Papua New Guinea's Bows and Arrows

By

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A PNG hunter in his traditional headdress.

This article is included with the Study information because of the pertinent information it contains relative to the arrows used by the native hunters of Papua New Guinea.

Recently I had the opportunity to examine in detail some bows and arrows used by the tribal hunters of Papua New Guinea (PNG). There were two equipment sets; one reflecting that in contemporary use, the other from the pre-WWII era. The earlier equipment is distinctly different from that in use today. Examination of these two sets of equipment, separated by a half century of change, reveals many interesting features. Though they may not necessarily reflect changes throughout PNG they clearly do for one region.

Increased contact with the outside world has brought many changes to tribal life but most rural natives still subsist primarily as hunter-gathers. PNG has numerous species of game. Those most commonly subsistence-hunted in the Tonda/Bula Plains region, from whence these bows originate, are Rusa deer, pigs and crocodiles, along with small game and fish of various types.

Both stalking and stand hunting are common methods used for the larger animals. Considering the appearance of the equipment used it was surprising to discover that these tribal hunters routinely take game at 25 yards or more with their lengthy, un-

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fletched arrows; especially the Rusa deer. The open-country dwelling Rusa are primarily hunted by stalking.

Three Rusa stags being stalking. Note second stalking hunter in the left edge of the third photo. Though they often 'team stalk' only one hunter shoots at a time.

Success. The open-terrain dwelling Rusa deer is a common quarry for PNG tribal bowhunters and, yes, that's an arrow, not a spear!

Antlers are just raw materials. The meat is the real trophy.

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A typical PNG treestand; this one for hunting pigs. The hunter shown had recently arrowed three pigs from this stand.

Among the equipment examined were three bows. Two were pre-WWII era bows made of black palm and one a contemporary bow, made from bamboo. The bow-design from these two eras is vastly different but all three bows are of heavy draw weight.

The older bows are carefully crafted and carried flat, braided strings of plant fiber, though most of their string is now missing. One of the early-era bows is a bit over sixty-three inches long, the other a shade over sixty-seven inches. Because of the age and rarity of the bows stringing them was not feasible. Feeling the floor-tiller and comparing it to my own 82# longbow I estimated the draw weight of each to be approximately 80 pounds.

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The pre-WWII era black palm bows.

Belly (L) and side view (R) of upper limb of the shorter black palm bow. The finish of each bow shows careful workmanship.

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The shorter black palm bow originally had four braded-fiber wraps, evenly spaced along the bow's limbs. Though two are now missing the imprint of their location is clearly visible. The longer bow had no wraps. Wrap construction is similar to that of the remnants of remaining bowstring. The wire visible to the right is to hang the bow for display.

The upper (L) and lower (R) nocks on both black palm bows are identical in design. The wide, flat string was platted in place over the lower nock. The design of the string's upper attachment could not be determined.

The contemporary bow is much more crudely finished than the earlier bows, but is very well tillered. Though I had no scale to measure it this bow was estimated to draw at least in the upper eighty-pound range; possible 90# or a bit more. All of my own commonly used longbows are in the 70# to 90# range (at my 27" draw), and I think the draw weight estimate is fairly close. In shooting their bows the natives draw to an anchor point at the side of the face, rather than the corner of the mouth. Their average draw length is similar to my own.

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The contemporary bow is a simply made and more roughly-finished section of bamboo. It is just over 7 feet long. Finished bow length is dictated by the pattern of rings on the individual section of bamboo. The bamboo's outer section forms the bow's facing, and the concave inner core the backing. The arrow shown is one used for crocodile hunting.

The contemporary bow's string is made from a single bamboo strip, about 3/8" wide. It is carefully chamfered along its entire working length. None of the arrows shafts have nocking grooves. The flat base of the arrow shaft is placed against the flat string.

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The bamboo sting's loops are often, though not always, padded with strips of cloth. The lower bow nock (L) differs from the upper nock (R). The projection that forms the bow's upper nock (red arrow) is on the backing side, facing forward.

Regardless of whether the bamboo string's ends are left flat or frayed and twisted into cord, the string loops are formed using a wooden wedge. The string is first wound around itself and the tip of a wooded wedge. It is then wound around itself underneath the wedge, passed over a carved projection at the thick end of the wedge and wrapped back around itself underneath the wedge again. The string's end is then tucked underneath the wraps and wedge's tip. Stringing the bow securely tensions the wraps and wedge arrangement. The wedge's tip faces the bow's nock.

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This skilled village bowyer is plying his trade. He understands tillering as well as any modern bowyer, and stops often to check the bow's symmetry.

The village spear maker, shown with a wooden spear point. Though steel has totally replaced wood for arrow points wooden spear points are still in routine use.

Stringing the contemporary PNG bow; a stringing-technique identical to that I've seen used in East Africa.

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All the supplies carried for a three-day bowhunting excursion: his bow, two arrows (one blunt and one broadhead), knife, cord, cook pot, cup and a bit of food … nothing from Cabela's!

Since I have a special interest in hunting arrows and their terminal performance, I spent a great deal of time examining and measuring the two sets of arrows; those from the pre-WWII era and those in contemporary usage. None of the arrows have nock groves or fletching, yet PNG hunters demonstrate a considerable degree of accuracy with their arrows. During 'practice' they can almost effortlessly center a 10" diameter tree from 20 yards with their outsized, blunt-point small game arrows; and both Rusa deer and pigs are commonly taken at ranges of 25 yards or more.

The shooting form they use is very natural in appearance; shoulders rolled forward a bit, a slight bend at the waist, elbow of the bow arm slightly bent, shoulder of the shooting arm elevated in line with the arrow, and the bow canted. Their draw to anchor, at the side of the face, is smooth and steady, with only a momentary pause at full draw before they relax their split-finger release. They use a very open stance, either facing the target squarely or at a very slight angle. Other than the appearance of their equipment and their extremely open stance, they would look right at home at any traditional shoot.

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Shooting form. Note the two extra arrows in the bow hand and herd of Rusa deer in the background. Imagine stalking into bow range of a herd of deer in that open terrain. These skilled hunters do so routinely!

The glaring difference between the two arrow sets is that those from pre-WWII all have barbed wooden points, whereas the contemporary arrows all have steel points of massive-dimensions. This results in a marked difference in arrow mass.

Whereas there is a stark difference in the quality of workmanship, fit and finish between the pre-WWII and contemporary bows, all the arrows show that a great deal of attention has been applied to their construction. Though no two of the arrows are identical each cane-shafted arrow shows a remarkable degree of straightness and balance.

All the arrows showed straight shafts and excellent workmanship.

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The pre-WWII arrows (L) all have barbed wooden points. The contemporary arrows (R) all have massive steel points, forged from rebar.

The fore-shaft of each arrow, in both sets, is meticulously wrapped. Shown is a contemporary arrow's wrap.

One of the pre-WWII arrows shows a strikingly different, somewhat bulbous point attachment; its purpose unknown.

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A contemporary small game blunt arrow (L) and 'broadheads'. The terminal end of the blunt is concave.

Crocodile arrows (L) and close-up of the detachable point (R). The barb on this point is scarcely 1" long, and some are shorter; just long enough to anchor into the crocodile's tough skin. A cord is attached to the point and shaft to tether them together, and the cord coiled around the arrow's fore-shaft. After a hit the tethered cane shaft acts as a float-marker, which is followed until the crocodile can be carefully and slowly brought to the surface with the cord, where it is dispatched with hunting arrows.

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Of the greatest interest to me were the dimensions of the big game arrows in each of the sets. The following tables show the measurements from each arrow available for examination.

Measurements for the pre-WWII Papua New Guinea arrows

#	Overall Length		Mass	Shaft Length		FOC
	(cm)	(Inches)	(Grains)	(cm)	(inches)	
#1	115.7	45.6"	680.7	84.8	33.4"	29.1%
#2	121.1	47.7"	1015.8	85.8	33.8"	35.7%
#3	114.2	45.0"	909.6	80.5	31.7"	34.1%
#4	119.5	47.0"	1017.8	84.3	33.2"	38.7%
#5	123.0	48.4"	1037.2	83.5	32.9"	37.9%
#6	123.0	48.4"	978.6	85.5	33.7"	33.5%
#7	124.4	49.0"	1007.7	84.4	33.2"	36.5%
#8	120.7	47.5"	871.8	85.1	33.5"	31.8%
#9	142.9	56.3"	1155.1	103.8	40.9"	35.3%
#10	117.7	46.3"	882.1	86.9	34.2"	33.3%

Measurements for the Contemporary Papua New Guinea Arrows

#	Overall Length		Mass	Shaft Length		FOC
	(cm)	(Inches)	(Grains)	(cm)	(inches)	
#1	133.5	52.6"	3953.3	108.0	42.5"	42.6%
#2	139.7	55.0"	2084.9	121.2	47.7"	32.5%
#3	135.5	53.3"	2306.8	111.3	43.8"	40.3%
#4	123.0	48.4"	1670.1	105.0	41.3"	32.4%
#5	120.0	47.2"	1810.8	103.9	40.9"	35.7%

When the average dimensions of each set of arrows are compared we find the following: The contemporary arrows average 8.12 cm (3.2") longer in overall length than those from the pre-WWII era, and their larger-diameter shafts (approximately ½" at the rear) average 23.42 cm (9.2") longer. Though the contemporary arrows weigh an average of 2.47 times as much as their pre-WWII counterparts their weight forward of center (FOC) averages only 2.1% more (using the AMO Standard FOC Formula). A larger sample size might well have shown the average FOC between the arrows sets to be even more consistent.

Though the 'broadheads' would show minimal wind-shear effect at the low velocity these setups are capable of, in order to achieve stable flight with an un-fletched arrow a high degree of arrow FOC is necessary. The average amount of FOC shown by the pre-WWII arrows is 34.6%. For the contemporary arrows it is 36.7%. Clearly, a major change in arrow design was necessary

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when steel points came into use, but the native arrowsmiths made an adjustment in shaft dimensions to maintain a relatively similar degree of arrow FOC.

Now, I'm fairly certain that not one single PNG native arrowsmith has the slightest idea what arrow FOC is, what it means, or what its function is. They reached the dimensions of their arrows by trial and error, altering the design until they had the degree of accurate arrow flight required for their hunting conditions.

Modern bowhunters have long considered 6% to 12% or 15% FOC as being the 'traditional norm' for arrows, but just exactly when did it become "traditional" to use such modest amounts of FOC in our hunting arrows? The few *original* stone-point Indian arrows I've had a chance to examine have shown from 20% to just over 40% FOC. Authentic arrows of oriental origin have typically shown FOC's in the 30% to 40% range. So have most of the arrows I've seen in use by African tribes. We 'moderns' are just beginning to rediscover the many advantages of having high amounts of FOC in our hunting arrows; more stable flight, faster paradox recovery and a substantial boost in arrow penetration – things our 'primitive' counterparts have, apparently, long known.

It was of great interest that wood tipped spears are still in common use by the natives of PNG yet wooden arrow points for big game hunting have been totally replaced by massive steel ones. Could it be that the ponderous steel-tipped arrows proved to penetrate and kill better than the lighter wood-tipped ones, whereas the much heavier spears penetrated and killed equally effectively with either wood or steel points? The pre-WWII arrows average 955.6 grains in weight. The contemporary steel-tipped arrows average a hefty 2365.2 grains! If lighter steel-tipped arrows had proven to be equally effective it would have been simple to make smaller steel points and lighter arrows, conserving the precious and relatively scarce supply of steel available.

It is with great incredulity that I so often hear modern bowhunters say that 650, 700, 800 or 900 grain arrows are far too heavy to hunt with; that they make hitting game at all but very closest of ranges a near impossibility. Throughout the world hordes of primitive hunters whose very survival still depends on their ability to regularly take big game with their bows and arrows are using arrows many times that weight. Look back at the photos above and consider the open country the Rusa deer of PNG frequent. If a crude bamboo bow casting a 2000-plus grain arrow shoots sufficiently flat to routinely take these wary and extremely hard-hunted open-terrain animals how can any modern bowhunter think the very heaviest of our modern arrows is "too heavy to hunt with"? We 'moderns' still have much about bowhunting to relearn from our 'primitive' counterparts!

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