artificial device placed on either the string or bow which enables an archer to aim directly on the gold without resource to a point of aim. Same as Peep-sight.

Sink a bow.

1. To reduce its weight.
2. Specifically:—The act of reducing the spirit or stiffness of a bow by shooting in it with heavy arrows. (Roberts.)

Single piece arrow. A self-arrow.

Single piece bow. A self-bow.

Single fish. A joint of a grafted bow, one part of which is a single wedge.

Single targets. Targets at one end only of a range.

Slash. To loose in a quick, plucking manner.

Slashing loose. See Slash.

Snake.

1. An arrow buried in the grass.
2. For an arrow to bury itself in the grass.

Sous. The petticoat.

Spell.

1. A rising in the ends of the grain in the wood of a bow.
2. For the wood to rise in this manner.

Spirit of a bow. Its stiffness, spine or strength as proven by its cast.

Spine. The degree of stiffness, elasticity and resilience of an arrow in proportion to its thickness and weight. Rarely used in regard to a bow.

Splinter. A small, flat sliver of wood split from the back of a bow but still attached at one end.

Spoon. Same as Horn Spoon.

Sprangling. The separation of the barbs of a vane, as by any form of traumatism.

Spring of a bow. Its resilience.

Stack. To stack the back of a bow is to make it higher than wide; to give it a parabolic outline in cross-section.

Stagger. To wobble. Said of an arrow in its flight.

Stand.

1. To fly steadily.
2. A target-stand.

Stand in a bow. An arrow will stand in a bow when it has sufficient spine to be shot without flicking.

Standard arrow. We frequently find mention of a standard arrow. This, no doubt, was the sheaf, or war arrow, made after a certain scale or pattern, long preserved in the exchequer, but also long lost and forgotten. Among the numerous manuscripts in the Cotton and Harlein collections, relating to orders in war, I have not been able to find one which affords any description or account of the standard arrow. (Roberts' *English Bowman*, p. 155.)

Standard yard. The common yard of thirty-six inches.

Stand in a wind. To stand across the wind.

Standing. The position of the archer while shooting. The first of Ascham's Five Points.

Standing bow. A bow that does not sink after much shooting.

Stave or Bowstave. A long, slender piece of wood of which a bow may be made.

Stele. The wooden part of an arrow.

Stone-bow. A bow for shooting small stones.

"Hail-stones full of wrath shall he cast as out of a stone-bow." (*Wisdom of Solomon.* V. 22.)

Stopping. The solid part of a pile.

Strale. Obsolete word for arrow.

String. Same as Cord and Bow-cord.

Stringer. A maker of bowstrings.

String rests. Blocks or pads at the elbows of Oriental bows which stop the string.

Sugar loaf pile. One shaped like a sugar-loaf, with sloping sides and round stopping.

Swell a bow. To leave it thick where there is a fault.

Swine-backed feather. Somewhat rounded feather but left natural at the rear.

Tab. A flat piece of leather large enough to cover the palmar surface of the drawing fingers and used to prevent abrasion of the skin. It is kept in place by sticking the first

and third fingers through holes. Between the first and third fingers is a slot for the nock end of the arrow. It was used by military archers.

Tackle. All the equipment of an archer.

"'Who so fayleth of the rose garlonde,' say'd Robin,
'His takyll he shall tyne.'" (*Robin Hood's Garland.*)

Tailors' yard. Thirty-six inches. Same as Standard yard.

Taper-fashion arrow. A bob-tailed arrow.

Target.

1. Any mark.
2. Specifically:—A straw boss covered with a face painted in rings around a bull's-eye. For a complete description of the standard target see earlier in this book.

Target arrow. An arrow used in shooting at a target, usually of medium weight and having a rather blunt pile that will not penetrate the boss, nor rip the face.

Target bow. The ordinary bow that most of us shoot. Usually of light or medium weight as distinguished from the powerful hunting and roving bows.

Target card. Same as score-card.

Target day. A set, formal shooting match.

Target pegs. Pegs for securing the legs of a target stand.

Target-stand. A tripod to hang a target on.

Tassel. A tassel, usually made of green worsted, suspended from the archer's belt to wipe his arrows with.

Thumb.

A small measure in butt shooting; the thickness of the first joint of the thumb. I think that a thumb is usually construed as an inch.

Thumbs.

1. With the Royal Company of Archers, thumbs is an arrow between the legs of the clout.
2. With the Woodmen of Arden, thumbs is an arrow so close to the clout that a thumb can hardly pass between them.

Tiller. A stick with notches in the side and ends, used to hold a bow drawn while it is being made or repaired. One end is placed against the inside of the handle and the string is caught in a notch at the desired distance.

Tiller-bow. An old English name for a crossbow.

Tillering. Using a tiller, including scraping the bow.

Tip.

1. A pile.
2. A reinforcement of leather on the fingers of a shooting-glove.
3. To apply such reinforcements.
4. A thimble, or similar device of leather or other material for each of the drawing fingers.
5. A bow-horn.

To the bow.

To the shaft. "A man is said to shoot, and his arrow is said to fly, to the bow or to the shaft, as his arrow flies to the bow-hand or shaft-hand side of his mark." (Roberts.)

Too much up. A bow is too much up when it is braced too high.

Tournament. A formal archery contest.

Toxophilite. A student of archery; one who studies the history and archæology of archery. (*Cent. Dict.*)

Toxophilitic. Relating or pertaining to the study of archery.

Trajectory. The path of an arrow in the air.

Trim. "To trim is a technical word among archers when they take their stand in regular succession for shooting." (Dodd, *Ballads of Archery.*)

Turtle-back shooting. Shooting high in the air so that the arrow, on falling, may hit a target laid flat on the ground. So called because the South American Indians are said to shoot turtles in that way.

Two piece bow.

1. A backed bow.
2. A jointed bow that comes apart in the handle.

Underbowed. Using a bow beneath one's strength.

Underhand shooting. Shooting with the bow held so that the point of aim is seen under the bow-hand. Used for great distances. Compare Forehand.

Underhand shaft. An arrow, usually a flight arrow, shot in an underhand manner.

Understrung. Said of a bow whose string is too long.

Union bow. A bow formed of more than one piece of wood, either backed or laminated.

Up shot. The best shot of a match. Formal acknowledgment of it is called "giving the upshot."

Up wind. A wind blowing from the target to the archer.

Vane.

1. A piece of feather tied or glued to the shaft near the nock to direct the flight of an arrow. Three are usually placed on each arrow.
2. Anatomically, the soft part of a feather as distinguished from the quill.
3. An arrow. Used only as Weather-vane.

Wag. Same as Stagger.

Wand.

1. A prick-wand.
2. Specifically:—A slat two inches wide and standing six feet above ground used in the wand-shoots for men and women of the N. A. A.

War arrow.

1. A heavy arrow with a head designed for slaughter.
2. An arrow sent by runners among the ancient Scandinavians as an order to report for military service.

War-bow. The heavy bow used in old English warfare.

Ward-mote. The annual gatherings of the Woodmen of Arden.

Web. The soft part of a feather.

Weight.

1. The avoirdupois weight of an arrow expressed in grains or in shillings and pence.
2. The force required to draw a bow the length of its arrow. For example, a man's bow weighing forty-six pounds is one whose string will be drawn twenty-eight inches from the back of the handle by a forty-six pound stress.

Weight in hand. Avoirdupois weight of a bow.

Well. A small quiver or sort of pocket for arrows worn on the belts of archers during the first half of the last century.

Wen. An excrescence in the wood of a bow.

Whale-backed bow. One whose belly is almost wedge shaped or at least higher than broad.

Whip.

1. To lap or serve a string.
2. To make the limbs of a bow disproportionally thin near the ends so that they will bend more than normally.

Whipping. Same as Serving and Lapping.

White.

1. Any light colored roving mark.
2. The outer ring of the target.
3. A hit in the white, counting 1.
4. A butt-mark.

White arrow. An unpainted arrow.

White bow. An unpainted bow.

Whistling arrow. An arrow with a large round and hollow head, generally made of horn and perforated with holes, which makes a whistling noise as it flies.

Wide. An arrow is wide when it flies to one side or the other of the target or mark.

Win the cast.

1. Win the shot at roving.
2. Have the honor of shooting first at the next mark because of winning the last one.

Windage.

1. The influence of the wind in deflecting an arrow.
2. The extent of such deflection.
3. Same as Drift.

Wing.

1. To feather an arrow.
2. A rare term for the feather of an arrow.

Wrapping. Same as Lapping.

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