THE DEERSTALKER
April 2011

THE DEERSTALKER

web address: www.newsouthdeerstalkers.org.au

NSW Deerstalkers Association

Formed: 7th June 1972

Life Members: the late Gordon Alford
Bob Penfold
Wayne McPhee
Jack Boswell
Paul Wilkes
Steve Isaacs

Affiliated To:
Australian Deerstalkers Federation
Game Management Council (Australia) Inc.

Contributions:
The editor and editorial committee reserve the right to modify any contributions.

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Advertisements:
Advertisements for products sold by NSWDA Members are accepted and printed free of charge provided a discount is given to club members.

Cover Photo
John Desanti with a lovely even Fallow trophy taken early in this year's season.

COMMITTEE FOR 2011

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FROM THE EDITOR

This year we will publish five issues of this newsletter. To ensure that we get each issue out on time, there will be deadlines for submission of materials to be included. If material reaches me after a deadline, it will be included in the next issue, if appropriate.
Expect to recieve each issue about three weeks after its deadline.

Guidelines for submissions.
Material which is emailed saves me a lot of work. Writing can be sent as a Word file, or a text file. For those without an expensive word processing program, you can use any writing program included with your operating system, or download "Open Office" free from the internet which is virtually identical to "Microsoft Office"& can exchange files with that famous program.
Photographs should NOT be included in the article itself, but sent as separate files (attachments to the email). You can indicate where each photo might be placed by typing its file name in brackets in the text.
Photographs should be . jpeg files, saved at about 15 cm X 10 cm size at quality 8 (which gives the best quality for the smallest file size).
Printed on paper submissions need to have clear black typed text. Feintly printed text will not scan & cannot be included.
Very short pieces, such as personal adverts can be hand written.

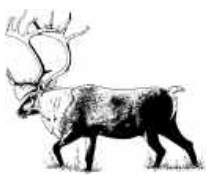
Meeting dates for 2011

I forgot to mention the 2011 meeting dates. The venue is the German Austrian Club Cabramatta – Thursday at 7.30 pm 19 May 21 July (also AGM) 13 October Trophy Exhibition & Christmas Party Saturday 19 November

Photos can be prints or negatives or slides. These can be returned to you if you include a stamped self addressed envelope. If these photos are valuable, send copies rather than originals.

NSWDA Hunting Club AHO (for R licences) is 10111, & the Agent No. is 7185

Please Note: The N.S.W.D.A. Inc. takes no responsibility for views expressed in "The Deerstalker". All articles submitted are signed by the relevant author. The Editor & Committee do however, take responsibility for views expressed in articles & reports submitted by them!



The 2011 NSW Election Result

The Upper House counting is complete. Results can be viewed on line at http://vtr.elections.nsw.gov.au/lc_summary.htm
Rob Brown has been returned with a significantly increased vote, but the Party still failed to gain a quota, due mostly to the skullduggery of the Fishing Party & the Outdoors Recreation Party. The Shooters & Fishers Party and Christian Democrats have the balance of power in NSW, and many have said what a bad thing this is, usually citing shooting in National Parks as their main reason.
On behalf of those of us who were responsible for organising shooters to hand out at local polling booths, I thank all of those who worked for us on the day. Your effort brought unprecedented success and allowed us to hopefully at least, enjoy our shooting sports another four years.
We of course, are relieved that the Greens did not get the balance of power. For various reasons it seems that not only was Labor unpopular this time around, but so were their perceived bed fellows. The price of Freedom is eternal vigilance, so this time around we have won a battle, not the war. The Greens will be forever out to remove our freedom & our firearms. They seem quite unconstrained by truth and ethics.

As a Biologist, I am dismayed at the Green's ignorance of ecology & wildlife management. Maybe our victory is just as important to the conservation of our wildlife & ecosystems as it is to defending our shooting sports. The Party is still pushing strongly for shooting in National Parks. Robert reiterated this in his first interview after the election. I really don't know what the Party hopes for in this regard, but I doubt it will ever be "open slather". If NSW moves to the South Australian model, what might occur is that occasionally, a small party of hunters, along with a NPWS officer will spend a short time in a closed off section of a National Park, targeting pest species. This has been a successful strategy in removing goats from sections of the Flinders Ranges, where their numbers had built up to unsustainable numbers. Goats had almost denuded the land & had taken over the habitat of the Yellow Footed Rock Wallaby, putting its survival in jeopardy. There are still plenty of goats in the Flinders & their control is an on-going job, and always will be. The South Australian SSAA actually bought a property with one of the last remaining wallaby populations & has its own continuous management program, keeping the populations of goats & foxes at levels which are low enough to allow the wallabies to survive & thrive. Unlike the relatively small areas which have been fenced to exclude foxes so that populations of Bilbies & other small species can be re-introduced, large areas like most National Parks cannot be fenced, & even if they were, the job of eliminating foxes, cats & other ferals is impossible. Currently National Parks are havens for feral plants & animals because there is insufficient money for their effective control, & even less political will. Baiting from the air kills many feral animals, but it also kills unacceptable numbers of natives as well. Parks & Wildlife organisations everywhere deny this, but it very easy to verify. The reality is that with insufficient money, baiting is a the only cheap political solution the NSW government would consider. Let us hope that the new State government has the balls to listen to professional game managers for a change, ignore the ignorant Greens and at least run some trial shooting programs against ferals in our National Parks.

Dal Birrell.

The Croc Report

Australia & New Zealand Hunting : Australia: Croc attack sparks 'monster' warning on 2011/3/13 15:05:13 (79 reads)
Residents on Queensland's Cape York Peninsula say there are local crocodiles much bigger than the one that attacked a fisherman on Wednesday.Todd Bairstow, 28, was attacked by a four-metre saltwater crocodile while fishing near the bank of Trunding Creek, near Weipa on western Cape York Peninsula on Wednesday.Police say Mr Bairstow grabbed mangrove branches and fought for his life, punching and kicking the crocodile for 15 minutes until he was free.Another man fishing nearby also fought the crocodile until it let go and disappeared into the water.Mr Bairstow had surgery yesterday in Cairns Base Hospital after suffering severe injuries during his 15-minute ordeal.A hospital spokeswoman says Mr Bairstow is having a second round of surgery today and will require further surgery for his wounds.His younger brother is by his side and his parents are due to arrive from Port Pirie in South Australia later today.Rangers will search for the crocodile in the hope they can locate it and remove it from the wild.Terry Garlick owns a tackle shop in Weipa and says he knows the crocodile that attacked Mr Bairstow and authorities will not have much trouble finding it.However, he says the animal is nothing compared to others on the eastern side of town."There is a monster croc over near the Mission River Bridge - it has been there since I have been here and they call it 'Black Beauty' and it's a monster croc," he said."I can tell you when you see it you shudder ... I go fishing there and when I see that croc I just go home, you just can't sit there because it's too big."Mr Garlick says Mr Bairstow is new to Weipa and appears to have underestimated the danger."There is some big ones here, there's some bigger ones here," he said."Billy's Lagoon has got one about 5.3 [metres] and it's probably the biggest one around this area."The Pine River has got another one about 5.3 [metres] and when you see them, I mean it's an eye-opener for anyone coming up here - it shocks."More education has got to be done for the people around that come to work here."I think the mining company has got to actually show them that you can't muck around with crocodiles."http://www.abc.net.au/news/stories/2011/03/11/3161161.htm

FOR some time now, calls have been made from the Northern Territory for the introduction of limited crocodile shooting.

They're a pretty good case.Croc populations have exploded since hunting was banned in 1971.Numbers are about 80,000 and climbing.These include a new generation of males - bigger, aggressive and much more dangerous than the females - that have matured with absolutely nothing to fear from man.As more people visit wetlands to watch or fish, clashes become more frequent.We look at crocs as more than prehistoric relics. They view us as food.There's a morbid public curiosity about cold-blooded beasts that dismember people and gulp them down.A blue-ringed octopus, something the size of a lap dog scrotum, makes you just as dead.The hunt proposal is modest - a trial quota of 25 reptiles.At $20,000 a head from well-heeled and mainly overseas hunters, it would be a windfall for accredited outfitters doing pig and buffalo hunts.Good too, for a tourist-based economy.What's stopping them?Canberra.Despite wholehearted support from the Northern Territory Government, Aboriginal groups, pastoralists and the tourist industry, a succession of proposals remain

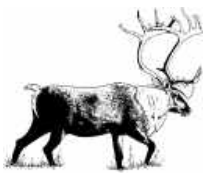
cont page 10.

Secretary's Report!

What's been happening around the traps?
NSW State Elections
The good news is that Robert Brown was re-elected into the Upper House as the representative of the Shooters & Fishers Party with a sizeable increase in the voting %.
I assisted on handing out "how to vote" on the day and we were better organised. It was interesting the number of people from all walks of life and sex wanting our "how to vote" card.
With the anniversary of the Port Arthur Massacre, a SMH reporter like always dredges up the tightening of "gun laws' without any facts. They took a Poll, should gun laws be further tightened?
Result Yes 14%
No 86% (6,729 responses)

It was good to read some of the comments from supporters.
On another note concerning future gun ownership a US Senator, Rand Paul, is pushing for support against the United Nations to pass a new Global "Small Arms Treaty" designed for a Global Gun Control Scheme. Interesting they all seem to have an agenda.
In a recent NPA survey – should logging be allowed in National Parks, 77% of respondents want logging.
Game Council
Discussion paper on wearing blaze orange when hunting on private land/property which is a requirement when hunting on public lands.
Game Council Events – check on their new website for more details.
On 23rd May for a six day period Macquarie Woods, a section of Vittoria State Forest which has been excluded from hunting, will be available for all types of hunting during that period. Hunters who participate are instructed to harvest as many game and feral animals as possible.
25 & 26 June – the 2011 Fox Drive to be held in the Oberon region of NSW
8 to 10 July – the 2011 Deer Hunting Workshop
9 to 11 September – the 2011 Bow hunting Workshop
Please check the Game Council website for more details.
The New South Wales Rifle Association Inc have sent out an important notice dated 29 April 2011 concerning the termination of licences to Range Users of the Anzac Rifle Range Malabar.
In effect, the termination date is the 31st October of this year. (A copy of this notice is included in the magazine).
The rut is over and I am aware that some members have taken some great trophies.
How about working on a story for our magazine so that we can all share the experience of your hunt.
Our next meeting is on 19th May at the German Austrian Club.
Also, if you change address or any other details have changed, please let me know so that our records can be changed.
Good hunting!

Greg Haywood



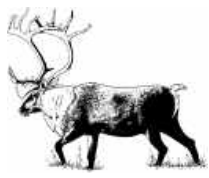
President's Report

No report is available this issue.

List of Official NSWDA Scorers.

The following members of NSWDA qualified as NZDA scorers at the workshop held in Sydney last year.
Members should contact any of these official scorers to get a head scored officially for NSWDA records.
As I think this list is incomplete, would any scorers who need to be added to the list please contact me, preferably be email. My contact details are in the front of this Deerstalker. Editor.

Chris Graham (Liason Officer with NZDA)
John Desanti,
Peter Birchall
Wayne McPhee
Steve Isaacs
Darren Plumb
Josh Raffin.
Terry Burgess (not NZDA qualified)
(Please let the Editor Know if your name should be on this list)



Video Library

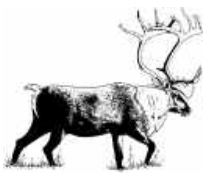
Free hunting videos for members to borrow for one month if picking up video's at a meeting. Members must pay postage by registered mail back to the club in carton supplied. You can phone or write for videos to be posted to you, however the member must pay postage both ways. When returning videos to the club within one-month members must include cost of postage to them in stamps inside the box.

If members are to lend these video's to fellow members, remember that the original person who borrowed them from the club will be held responsible if they are not returned within due time. As these videos are the property of the club, you are expected to look after them. If you loose or damage a video you will have to pay the replacement cost. If you don't return them after 4 weeks you won't get anymore.

To borrow a Video contact: **Terry Burgess** **Ph: (02) 9909 1267**
P.O. Box 80
Cremorne Junction NSW 2090

Library List

1. Black Death, Cape Buffalo, Lion
2. Capstick, Botswana Safari Buffalo, Lion
3. In the Blood, Capstick, Rhino
4. Zambia Safaris
5. Whitetail, Mule Deer, Pronghorn, Late Season Elk
6. Monster Elk, Horns of Plenty, Hunt Exotics 1 & 2
7. Hunting Bugling Elk, Big Muleys, Caribou
8. North American Big Horn Rams, Greatest Whitetail, Wild Hogs of Texas
9. Col Allison Hunters Home Video, Big Bears, Russian Boar, Whitetail
10. North American Mixed Bag, Big Horn Rams, Whitetail
11. Great Trophy Bucks Mixed Bag, Big Horn Rams, Whitetail
12. Wild Boar Pig Hunting Down Under Part 1
13. Hunting Sheep, Goat & Moose in B.C.
14. Big Rams Brooks Range, Big Horn Rams, Mouflon
15. The Bow Hunter, Whitetail Deer
16. Big Rams, North American Big Horn Sheep, Mouflon Sheep
17. North American Big Horn Sheep, Big Rams Mixed Bag
18. Mouflon, Bow Hunting Elk, Whitetail, Mule Deer etc.
19. Challenge of the Mountain Monarchs, Thars, Mouflon Sheep, Red Deer in Qld



20. Pig Hunting in Qld, Wild Goat in Qld, Mouflon

21. Pig Hunting in Qld, Red Deer in Qld

22. Hunting in Spain, Pig Hunt in Tunisia, Red Deer in Scotland

23. Hunting Fallow in Scotland, Red in Scotland, Kiwi Hunts North West Territories

24. The Wildlife Bow Hunter, Deer, Pigs, Foxes, Mountain Hunting NZ, O'Rourkes Deer, Chamois, Thar

25. Mountain Hunting N.Z., Deer, Thar, Chamois, Red, Sika, Bow Hunter

26. N.Z. Hunting, Sambar in Victoria, Red Deer in France

27. Hunting N.Z. Red Deer, O'Rourke's N.Z., Chamois in Europe

28. Bowhunting Red Deer in N.Z., Bugling Red Deer Rifle

29. Fox Shooting at its best-Volume 3 & 4

30. The Ultimate Whitetail Hunt

31. Sambar Hunting, Mountain Hunt N.Z., Thar in N.Z.

32. Caping Demo by NSWDA

33. Roar Red Stags, Shadows in Scrub, Great Trophy Bucks

34. Hunting the Elusive Wild Dog, Hunt to outsmart Wild Dogs

35. Dark Continent

36. Red in Qld, Dingo, Fox, Fallow, Hog etc., Sika N.Z., Cape for Trophy Mount

37. How to cape for a Trophy Mount, Shoot the Bull, Hunting QLD Red Deer, Deer Attack

38. Hunting African Lion, Hunting Cape Buffalo

39 Big Horn Rams, Nth American Mixed Bag

40. Shadows in Scrub, Red Deer - Clark McGhie

41. Sambar Stalking 1 & 2 - Reg Gordon

42. Bucks & Bulls, NZ Chamois, Thar, Whitetail, Sportsmans Paradise, Pigs, Barramundi, Tusk Versus Tooth, Pig Hunting with Dogs

43. Bucks & Bulls, NZ Chamois, Thar, Whitetail, Hog Deer in Victoria

44. Bucks & Bulls, NZ Chamois, Thar, Whitetail, Sambar Stalking 1 & 2 - Reg Gordon

45. Dogs, Guns & Grunters, Tusk Versus Tooth, Lifes a Boar NZ

46. "How To Load From A Disk" Ballistic CD-Rom

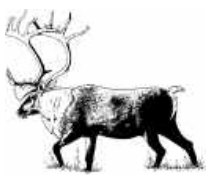
47. Huge Hogs of Aust. North Part 1 & 2

48. Sambar Safari Vol 1, SHIKARI

49. Venison Hunters, Hunting Northern Cape, Hunting NZ Southern Alps.

50. Hunting the Zambeze Delta, Trophy Seekers, Trophy Seekers Shadows End

51. NZ Hunting, Hunting Safaris Vol 1 & 2, Rusa Hunting



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blocked.One drew a visit to the minister's office by Steve Irwin, to demonstrate crocodile-trapping techniques ... I'm not sure about any wrestling on the carpet.Australia's original crocodile hunter, Malcolm Douglas, was in favour of limited and selective hunting. Trapping is a venture already in overload.How many croc farms and related tourist ventures do we need?As a management strategy, it fails.The field conservation people - under Canberra's watchful eye - trap and relocate troublesome animals.Usually, there first needs to be an incident with a follow-up complaint. Trouble is, relocation does not work.Buddy Williams once did a song about a cat that kept coming back. John Williamson could just as easily change the moggie for a man-eater.Plenty have not gotten the message.A social structure exists among the saurians.The alpha male hogs and defends territorial and mating rights. It's easier for a transplanted croc to find its way back to from where it was taken.Some travel hundreds of kilometres returning to old stamping grounds.Common sense has to prevail on croc water.A lick and a promise, so to speak, rather than skinny dip.Caution may soon not be enough.Not if overt attacks where people have been dragged from tents are anything to go by.The behaviour of some Top End crocs remind me of an account about a patrol officer in Papua New Guinea back in pre-independence days.On the hunt for a rogue croc that had been capsizing dugouts, he shot and missed, ending up in the water with broken ribs.In hospital, lucky to escape with just his life, the starched sister with the clipboard was doing her morning rounds."When was the last time you used your bowels?" she enquired."When that bloody croc tail knocked me into the river," he gasped.http://

Crocodiles are being released from traps designed to keep the man-eaters out of waterways and away from people in Australia — leaving an expert puzzled as to the motives of those responsible, the Northern Territory News reported Thursday.So far this year, at least four of the man-eaters were sprung from traps in Darwin Harbour and Shoal Bay east of Darwin in Australia's Northern Territory. The latest assisted escape happened last week.Crocodile catcher Tommy Nichols has given up trying to understand the senseless acts of stupidity."Unfortunately they think it is fun to release crocs [crocodiles] — I find it hard to understand," Nichols said.Last year it was made illegal to release crocodiles from traps or interfere with the cages. People can be jailed for a maximum six months or fined up to AU$6,500 (US$6,581) for the offense.Nichols said bigger crocodiles were being caught in the harbor this wet season, which runs from November to April, with two measuring more than 13 feet (4m) long.Nichols said three crocodiles measuring more than six feet (2m) long had also been caught in the storm drains recently. He said it was a concern because kids were known to go fishing in the drains.SOURCE LINK: http://www.ntnews.com.au/article/2011/03/24/220061_ntnews.html http://www.myfoxorlando.com/dpp/news/ ... -from-traps-in-australia-

Europe Hunting : Spain: The boar war

Barcelona aims to control its wildlife on 2011/2/17 9:06:44 (112 reads) Catalonia became Spain's capital of animal rights last summer when the regional parliament banned bullfighting. Now it is struggling with a new animal issue: what to do about all those wild boars in a Barcelona park?The boars are not as glamourous as the bulls that face sequinned-suited matadors. But the creatures' fate is stirring the animal-activist crowd.The number of wild boars in Collserola Park has grown too big to sustain itself. Environmentalists estimate that about 500 of them forage for roots, plants, insects and tiny prey in the wooded mountains at the edge of Barcelona. They also sometimes wind up in the city itself, scavenging for food in trash containers. Wandering across roads and highways, they occasionally cause traffic accidents.So the regional government that previously spared the fighting bulls devised an odd solution, allowing hunters to control the boars' numbers by killing them with bows and arrows."It's very secure and ecological, and there have never been accidents," said Francisco José Martinez, president of the Astor Bow Hunting Society. Archers shoot hi-tech metal arrows that cost as much as •30 (£25) each from deluxe aluminium bows, which cost thousands of euros. The weapons kill as quickly as shotguns, Mr Martinez said. They also make far less noise and do not disturb birds nesting nearby.But the local animal lobby, riding high after its anti-bullfight victory, protested against the scheme with a letter-writing campaign. AnimaNaturalis called the method "cruel, evil and inefficient", causing the animal to bleed to death slowly and painfully. So far, the activists are on a winning streak. The Catalan government has backtracked and now the only legal way to control the numbers of wild boars is to trap them or daze them with a tranquilliser dart and transfer them to another mountain.But environmentalists are still not satisfied. "We humans created the problems, so the solution isn't to kill more of them but to lessen the impact of development by bringing back their natural predators," said Jaume Grau, a spokesman on biodiversity issues for the environmental group Ecologists in Action.His group recommends introducing predators such as wolves, eagles and bears, which gradually disappeared from the park over the last century to be replaced by marathons, motocross races and bird watchers. "Bears have been re-introduced in the Pyrenees mountains and nobody has been killed except a sheep or two," Mr Grau said.Barcelona may seem like an unlikely place to encounter a glut of wild boars. But the city's population has multiplied nearly five-fold in the last 50 years. Before then, the Sagrada Familia, Las Ramblas and other monuments were surrounded by farms and wooded mountains.The boars' problems began as the Barcelona suburbs sprawled around their habitat. "Before they needed more food they could move to another mountain habitat, now when they leave the forest they immediately encounter a highway," Mr Grau said.This year, the park became a nature reserve and hunting with guns was banned, allowing the boars to multiply further.The archers, meanwhile, are disappointed. They saw their role as a "social service" and had mapped out a careful strategy under which lone shooters would target animals at close range to ensure a quick kill. And they would not waste the succulent meat, Mr Martinez said. "Wild boar is tastes very good," he said, "But... you have to prepare it well."http://www.independent.co.uk/environm ... its-wildlife-2211242.html

cont. page 19.

Attention Pig Dog Hunters

Due to the successful rollout of the first night time pig dog hunting forests and the responsible attitude and action of R-Licenced pig dog hunters, a further 7 declared public land hunting area are now available for night time pig dog hunting: New night time pig dog hunting public land hunting areas: o Ben Bullen State Forest o Coricudgy State Forest o Piliga East State Forest o Piliga West State Forest o Canobolas State Forest o Glenwood State Forest o Mullions Range State Forest Existing public land hunting areas available for night time pig dog hunting: o Nundle State Forest o Hanging Rock State Forest o Riamukka State Forest o Nowendoc State Forest o Mundaroo State Forest o Carabost State Forest o Tallaganda State Forest o Pennsylvania State Forest o Roseberg State Forest o Gurnang State Forest o Jenolan State Forest o Vulcan State Forest o Gurnang State Forest o Sunny Corner State Forest o Sunny Corner State Forest – Abbotsbury Section o Barigan Regional Crown Reserve – Hawkins Zone o Barigan Regional Crown Reserve – Barigan Zone o Barigan Regional Crown Reserve – Fitzgerald Zone o Barigan Regional Crown Reserve – Growee Zone

In addition to the standard Written Permission conditions, the following conditions specifically relate to pig dog hunting on public land hunting areas:

7. Hunting at Night: Firearm and bowhunting is not permitted at night.

8. Pig Dog Hunting at Night: Unless specified in "Other Specific Conditions"

Pig hunting using dogs is allowed at night subject to the following conditions:

a. Hunters must operate as a team, minimum of two

b. Hunters must carry a: torch, UHF radio and GPS,

c. Some form of illumination is to be attached to each hunting dog

d. No firearms are to be carried on the hunt (Including in the vehicle),

e. Spotlights (an artificial light source powered by 4.5 volts or more) are not to be used on the hunt.

9. Hunting Dogs:

All hunting dogs that are free ranging when hunting must be fitted with a radio tracking device whilst being used for hunting.

Dogs that are hunting on a leash or lead are not required to be fitted with a radio collar. If not being used for hunting, dogs must be controlled on a leash or confined at all times.

10. Hunting from vehicles:

All firearm and bow hunting must be conducted on foot. Pig hunting with dogs is permitted from vehicles however dogs must be restrained or caged at all times whilst the vehicle is moving.

The vehicle must come to a complete stop before dog is released from cage or restraint.

To support the further expansion of the public land night time pig dog hunting program please report any suspicious or illegal Hunting activity to Game Council NSW on 02 6360 5111 For questions, licencing or to book hunting permits please call Game Council NSW on 02 6360 5111 Game Council are also looking for more pig dog hunting pictures and stories for Hunt NSW magazine. Please email pictures and stories to commsmgr@gamecouncil.nsw.gov.au David Smith Game Manager: Central Zone Appointed Inspector (Game and Feral Animal Control Act 2002 and Regulation 2004) Authorised Officer (Sec 32D, 38A, 38B Forestry Act 1916 and Regulation 2009) GAME COUNCIL OF NSW Conservation Hunting

NSWDA Merchandise

I have organized some new club shirts, polar fleece & caps.

The colours are at this time ;

Polo shirts …….white/navy trim…….$ 25.00

Micro fleece top…….Moss green……..$ 35.00

Caps…….bottle green…….$ 15.00

Caps…….blaze orange…….$ 15.00

All garments have the club emblem embroidered on the item

We will have the items at the next meeting for sale & also at Coffs Harbour.

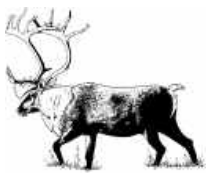
For further information members could contact me on 48 210 774 / 041 202 1741 or at 20 John street. Goulburn. 2580

Postage will be at $5.00 for members.

Also, other colours are available but will need to be a special order.

Thanks Darren

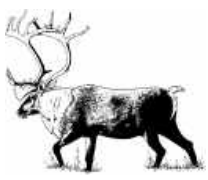
For Sale SWAZI Wapiti Coat
Sz XL, Olive, Excellent
Condition $400 ono
M: 0439 368 210 (txt or call)
Les and Mel King



Penfold on Buff.

Many, many years ago (at age 26) I wanted an opportunity to shoot buffaloes in NT. I wrote to numerous professional shooting outfits, however only received one response. It was from John Barling who ran the meat recovery operation for Mudginberry station. John invited me to go shoot buffs with him, but it was to be all work and no pay. I ventured to Mudginberry where John taught me how to and where to shoot buffs for human consumption. They were all head and neck shot as body shot buffs were not allowed into the abattoirs to be processed. I thought that I learned fast, shooting with the legendary Harry Chandler, with John and another professional shooter. After some days shooting 32 bulls each day, I had run out of 375H&H ammo and my supply of 300 Win Mag ammo. I thought that as I was young, a hotshot shooter and that I now knew exactly how and where to shoot buffs to kill them cleanly in one shot, I decided that my 270W with 150 grain Sierra loads would be adequate. I hunted with Harry and he drove while I shot bulls. We loaded the first load of 6 bulls and drove the Toyota with loaded trailer out onto the gravel roadway where we met an aborigine with a second trailer, then took off to secure a second load of 6 bulls before lunch. I was on fire and I really thought that I was the god of shooters. I shot 10 straight one shot kills on the big buff bulls and thought that I could do no wrong. A bull ran out of the bush to cross a clearing. Harry stomped on the brakes and as we slid to a stop I shouldered the loaded 270. The bull was running left to right, so I shot him just under the right ear and he dropped like he was struck by lightning. When buffs die in mid-stride, they throw their head in the air as their front legs collapse and then crash down chest first with their rear end closely following. This bull did this perfectly and as classically as I had ever seen. He hardly moved after he hit the dirt. So confident was I that I had done the job on him that I (stupidly) abandoned my rifle in the Toyota, grabbed my knife and ran the 30 yards to the bull. Without any caution or ceremony I grabbed his horn and pushed it over his head exposing his jugular, then pushed my knife straight in to the hilt to bleed him. Then the bull suddenly jumped to his feet with me holding his horn in my left hand and my knife stuck in his throat with my right hand. His horn bumped me in the chest as he swung his head around to me. We were eye to eye. My heart literally jumped up inside my chest and jammed itself in the bottom of my throat shutting off my windpipe. I opened both hands and sprung backwards (Harry said that my first step was 30 feet) and ran towards the Toyota. I knew that he had me and that I had no chance to cover the 30 yards before he got me. My life passed through my mind during the several seconds that it took me to reach the Toyota. I ran around the Toyota and looked back for the first time. The bull was still standing where I left him, legs spread, blood pouring from his nose and down the knife handle. He was out on his feet but not quite dead. I grabbed my 270 from the Toyota passenger seat. Harry was smiling and rolling a cigarette. While I still could not breathe, I struggled to take a rest over the spare wheel mounted on the Toyota hood. It took me several attempts to get the crosshairs on the killing shot position, but finally put the finishing round into his head and he dropped, dead this time. I collapsed into the passenger seat of the Toyota, still unable to breath. I closed my eyes and tried to take a breath, but my heart was still jammed tight up under my throat restricting any airflow. (If you think that I am exaggerating with my explanation, I can guarantee you that at the time it was much worse than I can describe here in writing). I literally could not suck in any air for some minutes before my body relaxed and allowed me to breathe again. If you think that I got a massive fright, you are right. I still shudder when I

remember how stupid I was and how close I came to death at that time. This incident taught me all that I needed to know about dangerous game hunting and I never forgot the lesson. I practiced what I had learned for the rest of my life as I hunted both big and dangerous game all over the world over the next 40 years. Harry lit his cigarette and in his slow drawl said "Hotshot, that is how you get yourself killed out here. You need to set yourself a set of safety rules that suit your work and never break those rules or you will die out here". We walked to the bull together and he showed me his technique. "Load your rifle and watch the round go into the chamber ahead of the closed bolt. You never speak as that immediately frightens the buff. (Neither of us were wearing shoes) You sneak up quietly behind him with you rifles cocked and loaded with the safety off and scope on lowest power. You reach over carefully and flick his eyelid with the tip of your knife while you hold your rifle barrel on the back of his head." He showed me how. "If the buff blinks he is alive. Step back and shoot him right in the back of his head right now, then repeat the process to ensure that he is dead." "The last thing that dies in any animal is his eyelid. If he blinks his body is alive, if he does not blink he is dead and you are safe to assure yourself that he is indeed dead before you get on with the bleeding and the work. Remember this and never break these rules and you have a change at having the adventure while staying alive to enjoy it." I never forgot the incident or Harry's rules, and I am still here to prove that he was right on the money. Here are my rules for guiding hunters on trophy buffalo hunts. Always get the hunter as close as you can, but not closer than 35 to 40 yards as inside that distance you become inside his "Area of awareness". (I will explain that area awareness later). Have the hunter rest his rifle on a tree, rock or ant bed with his hand between the gunstock and the hard surface or the tree, rock or ant bed. Watch the end of his barrel. If it is moving, do not let him shoot. Instruct him to shoot only when you are sure that he has a steady aim. Then watch the bull through your binoculars to watch for the bullet strike. Make the first shot the killing shot. Then ensure that the hunter, following your previous instructions, shoots every round out of his rifle into the bull just as fast as he can reload and take aim again. Only when the gun is empty do you allow him to stop shooting. If you follow these instructions carefully you never get into trouble or have a wounded bull and dangerous follow-up on your hands. Following up wounded buffs is never any fun I can assure you. He knows that you are coming after him and he will hide and ambush you if you give him the opportunity. Next, have the hunter reload his rifle. Watch the bolt shove the first round into the chamber. An ominous "click" of a firing pin falling on an empty chamber achieves nothing except to make the bull aware of your presence and never sounds good. Have the hunter carefully and quietly approach the downed bull from behind, remember that they die with their eyes open. You must ensure that all signals to the hunter are understood to be by hand only with not one work spoken after the first shot. Repeat the procedure that I learned from Harry and only when you have determined that the bull is dead do you allow any talking or shouting. Then I take the hunters rifle from him and empty every shell out of the rifles chamber and magazine and put the rounds in my pocket before returning his rifle to him. This is the only way to ensure that there are no loaded rifles or potential accidents while setting up the bull for photos. If you follow these procedures every time, to the letter, you should never get into any trouble hunting big trophy buffs. "Area of awareness". This is different for every animal. Deer are super sensitive and rely on eyes, ears, nose and their sixth sense to keep them out of danger. Their area of awareness depends on their habitat at the time. If deer are feeding way out in a field, then they are testing all of their



senses 100% of the time. If they are in heavy bush, their area of awareness is much reduced and you can often sneak right up to them snoozing in their daytime bed or roaring in thick bush. As buffalo generally feed in open areas throughout each night, then they are out of the bush when you catch them out while hunting during daylight hours. I have found that anywhere outside of 35 to 40 yards they are not wary, however, once you get inside that area of awareness somehow they become aware that there is potential danger, even if they cannot hear, see or smell you. They just become aware. Particularly with younger and less experienced bulls, if they suddenly become aware of you inside that critical 30 yards range, they make a very quick decision to either run away or to charge you to get rid of the problem. These young and surprised bulls are singularly the most dangerous encounter that you can have while hunting in NT. They are inexperienced and do not know if they should run or charge, and being awakened from a sleep under a shade tree, they make an instant decision that can end up with them on top of you in less than three seconds. They have an amazing turn of speed and you will have one only opportunity to stop him, so you had better be ready and prepared to act "right now" if this ever happens to you. I had been lucky. In 30 years of guiding buffalo hunters I only had this happen when the bull charged instantly on three separate occasions. Lucky for me I was always prepared and ready for such an encounter and lucky for me my "instant dispatch" reaction served me well and I never had a client or myself run down by a wounded or unwounded bull. I never forgot what I learned that one time so long ago when I just got lucky.

Bob Penfold.

Practical Bloodtrailing Tips

Bloodtrailing is a skill that every bowhunter should work hard at mastering. We owe it to animals we hunt, as well as to the sport, to follow up as best we can on the shots we take. While bloodtrailing is more of an art than a science, anyone can become competent at it. It just takes a little careful thought before, during and after the shot. Establishing a standard bloodtrailing routine can make bloodtrailing much easier. The routine that I use is described below.Much of what you'll read here I learned from outdoor writer and lecturer John Trout, Jr. His book, Trailing Whitetails is easily one of the definitive works on bloodtrailing. Unfortunately, the book recently went out of print. If you're lucky you may still be able to snatch up a copy before they're all gone.Because the whitetail is the most popular big game animal sought by bowhunters, that's the type of bloodtrailing situation that will be discussed here. Most of this information, however, is applicable to trailing other animals.KNOW Where the Animal Was When You Shot You can often tell a lot about the nature of the hit from what you find at, or near, the site of the hit. But first you have to be able to find the spot. You might want to note the animal's position as you're drawing your bow or calculating the distance of the shot. I usually pick a tree or bush that the animal is next to as a reference point. Immediately after the shot, when the animal has left the area, I look back at the landmark I've chosen and etch it into my mind again. REMEMBER How the Animal Was Standing When it Was HitYou already know the importance of shot placement. Note, however, a deer in perfect position just as the arrow is leaving your bow can move into a bad position before the arrow actually hits. What you observe during the arrow's flight, along with other clues to be discussed later, can help you make some very

important bloodtrailing decisions. WATCH the Animal Closely as it LeavesCarefully note the animal's direction of travel after the shot. This can make finding the initial trail much easier, especially in the event there isn't much blood. At the very least, pick out a distinctive landmark at the point where the deer disappears from sight. It's not a bad idea to take a compass reading either to map the animal's general direction of travel. Also, check to see if the arrow is still in the animal, otherwise you might spend a lot of time looking for it on the ground at the scene of the hit. Many bowhunters believe you can tell where a deer has been hit by how it runs away. This is certainly true some of the time, but it isn't a dependable method of analysis. Deer do have a tendency to "hump up" in the middle and leave the area more slowly if they're gut shot. Other hits aren't as easy to diagnose, however. Some deer will race off with no indication of being hit even though they've been 'double lunged.' CAPTION- A walking deer (left) leaves a significantly different blood trail than one that's running (right). The direction of the blood splatter from the running deer points out its direction of travel. SEARCH the Scene of the Hit for CluesWhat you find here can help you determine what type of hit you're working with. Let things quiet down after the shot for five to ten minutes before moving to check the scene (if lighting and/or weather conditions will allow it). Be as quiet as possible when you make your move as the animal may still be alive and close by. The most important clue to be found here is the arrow (which will be discussed in the next section), but hair cut off by the broadhead's entry and/or exit can provide important information too. This is especially true with whitetails... if you know what color hair comes from what part of a deer's body. This chart from Trailing Whitetails can be very helpful in determining the nature of a hit, especially less than perfect ones. Good blood at the site is usually a sign of a lung hit. If this is the case you'll sometimes find blood sprayed out on the ground in a shotgun-like pattern, the result of the arrow and the deer's respiration forcing blood out through the broadhead's exit hole.

Of course the most important thing to find here is the arrow. Given a body hit on a deer, you're most likely to find the arrow nearby.PERFORM a Thorough Arrow AnalysisThe arrow will often tell you a lot about the hit, and its more than worth your time to search for it if its not immediately visible. Because much has already been written on deducing the nature of the hit by the condition of the arrow I won't go into detail here. But generally speaking, there are four types of hits that are relatively easy to diagnose from examining the arrow. An arrow that passes through a deer's heart or lungs will likely be covered completely with crimson red blood, almost a reddish pink in the case of a lung hit. There may be some tiny air bubbles in the blood in the event of a lung hit too. There should be an excellent blood trail to follow with blood right at the site or within 20 yards.A liver hit is often indicated by an arrow completely covered in a medium to dark red blood. A blood trail should be evident within 30 yards, but it may be sparse at times. Here's where paying close attention at the time of the shot can help. Match these conditions up with the perception

that the arrow may have hit too far back and you probably have a liver hit. An arrow that travels through a deer's paunch may not have much blood on it at all. Instead, it will be coated with a foul smelling fluid/material, sometimes greenish in color (the contents of the deer's stomach or intestines). While there will be some blood to follow, the trail will likely be sparse.The last type of hit, one in a leg quarter, neck, rump, or loin, is sometimes called a "meat hit." It will leave a blood soaked arrow and a poor to fair initial blood trail that tapers off after a few hundred yards. Some meat hits result in only partial arrow penetration, with the arrow being found down the trail a ways. In this case the arrow may only have its front portion covered in blood, the part that was in the deer. It's not uncommon to find just the back end of an arrow in these cases too, an indication that the front of the shaft may still be in the animal. Don't forget to examine any hair that's on the arrow. Hair here, along with that found on the ground, can indicate the type of shot you're dealing with. CONSIDER How Long to Wait Before TrailingHow long you should wait before trailing depends upon what type of hit you think you're dealing with. Weather can also be a factor and that will be discussed later.While there are no hard and fast rules. MARK the Trail You're FollowingTrail makers are a good idea anytime, but they can be especially helpful when you're dealing with a marginal hit. A marker, at the very least, can help you go back to the last spot you found blood in the event that you've lost the trail. From here you can start searching for new sign all over again.Markers can also help you determine a deer's general direction of travel. Sometimes this will point you toward the next bit of blood or the deer. Toilet paper makes an excellent marker if it's not raining. Bright orange biodegradable surveyor's tape also works well.TRAILING Dos and Don'tsDo take your time while trailing, and try not to get frustrated if things aren't going well. Slow and steady is more likely to lead to recover than quick and hectic.Try to stay off the trail the deer has taken. You may want to go back and examine some of the blood sign and you can't do that if you've walked all over it. Having a buddy along to help you trail isn't a bad idea, but limit the number of helpers. In the event of a marginal hit, you want to trail slowly and quietly. That can be impossible with a crowd.Get down on your hands and knees to search for blood if you've lost the trail. Sometimes that's the only way you'll find it. And don't forget to look on the sides of bushes, trees and grass for blood wiped off as the deer passed by.

If you jump the deer while trailing, it's probably a good idea to back off for a while and give the deer more time to expire (unless you're dealing with a meat hit). Continuing to trail will just push the deer and result in a marginal blood trail that's difficult to follow. DEFEATING Foul Weather and Darkness Rain and falling snow can wipe out a blood trail in short order. If you're certain of a good hit you should begin trailing right away. Dealing with a paunch hit in rain or a snow is more tricky. If you have a good idea of where the deer went you may want to wait the usual amount of time. The deer probably won't go far and you'll have a decent chance of finding it when the weather clears. If you're uncertain where the deer went you may be out of luck. This is a bad situation to be in, and it points toward being extra careful when taking shots when there's bad weather. You may have to begin trailing right away with the hope of jumping the deer, hopefully getting and idea of where it might bed next, and then backing off until later. Trailing at night has its own difficulties too. Not only is it easy to miss obvious blood sign, it's easy to walk right by a downed animal and never know it. A super-bright flashlight is essential, and a gas lantern is even better. Also, take extra care not to get lost. Even familiar woods can be confusing in the dark.HOLD on to HopeIf you loose the trail there are a couple of things that you can try to get on the right track again. The first is to begin a zig-zag pattern projecting outward from the last blood sign

along the deer's general direction of travel. The second thing to do is search nearby sources of water for sign. Deer often go to, and stay near, water when they're wounded.
Keeping a positive attitude is essential when things aren't going well. It's easier to overlook clues when you're dejected. Don't give up if there's the slightest chance that the animal may be down. As John Trout says, "It's not always the bloodtrail that will lead you to the deer, for it is so often the effort you put forth."

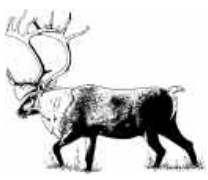
Duck Hunting Protestor Shot

MELBOURNE, Australia — A woman protesting about the start of the duck hunting season in the Australia's state of Victoria was shot in the face just hours after hunters opened fire Saturday.Julia Symons suffered pellet injuries to her face, teeth and hand in the accidental shooting at Victoria's Lake Buloke, about 185 miles (300km) northwest of state capital, Melbourne.Witnesses said Symons, aged in her 20s, was waist-deep in water when she was shot by the hunter, who was believed to be aiming at a low-flying bird.Symons was conscious when she was carried from the water by fellow protesters, with a so-called "duck rescue group." With pellets lodged in her face, and one of her teeth shot out, she was taken to a local hospital where she was in a stable condition.A teenage member of the Australian Cypriot Sport Shooting Association was being interviewed by the police following Symons' shooting, The Weekly Times reported.Saturday is the first day of the state's duck hunting season, during which hunters are allowed to kill 10 birds a day, which will run until June 13.http:// www.poconorecord.com/apps/pbcs ... NEWS/ 110319616/-1/NEWSMAP

A Review of "The Last Lions" (Paperback) publisher; National Geographic.

The last Lions is a book worthy of inclusion in the library of every naturalist & every hunter, whatever s/he hunts & whatever s/he uses; gun or camera. The graphic photographs & the text pull no punches. The reader cannot fail to appreciate the reality of life for the lions & their prey, which is strenuous and brutal, but without cruelty as humans know it. As a reader,you come to a better appreciation of lion psychology & the social system of the pride, which operates like a single organism as much as a collection of individuals. Individuals & prides live on a knife edge. The authors are passionate about their lions & present compelling evidence that their continued existence is really threatened. The single argument that hunting helps fund conservation in Africa is undoubtedly true for many herbivores, but not for lions. Dereck Joubert's descriptions of lions hunting are strikingly similar to how I feel as a deer hunter in the field. He has put into words what I have many times tried & failed to do. There is a similarity in the true hunting experience which early man could not have failed to recognise; could not have failed to admire in the lion. Not since reading Aldo Leopold's "A Sand County Almanac" have I felt this way about a book. This is possibly not a book for young children, but it's worth keeping a copy for them to read later. It dispells the Disney nonsense image of life in the wild which has done so little to conserve wildlife.

Dal Birrell



Coomba Park Deer history.

Coomba Park is a sleepy holiday village on the opposite side of the lake from the coastal township of Forster. To get to Coomba Park you drive 20 K's south of Forster on the coast road which runs south between the coast and the lakes, to Seal Rocks and Bulahdelah. Then take the Coomba Park turn off to the right that follows the lake around a further 20K's to the township. Coomba Park is a fairly new development, established mainly for Sydney and city dwellers to establish holiday homes on the quiet waterfront land. However, numerous local people buy the village houses as they are resold cheaply by the holiday concept buyers. When I was first informed that there were "deer everywhere" at Coomba Park I decided to go take a look at them to see if they were huntable. First I drove the Coomba Park adjoining roads and visited small rural farms, many with retired people relaxing in an undisturbed quiet rural setting, some with active farming families. All had stories about the deer, but no one seemed to know what species they were. At first a retired city resident told me that they had branching antlers with many points. He had a white deer living in his yard for a couple of years while hanging on his garage wall was a set of cast rusa antlers. A second farmer advised me that hunters used to come to hunt the deer at Coomba Park because they had great 12 point antlers. I was confused. Then I met a farmer who passed on to me the real story. There was a deer farm set up outside Coomba Park township by an enterprising farmer. He had a nice stock of red deer that were breeding well. One night an electrical storm knocked down his highwire deer fence and all of the red deer escaped into the very thick jungle that surrounded the farm. He believed that the deer farmer re-captured some or most of the deer. (I had a look at the old deer farm and I would be astonished if he ever recaptured one of the escapees) However, the deer farmer then re-stocked with Rusa deer and up until 1995 they bred up to 60 or so in number. The farmer advised me that during the drought the deer farmer struggled to feed his deer herd and subsequently and unfortunately became bankrupt. (This may or may not be true, but this is what his neighbour told me) Before the bank was able to foreclose on the deer farmer, the deer escaped into the Coomba Park bushland. So, it appears that for some time anyway, there were some really big red stags taken by trophy hunters from the area before all of the red deer were eradicated leaving only the rusa running free in the area.

As we know, a healthy population of wild deer reproduces by adding 1/3rd of their total population annually. So if in 1995 there were 60 rusa, in 1996 there would have been 80 and in 1997 over 100. If my calculations are correct there were way over 600 by 2001. Who knows how many have spread throughout the rich farming district, but even with serious harvesting there will be way over 1000 rusa running in the surrounding areas today. The deer in the area range over cultivated fields and very rich farming

country. This is paradise for deer which are not contained by simple farm fences. They are really fat and healthy. The farmers informed me that the NSW Game Council arranged a public meeting where (they say) they were advised that the NSWGC would manage the deer and reduce the troubling population numbers. Subsequently NSWGC members shot 9 big trophy stags and no females. Was this management and numbers reduction? Several farmers advised me that following the arrangements with NSWGC they found deer with arrows sticking out of their ribs and had to call the local police to kill the suffering deer. While they blamed the NSWGC hunters or the publicity that they gave the deer, some farmers rightly or wrongly developed a low opinion of NSWGC hunters. The most serious problems were deer crossing the roads to feeding areas and poachers shooting the deer amongst the houses during daylight hours, but especially during night time during the rut which is first 10 days of July.

There were shots fired, spotlights from roving vehicles after midnight and carcasses with no heads left on roads and roadsides. I began to investigate the hunting prospects. I found one lady with around 25 or 30 rusa living close to her house, however she advised me that they were her pets and that she fed them regularly. She allowed no hunting, but did not mind hunters shooting them once they stayed off her property. Another farmer who had lots of rusa resting under the trees down near the lake foreshore on his property told me that he allowed hunters onto his property to hunt deer with strict conditions. There were to be no fires, no alcohol consumption and no carcasses left after having been shot. The first night the irresponsible hunters lit a big fire, drank until almost dawn shot a big stag near his driveway and left the headless carcass where it fell. He did not want hunters on his property after that incident. There were horror stories from all quarters, but the deer were virtually everywhere in and around the township and in the surrounding farmlands. There definitely was an overpopulation problem. I discussed the deer problem with the local NP&WL service people who wanted all of the deer shot and removed. I talked with the local Forster police with whom I made an arrangement whereby I would telephone them the evening before I was due to shoot deer and again after I turned off the Forster/Seal Rocks main road early in the morning just before shooting light. I negotiated hunting rights with several farmers and began shooting females and harvesting the meat. I saw no stags in a full year of shooting the females, however I did not go take a look during the rut when my farmers advised me that there were lots of big stags roaring during the nights and deer running everywhere around Coomba Park. Late in 2010 I read an announcement that the Great Lakes Shire had applied for a $120,000 grant so

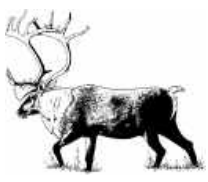
that their council shooters could shoot "all" of the deer at Coomba Park. I negotiated a meeting with the lady mayor of Great Lakes Shire and drove to Forster to meet with her. Unfortunately the lady was "all knowing" about deer, but would not eat a deer from Coomba Park as it would have been like eating "Bambie". I tried to advise her that there were better ways to control the deer numbers by having experienced (NSWDA) deer hunters undertake an ongoing serious culling program that would reduce the population and get the deer out of the township. When I put the idea that shotguns might be used in close urban areas to harvest the deer the lady was beside herself "you would blow them to pieces" she said horrified at the suggestion. I put to her that if the deer were used as a resource then surrounding motels, accommodation restaurants and tourist infrastructure facilities could greatly benefit from the resource, the lady was horrified and advised me that she nor her council would not support such tourism ventures. The lady advised me that her shooters were going to use subsonic ammunition and silenced rifles to shoot all of the deer, which she had already had permits to use. When I asked her how they thought that they were going to kill hundreds of deer with subsonic ammunition, one of her staff shooters advised me that they were going to "heart shoot every deer". I knew that it was time to leave. You can never have a progressive and educated discussion with people who simply "do not know that they do not know". So, today, the Great Lakes Shire Council shooters are trying to shoot 1000 wild rusa deer with subsonic ammunition and inadequate firearms that will simply wound many deer that will die in agony over a long period of time after having been shot with subsonic ammunition. Remember that they need to shoot a minimum of 350 females each year just to keep the population at the current numbers. I am totally disgusted that in our progressive society, that a government organisation should not only allow but support inflicting massive misuse of inadequate firearms to inflict so much pain on so many deer. No dedicated deer hunter or serious conservationist would support such activity, especially when trained and dedicated deer hunters would do the job much better and free of charge. There is simply no chance that they can effectively reduce the numbers significantly in the short term, but it appears to me that a valuable resource is being squandered by people who simply do not understand modern deer management. There are hundreds of experienced deer hunters and trained Game Council members who would become involved in such a project if invited. Their free deer harvesting and management skills should be used to manage this free range rusa herd instead of government money being wasted on this ill advised project. I have recently discussed this matter with NSW Game Council and they advised me that it was a matter which they would look into sometime in the future.

Who knows where this will lead. It is certain that the rusa will quickly adapt to the council shooters after they harass the deer for some time and become strictly nocturnal. What then? Such is modern day deer management in the state of NSW.

Record Elk found mired in Montana.

Qld Red Deer Update.

The Queensland Government has extended a deadline for community comment on efforts to control the state's 30,000 feral deer.The strategy is aiming at managing the feral deer, in consultation with landholders and community groups.Biosecurity Queensland (BQ) says the strategy is not a plan to eradicate the pest from Queensland.BQ spokesman Bruce Wilson says the four species of feral deer are most prevalent in areas recently affected by the floods and it wants to ensure the public has sufficient time to comment."We realise that a range of parties may not have had full opportunity to provide comment on it," he said."We've certainly been receiving comments and the intention is to receive all those comments to consider them, weigh them up and then to amend the strategy accordingly."Mr Wilson says some submissions are urging for the eradication of the 30,000 feral deer but he says that is not an option."They are well established here in Queensland - in traditional areas where they're present, it's not feasible to eradicate them and that's not what we're intending to do," he said.But Clark McGhie, from the Research into Deer Genetics group, says the month-long deadline extension does not give landholders enough time to prepare their submissions."There's been a sensible option put forward there that there's actually a bigger length of time given to determine this full strategy, this full policy, and it's been suggested three to five years and I think that's what's needed," he said."Their policy has been described as by many people - international biologists and even people from their own organisation - have classed it as a 'shocker'," he said."They said it's an absolute shocker and they've really got to go back to the drawing board."Submissions can be made until the end of the month.http://www.abc.net.au/news/stories/2011/02/16/3140014.htm



THE NEW SOUTH WALES RIFLE ASSOCIATION Inc

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29th APRIL 2011.

IMPORTANT NOTICE TO ALL MEMBERS OF N.S.W.R.A.
C.c. ALL CLUBS AND DISTRICT ASSOCIATIONS AFFILIATED TO N.S.W.R.A.

FROM: **N.S.W.R.A. CHAIRMAN – John Fitzgerald.**

SUBJECT: **TERMINATION OF LICENCES TO RANGE USERS OF ANZAC RIFLE RANGE MALABAR.**

Yesterday, Thursday 28th April 2011, I had a meeting with the owners of the Anzac Rifle Range Malabar (i.e., The Commonwealth) represented by Adrian Kirk of Dept of Finance and Deregulation and Trevor Abbott (Assistant Director, Property Branch) in my office at Anzac Range.
At this meeting I was informed by Adrian Kirk that under the Licenses granted to Range Users by the Commonwealth for occupancy of Anzac Rifle Range, the "Notice of Termination" had been issued to the following users in accordance with aforementioned License Agreement. The termination date effective on the 31st October this year (2011).

1. **Drummoyne RSL Pistol Club.**
2. **Malabar Riding School.**
3. **SSAA.**
4. **Sydney Model Aero Club.**

NSWRA and NSW Small-Bore and Air Rifle Association are at this point in time unaffected by these termination notices due to a relocation clause included in our license.

I was advised by Adrian Kirk that the Commonwealth was in consideration of appointing a Consultant to act in co-operation with us with the end result of identifying a suitable alternate site for us to continue our shooting activities.

The termination of activities of the aforementioned users has been brought about on the advice of Comcare and the direction of the Special Minister of State, Gary Gray, due to the continuing contamination of the complex by asbestos and the obligation by the Commonwealth to implement a "Remediation Action Plan" to manage the contamination.

Further meetings with the Commonwealth are anticipated in the short term to determine our future. I will keep you all fully informed as we move in that direction.

In the meantime **PLEASE** do not become a member of the "Chinese Whispers" syndrome club and rumour mongering inaccuracies that will undoubtedly arise in relation to this issue. I will be available if you have any questions most days during the coming weeks at NSWRA office at Anzac Range and am happy to take your call.

John Fitzgerald,
Chairman,
NSWRA Inc.,

EASTON

ARROW TUNING AND MAINTENANCE GUIDE

The Complete Archer's Resource 2nd Edition

$2.50

Tuning

This section includes step-by-step tuning procedures for obtaining optimum performance and accuracy from your bow and arrow setup. Also included are equipment setup tips, and suggested solutions to most bow tuning problems.

Maintenance & Assembly

This section provides instructions for properly cutting shafts and installing components. Arrow maintenance procedures are also included.

INTRODUCTION TO TUNING

Successful tuning can only be achieved by using a properly spined arrow shaft. Initially, it is best to start with a shaft recommended by one of Easton's Arrow Shaft Selection Charts or by one of Easton's computer selection programs, the Arrow Flight Simulator or Shaft Selector "Plus." Final verification is achieved during the tuning process. Any problems due to an improperly spined shaft will become evident during tuning. Before tuning be sure that shafts are straight, are properly fletched, and have perfectly aligned nocks (see pages 15 thru 30).

Choose Your Shooting Style.

Tuning procedures for the three most popular shooting setups are described and abbreviated throughout the manual as follows:

- recurve bows, using finger release (RF)
- compound bows, using finger release (CF)
- compound bows, using a release aid (CR)

You will notice that some of the techniques of bow tuning apply to all types of bow setups and others apply to just one or two types. When separate tuning procedures are required for specific setups, find your setup within the topic and follow those specialized instructions.

Install All Accessories

Before you start any bow tuning procedures, be sure to install all accessories on your bow, i.e., the correct bowstring, bow sight, stabilizers, arrow rest, cushion plunger, etc. In other words, install all the items you intend to use when shooting. Any adjustments made to the bow or changes in bow components can affect the tune of your equipment. When tuning, it is very important to change only one variable at a time!

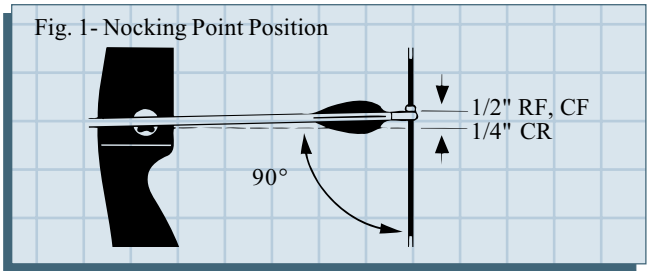
PRELIMINARY BOW SETUP

The first phase in achieving well tuned equipment is good preliminary equipment setup. If the initial setup is done correctly, bow tuning can be an easy process. By following the bow setup guidelines in the initial preparation of your equipment, you can eliminate most or all of the possible disturbances which cause tuning problems, including false tuning indicators. A false tuning indicator would be having a high nocking point indication when the problem is actually poor clearance.

Install the Nocking Point

Install a moveable nocking point on the bowstring. Clamp-on types are ideal. Initially, position the nocking point on the bowstring about 1/2" (1.3 cm) above square for RF and CF and approximately 1/4" above square (0.63 cm) for CR. See Fig. 1.

Fig. 1- Nocking Point Position



Find the Limb Centers

In order to have a reference point from which to adjust the arrow's left/right position on the bow, it is necessary to find and mark the exact center of the limbs on a recurve bow, or what is termed the "balanced limb center" on a compound bow.

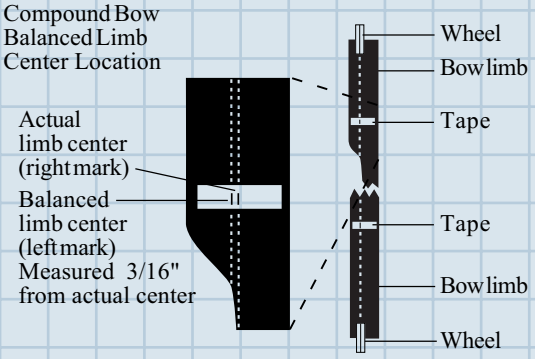
Recurve Bows

To find the limb center for recurve bows, place a piece of masking tape across the inside of each limb a few inches from the riser. With an ink pen, make a small vertical mark on the tape in the exact center of each limb.

Compound Bows

To find the balanced limb center location for the preliminary setup of your compound bow, place a piece of masking tape across the inside of each limb a few inches from the riser. Accurately measure the width of the limb (at the tape) and place a very small pen (or pencil) mark on the tape in the exact center of each limb. Next, measure $^{3}/_{16}$" (4.8 mm) to the left of the mark (for right-handed archers) and make a larger vertical mark on the tape. (Left-handed archers place a larger mark $^{3}/_{16}$" (4.8 mm) to the right of the limb center mark.) This second mark will be used for arrow centering. (See Fig. 2.) This procedure is done to compensate for the amount the eccentric wheel or cam is offset from the actual center of the limb. The $^{3}/_{16}$" (4.8 mm) measurement is an average "offset" difference for most compound bows and does not need to be a precise measurement in the preliminary setup stage, as you will locate the true balanced limb center when performing the fine tuning procedures.

Fig. 2 Compound Bow Balanced Limb Center Location



"Centering" the Arrow

The objective of arrow centering is to have the arrow leave the "theoretical" or "balanced" limb center of the bow. In actuality, it's the two nodes of the arrow shaft that should leave the center of the bow in direct alignment to the target. Releasing the string with fingers creates a horizontal bending motion within the arrow. Releasing the string with a release aid causes a slight up/down bending motion instead. Because of this, the arrows must be positioned differently for each style of release. (See Node Alignment diagram to the right). A description of these position adjustments follows.

Aligning the Nodes

Fig. 3 - Nodes

Arrow Nodes - As the arrow oscillates, the nodes remain in direct alignment to the target. This diagram clearly illustrates the front and rear node positions of the arrow. The front node is usually closer to the front end of the arrow than the rear node is to the nock end. This is due to the mass weight of the point—nodes will always be located closer to the heavier mass.

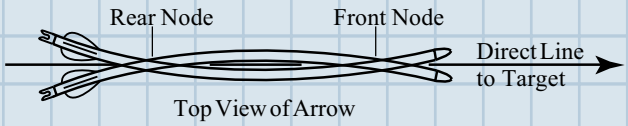


Fig. 4
Finger Release (RF, CF)

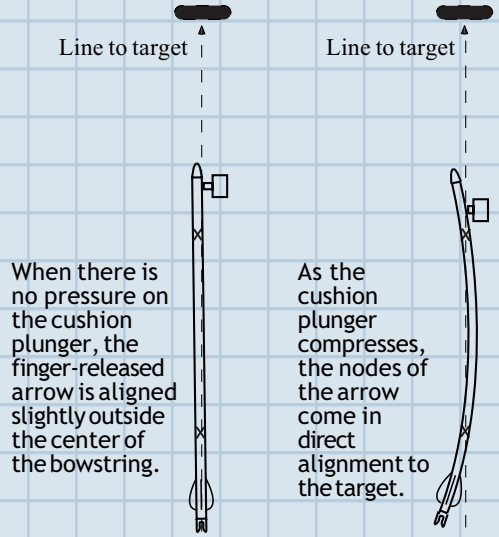


Fig. 5
Compound Mechanical Release (CR)

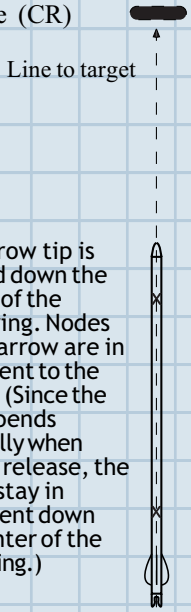
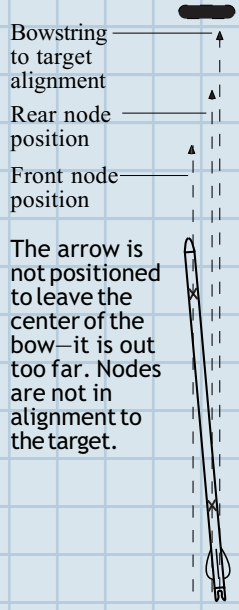


Fig. 6
Misaligned Arrow RF, CF, CR
(Incorrect Arrow Rest Position)



Adjust the Arrow's Left/Right Position

Adjust the horizontal (in/out) position of the cushion plunger or arrow rest assembly so that the tip (center) of the arrow point is correctly aligned with the type of equipment you shoot.

With Finger Release (RF, CF)

Align the "tip" of the arrow point 1/16" to 1/8" (1.6-3.2 mm) or less outside the bowstring with the bowstring properly centered according to Fig. 7. The arrow tip is placed slightly outside the string to provide compensation for the amount the cushion plunger or side loading device compresses into the bow when the arrow is released. See Fig. 4.

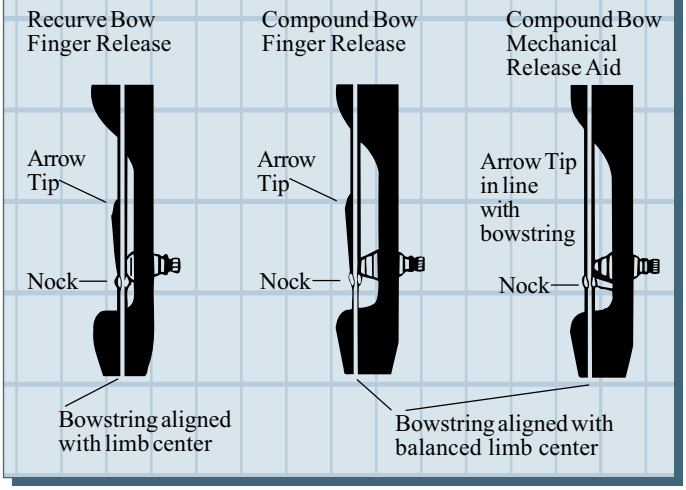
With a finger release, the arrow bends horizontally, first bending in toward the bow, then bending away from the bow, which causes the arrow shaft to leave the arrow rest. In the next bending sequence, the arrow nock disengages from the bowstring. The arrow is then on its way, freely oscillating all the way to the target. The amount of oscillation decreases as the arrow travels farther from the bow.

With Mechanical Release (CR)

Align the "tip" of the arrow point down the center of the bowstring. See Fig. 5. The center line (axis) of the arrow must start out in a direct line with the bowstring when the bowstring is aligned to the balanced limb center. See Fig. 7.

When using a release, the arrow most often bends vertically, rather than horizontally. Therefore, there is no need to compensate for any inward compression of the arrow rest or cushion plunger. Follow the bow tuning methods in the Fine Tuning and Micro Tuning sections on pages 12-14 to find the best in/out position for your arrow shaft, which allows the arrow nodes to be in direct alignment to the target.
The diagrams in Fig. 7 indicate the correct in/out arrow position for your shooting style.

Fig. 7 - Arrow Centering



Adjust the Arrow Rest

(recurve and compound)
The arrow rest support arm position is critical to achieving good arrow clearance.

With Finger Release (RF, CF)

Most Flipper/Rest setups have an adjustable arm for the arrow rest. If this adjustment is available on the rest you're using, the arrow rest support arm should be adjusted so that it is not visible past the outside of the arrow shaft when observed from an overhead view. See Fig. 8.

With Mechanical Release (CR)

On launcher type rests, commonly used on compound bows with release aids, be sure that the arrow support arm is narrow enough to allow the two lower vanes to pass over the rest without making contact. (See the Fig. 9.) This is very important for archers using release aids because the arrow is most often supported on the rest for its full length of forward travel. For the smaller diameter aluminum/carbon or carbon shafts with less space between vanes, it may be necessary to significantly reduce the width of the launcher blade.

Fig. 8
Arrow Rest - Overhead View (RF, CF)

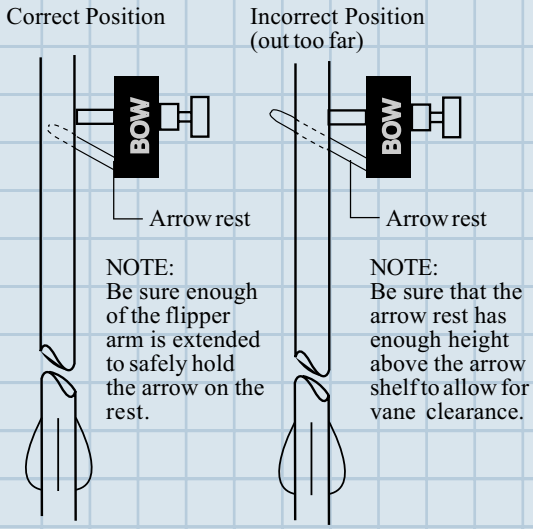
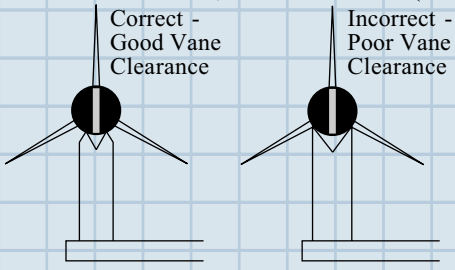


Fig. 9
Arrow Rest - Back View, Vane Clearance (CR)



Adjusting for Outsert Components (CR)

When using carbon arrow shafts which have externally fitted nocks, it may be necessary to adjust your nocking point up slightly to allow the nock to clear the arrow rest. The nock diameter is significantly larger than the shaft diameter on these arrows. A slightly higher nocking point lifts the arrow off of the arrow rest and keeps the nock from coming in contact with it, eliminating a potential clearance problem.

Riser-Mounted Clickers (rf, cf)

For clicker shooters, be sure that the arrow is well supported on the rest and not held in place by the tension of the clicker only. It is important to draw the bow a few times without the clicker to make sure the arrow can be drawn and let down without the arrow falling off the arrow rest.

Align the Bow-sight Pin

Initially, set the sight pin on your bow sight over the centerline of the arrow shaft.

Set the Cushion Plunger

Not every type of bow setup uses a cushion plunger. Some archers use rests without a cushion plunger. For example, many tournament archers use a Springy™ rest, and some traditional archers use other styles of arrow rests that do not have side pressure tension adjustments. If your setup incorporates a cushion plunger, start with the spring tension set at medium.

Set the Brace Height

(Recurve bows)

Start with the brace height at the lower end of the manufacturer's recommendation or use the following chart. To locate the optimum brace height for your particular bow, "twist up" the bowstring to make it shorter. This raises the brace height.

BOW LENGTH	BEGINNING BRACE HEIGHT
64"	8 1/4" - 8 1/2" (21.0 cm - 21.6 cm)
66"	8 3/8" - 8 5/8" (21.3 cm - 21.9 cm)
68"	8 1/2" - 8 3/4" (21.6 cm - 22.2 cm)
70"	8 5/8" - 8 7/8" (21.7 cm - 22.5 cm)

All bows are different, even ones of the same make and model. Therefore, it is important to locate a brace height that fits your particular bow and shooting style. Shoot a few arrows at the suggested beginning brace height, then unstring the bow, add 3-4 twists to the bowstring and shoot again. Continue this process until the bow feels smoothest and quietest when shooting.

If the bowstring is too short to allow a brace height at the lower setting, you may wish to use a slightly longer string. If the string is too long to allow a higher brace height (and starts to knot-up from too many twists), you may wish to try a slightly shorter bowstring. There are many custom bowstring makers who produce strings to your exact specifications including length, type of material, type and color of serving, etc.

The brace height determines the specific point at which the arrow separates from the bowstring and the amount of bend the arrow has when the separation occurs. The best brace height for your recurve or compound bow is one that allows the most compatible launch position for the arrow at the end of the bow's "power stroke." Locating the best brace height for your bow can significantly improve arrow grouping and shooting consistency.

Set the Brace Height

(Compound bows)

Brace height is set by the compound bow manufacturer. Sometimes changing the brace height to a slightly higher or lower position will improve arrow flight and grouping. This can be accomplished by changing the length of the string, as described previously for recurve bows. Remember, however, that changing the brace height of a compound bow affects the draw weight and draw length of the bow.

Nock-to-Bowstring Tension

The nock tension ("snap fit") necessary to separate the nock from the bowstring serving can be very critical, especially on light draw-weight bows (30 lbs. and under). Nock tension should be tight enough so the arrow can easily support its own weight when the arrow is hanging vertically on the bowstring (nock against the nocking point). To check this, hang your arrow vertically from the bowstring, and give the string a sharp tap with your finger on the serving about 1-2" (2.5-5 cm) from the arrow nock. The arrow should separate from the string. If it does not, the nock is probably too tight for most target archery. For hunting, a slightly tighter nock-to-bowstring fit is often preferred.

STANDARD TUNING METHODS

Now that you have completed the preliminary adjustments you can start the tuning process. Four methods of bow tuning are described (pp. 4 thru 14) —the Bare Shaft Planing Test, the Paper Tuning Arrow Test, Short Distance Tuning, and Broadhead Tuning.

Bare Shaft Planing Test

(Finger release - RF, CF)

In addition to tuning, the bare shaft test is also useful for determining if the correct shaft has been selected. If the left/right adjustments outlined under "Fishtailing" do not cause the unfletched shafts to group with or very near the fletched shafts, then a weaker or stiffer spined shaft (based on where the arrows have impacted) must be selected.

Arrows that do not fly well and do not group tightly are usually affected by one or more of the following problems:

1. They may PORPOISE in flight.
2. They may FISHTAIL in flight.
3. They may not CLEAR the bow properly as the arrow leaves the bowstring.
4. They may MINNOW in flight (a specific type of clearance problem).

Porpoising

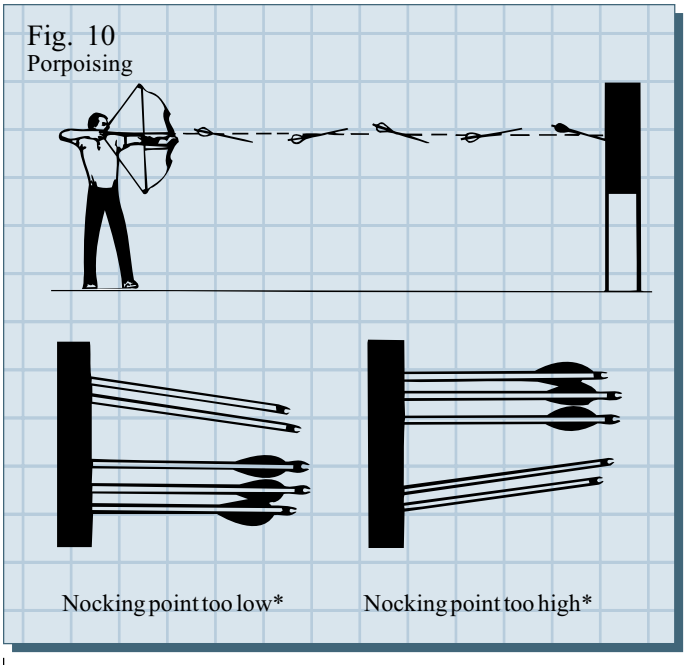
It is important to correct for Porpoising first. If the arrow leaves the bowstring with the nock too high or too low, a motion known as Porpoising occurs. Porpoising is caused by an incorrect nocking point location. Use the Bare Shaft Planing Test to find the correct nocking point location. Shoot at least three fletched shafts at a distance of 15 to 20 yards (or meters). Then shoot two identically-aimed unfletched shafts. Once you get the bare shafts to impact close to the fletched arrows at 20 yards (or meters), you may want to try shooting 25-30 yards (or meters) for a finer tuning indication.

If the unfletched shafts impact above the identically-aimed fletched shafts, move the nocking point up on the bowstring until both fletched and unfletched shafts strike at the same elevation. See Fig. 10.

If the unfletched shafts impact below the identically-aimed fletched shafts, move the nocking point down on the bowstring until the unfletched shafts hit at the same elevation or slightly lower than the fletched shafts.*

To assure you have eliminated Porpoising, repeat the test, shooting first the fletched, then the unfletched shafts, and make adjustments to the nocking point until both fletched and unfletched shafts impact at the same elevation.

Fig. 10
Porpoising



* It is sometimes desirable to have the bare shaft impact just slightly below the identically-aimed fletched shafts. Bare shafts that impact above identically-aimed fletched shafts indicate a low nocking point. If the nocking point is too low, it may force the arrow fletching down into the arrow rest, creating Clearance problems.

Fishtailing

If the arrow leaves the bow with the nock end leaning to one side or the other, Fishtailing occurs. The nock end of the arrow will appear to move from side to side as the arrow follows its flight path. See Fig. 11.

Use the Bare Shaft Planing Test to correct Fishtailing. Shoot three fletched shafts at a distance of 15 to 20 yards (meters), then shoot two identically-aimed, unfletched shafts.

If the unfletched shafts impact left (stiff) of the identically-aimed, fletched shafts, as seen in Fig. 11 (for a right-handed archer), either decrease the spring tension on the cushion plunger, increase bow weight slightly (if your bow weight is adjustable), or increase arrow point weight.

If the unfletched shafts impact right (weak) of the identically-aimed, fletched shafts, as seen in Fig. 11 (for a right-handed archer), increase the spring tension on the cushion plunger, decrease bow weight slightly (if your bow weight is adjustable), or decrease arrow point weight.

Your equipment is basically tuned when the bare shafts and fletched shafts impact at the same or very near the same location. Once you have completed the finer tuning methods listed for Fine Tuning and Micro Tuning on pages 12-14, do not be surprised if the bare shaft impact changes. It is common on a well-tuned bow to have the bare shaft impact a little low and slightly stiff (to the left of the fletched shafts for a right-handed archer). Occasionally, a good tune may be achieved with the bare shaft impacting slightly weak (to the right of the fletched shafts for right-handed archers), but this is less common.

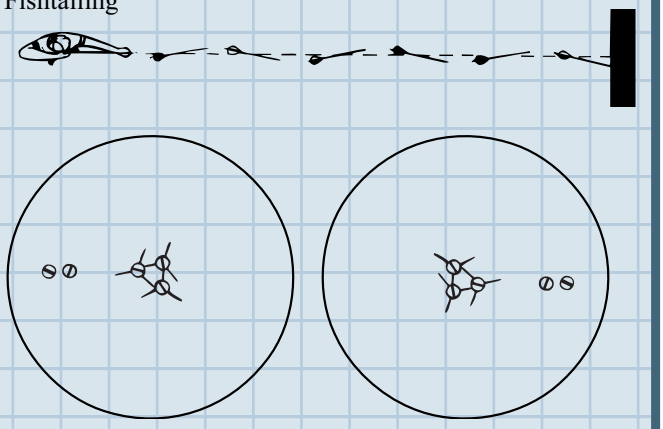
When correcting Fishtailing using the Bare Shaft Planing Test, you may have a problem adjusting the unfletched shaft's impact to that of the fletched shaft. Your arrows might be too weak (the unfletched shaft impacts to the right of the fletched shaft for right-handed archers) or too stiff (the unfletched shaft impacts to the left of the fletched shaft for right-handed archers). If, after completing this test, the bare shaft impact is more than 6 inches (15 cm) to the right (weak) or left (stiff) of the fletched shafts at 20 yards (18 m), you will need to make some modifications to the equipment to achieve a better tune. Follow the suggestions on how to better match the arrow to your bow in the “Adjustments Within the Bow and Arrow System” section on page 10.

Clearance

Proper clearance is absolutely essential for optimum grouping, consistency and accuracy. This is especially true with ultra-light weight arrows like the UltraLite aluminum, the A/C/E and A/C/C HyperSpeed shafts.

After you have performed the Bare Shaft Planing or Paper Tuning Arrow Test, it is a good idea to check for adequate clearance. To check for clearance, use dry powder foot spray, dry deodorant spray or similar product, applied to the last quarter of the arrow shaft, fletching, arrow rest assembly and sight window near the arrow rest. Do not disturb the powder sprayed on the arrow and

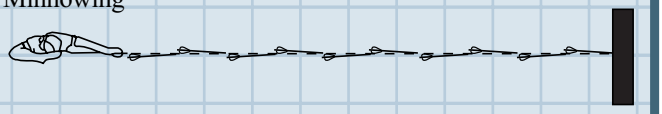
Fig. 11
Fishtailing



Stiff Arrow
Unfletched shafts impact left
(RH archer, opposite for LH)

Weak Arrow
Unfletched shafts impact right
(RH archer, opposite for LH)

Fig. 12
Minnowing



bow while preparing to shoot. The arrow should be shot into a firm target so that it will not penetrate to the fletching.

If you are not achieving good arrow clearance, and the arrow fletching and bow make contact, optimum grouping cannot be achieved. By examining the areas where the dry powder spray is scraped off, the nature of any interference can be determined, and the position of the fletching as the arrow leaves the bow can be identified.

Easton has introduced a new term indicating clearance problems called Minnowing. Like Fishtailing or Porpoising, Minnowing indicates a specific arrow flight disturbance. Minnowing will appear to look much like Fishtailing except that the tail of the arrow appears to move from side to side more quickly, and the amount of side swing is usually much less than in Fishtailing. (See Fig. 12.) Minnowing indicates inadequate clearance and is caused by the rear portion of the arrow (usually fletching) contacting the arrow rest assembly.

Correcting Clearance Problems

The following procedures can help you correct clearance problems that cause Minnowing:

1. If the arrow fletching is hitting the arrow rest, try rotating your arrow nock 1/32 of a turn. Continue rotating the nock in 1/32-turn increments until clearance is achieved.
2. Make sure your arrow rest support arm does not protrude past the outside of the arrow shaft when the arrow is resting on the support arm and is lying against the cushion plunger or side loading device. See Fig. 8.
3. Choose a lower profile fletching.
4. Follow the procedures for Tuning Adjustments within the Bow and Arrow System on page 10 for equipment modifications to achieve a better tune.
5. Move the cushion plunger or side loading device slightly out from the bow to help increase clearance if the other tuning modifications have no effect.

Paper Tuning Arrow Test

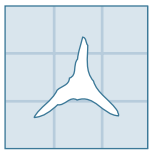
(Recurve or compound - RF, CF, CR)

Archers using mechanical release aids (CR) should review the following reminder notes before starting the Paper Tuning Test.

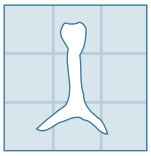
1. Align the arrow down the center of the bowstring with the tip of the arrow point correctly positioned as indicated in Fig. 7, page 3.
2. Initially position the sight pin over the centerline of the arrow.
3. When using a release aid the arrow normally bends more vertically than horizontally, so good clearance is essential. Usually, the entire arrow contacts the rest when it is shot and the fletching must be positioned to clear the rest.
   "Shoot-Through" Rests - It may be necessary to adjust the width of the arrow rest support arm(s) so the fletching will pass cleanly over or through.
   "Shoot-Around" Rests - Vane-to-nock indexing is very important and should be adjusted to achieve maximum clearance.

The Paper Tuning Arrow Test is the most commonly used bow tuning test for archers using compound bows with release aids. This test also works well for finger release:

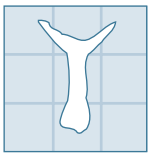
1. Firmly attach a sheet of paper to a picture frame type rack approximately 24" X 24" (60 x 60 cm).
2. Position the center of the paper about shoulder height with a target mat about six feet behind the paper to stop the arrows.
3. Stand approximately 4 to 6 feet (7.8-1.5 m) from the paper.
4. Shoot a fletched arrow through the center of the paper with the arrow at shoulder height (parallel to the floor).
5. Observe how the paper is torn.



This tear indicates good arrow flight. The point and fletching enter the same hole.



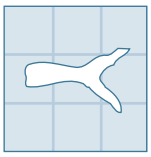
This tear indicates a low nocking point. To correct, raise the nocking point 1/16" (1.6 mm) at a time and repeat the procedure until the low vertical tear is eliminated.



This tear indicates a high nocking point, clearance problem, or a very weak arrow if you are using a release aid. To correct, lower the nocking point 1/16" (1.6 mm) at a time until the high tear is eliminated. If, after moving the nocking point a few times, the problem is unchanged, the disturbance is most likely caused by a lack of clearance or by an arrow which is too weak (if using a release aid). To identify a clearance problem, check to see if the arrow fletching is hitting the arrow rest. (See "Clearance" on page 5.)

CR - If no clearance problem exists and you are using a mechanical release, try:

1. A more flexible arrow rest blade if using a launcher type rest or reduce downward spring tension on adjustable tension launcher rests.
2. Decreasing peak bow weight if there is an indication the arrow spine is too weak.
3. Reducing the amount the shaft overhangs the contact point on the arrow rest.
4. Choosing a stiffer arrow shaft.



This tear indicates a stiff arrow reaction for right-handed archers using finger release (RF, CF). Left-handed finger release archers will have an opposite pattern. This is an uncommon tear for right-handed compound archers using a mechanical release (CR). However, it can occur and generally indicates that the arrow rest position is too far to the right or that there is possible vane contact on the inside of the launcher rest.

Finger Release (RF, CF) To correct:

1. Increase bow weight/peak bow weight.
2. Use a heavier arrow point and/or insert combination.
3. Use a lighter bowstring (less strands or lighter material, like Fast Flight®).
4. Use a weaker spine arrow.
5. Decrease cushion plunger tension or use a weaker spring on "shoot around" rests.
6. CF only - Move the arrow rest slightly in toward the bow.

Mechanical Release Aid (CR) To correct:

1. Move the arrow rest to the left. Continue moving the rest to the left in small increments until the right tear is eliminated.
2. Make sure the arrow has adequate clearance past the cable guard and cables.
3. Make sure the bow hand is well relaxed to eliminate excessive bow hand torque.

This tear indicates a weak arrow reaction or clearance problem for right-handed finger release (RF, CF) archers. Left-handed finger release archers will have the opposite pattern. For right-handed compound archers using mechanical releases (CR), the left tear is common and usually indicates a weak arrow reaction and/or clearance problem. If a high-left tear exists, (see next tear illustration) make sure you correct the nocking point first before proceeding further.

Finger Release (RF, CF) To correct:

1. Check for Clearance (See page 5).
2. Decrease bow weight/peak bow weight.
3. Use a lighter arrow point and/or insert combination.
4. Use a heavier bowstring (more strands or heavier material).
5. Use a stiffer spine arrow.
6. Increase cushion plunger tension or use a stiffer spring on "shoot around" rests.
7. CF only - Move the arrow rest slightly out, away from the bow.

Mechanical Release Aid (CR) To correct:

1. Move the arrow rest to the right. Continue to move the rest to the right in small increments until the left tear is eliminated.
2. Make sure the bow hand is well relaxed to eliminate excessive bow hand torque.
3. Decrease peak bow weight.
4. Choose a stiffer spine arrow.

This tear shows a combination of more than one flight disturbance. Use the procedures that apply to the tear pattern for your style of shooting, and combine the recommendations, correcting the vertical pattern (nocking point) first, then the horizontal. If you experience a tuning problem (especially with the nocking point location) and are unable to correct a high/low tear in the paper, have your local pro shop check the "timing" (roll-over) of your eccentric wheels or cams.

For archers using release aids, it may, in some cases, be necessary to apply adjustments opposite from those described. The type of arrow rest and release aid combination used can alter the dynamic flex of the arrow to produce tear patterns contrary to those indicated (although it is uncommon).

Once you have achieved a good tune at 4 to 6 feet (1.2-1.8 m), move back 6 feet (1.8 m) more and continue to shoot through the paper. This ensures that the tune is correct and that the arrow was not just in a recovery position when it passed through the paper at the first distance.

SHORT DISTANCE TUNING

(Recurve and compound - RF, CF, CR)

Many times it is not possible to shoot long distances when your equipment needs to be tuned. The following method results in a very good equipment tune at short distances. Use this tuning method after you have completed one of the basic bow-tuning methods—either the Bare Shaft Planing or Paper Tuning Arrow Test.

Start at approximately 12 to 15 yards (meters) from the target. Use a 40 cm or 60 cm target face and place it with the face side in so you are shooting at a plain white target.

Up-Down Impact

Using fletched arrows only, shoot approximately 6 to 8 arrows along the top edge of the target face. This step determines if your nocking point is correct. See Fig. 13.

Normally, small tuning problems show up at close range, because the arrow has its maximum vibration at short distance. This test assists you in identifying these arrow flight problems and makes it possible to make finer adjustments than with the previous tuning procedures.

If you are unable to consistently hit the top edge of the target face, there is probably a small tuning disturbance in the equipment. To correct, make a 1/32" (.8 mm) nocking point adjustment either up or down and shoot again. Continue making nocking point adjustments in 1/32" (.8 mm) increments (no more than 1/32" (.8 mm) at a time).

If your arrows are hitting the top edge of the paper more consistently and you are achieving a straight, horizontal line of arrows across the top of the paper, you are correcting the disturbance. If the horizontal line of arrow impact is widening, go back to your original nocking point position and start making 1/32" (.8 mm) nocking point adjustments in the opposite direction. This will provide you with the correct nocking point position.

Left-Right Impact

Once you have achieved the straightest horizontal line of arrows that your ability will allow, you are ready to tune for left/right arrow impact. Shoot 6 to 8 arrows at the left edge of the paper in a vertical line. See Fig. 14.

To improve the left/right impact for CR and CF archers, move the in/out position of your arrow rest. This is done to compensate for the effect of the eccentric wheel. The offset of the eccentric wheel on compound bows does not always compensate for the degree of natural torque generated in the bow. The wheel often torques or leans over slightly as it reaches the full draw position. This is common and is nothing to be concerned about. At full draw, the "limb center" you started with in the preliminary setup may not really be the true balanced center. Therefore, through some trial and error, you must locate the best in/out position for the arrow to obtain maximum accuracy.

Make a 1/32" (.8 mm) adjustment either in or out and shoot again. Continue making 1/32" (.8 mm) adjustments

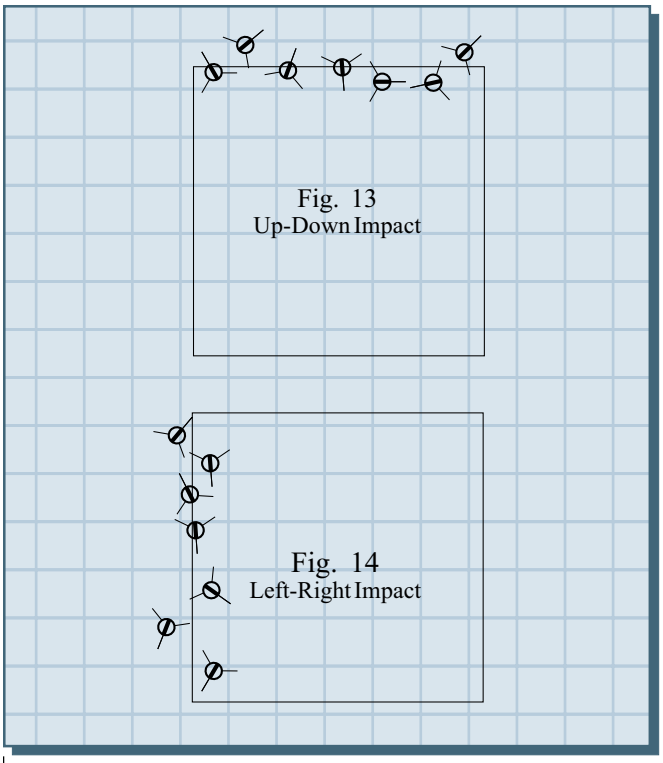
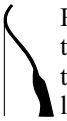


Fig. 13
Up-Down Impact

Fig. 14
Left-Right Impact

until you achieve the best possible vertical impact line of arrows. If the vertical line widens, go back to your original arrow rest position and move it 1/32" (.8 mm) in the opposite direction. If the vertical line narrows, continue 1/32" (.8 mm) adjustments in that direction until you achieve the straightest line possible.

CF archers using cushion plungers should make the necessary arrow rest adjustments and then try a second tuning adjustment, the cushion plunger spring tension. Increase or decrease spring tension 1/8 of a turn at a time. Again, if the vertical line becomes wider, return to the original spring tension setting and make 1/8 turn adjustments in the opposite direction until you achieve a narrow vertical impact line.



RF archers should make cushion plunger spring tension adjustments only, increasing or decreasing the spring tension 1/8-turn at a time. If the vertical line becomes wider, return to the original spring tension setting and make 1/8-turn adjustments in the opposite direction until you achieve a narrow vertical impact line. Do not move the in/out position of your arrow! The in/out position of your arrow to the centerline of the bow has already been established in the preliminary equipment setup.

TROUBLE-SHOOTING ARROW GROUPS

You may have heard people say, "If your arrows group well at 20 yards, they will group at any distance," or, "If your arrows group at long distances, they will group at short distances." In some cases, neither statement is true. There may be a minute disturbance in the equipment

Fig. 15
Good grouping patterns show progressively increasing grouping sizes as shooting distances increase.

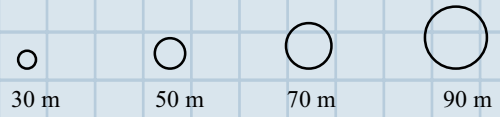


Fig. 16
Excessive Drag

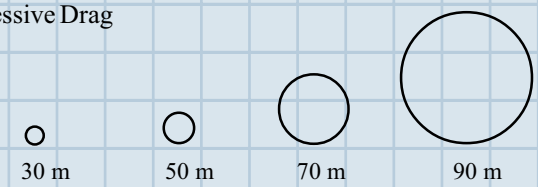


Fig. 17
Insufficient Clearance

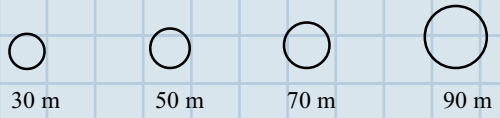
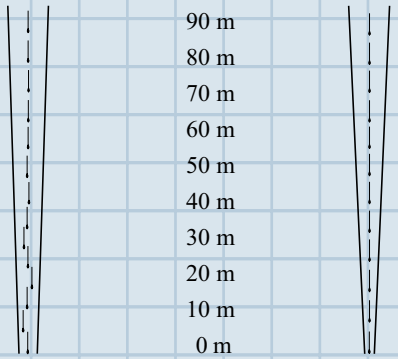


Fig. 18
Poor close range grouping
Acceptable long range grouping

Fig. 19
Path without disturbance



that affects the equipment's potential for superior accuracy and causes poor arrow grouping. What follows here is information that will help you perform the fine tuning adjustments necessary to eliminate most or all of the minute tuning problems.

Many archers have experienced one or all of the following arrow grouping/arrow flight combinations:

Poor arrow flight and good grouping - This is commonly the result of a stiff arrow. The arrow yaws slightly as it leaves the bow, but usually recovers quickly and often produces very acceptable grouping.

Good arrow flight and poor grouping - Although this seems contradictory, the phenomenon is somewhat common and relates to the tuning method you use. Having a perfect bullet hole through paper using the Paper Tuning Arrow Test, or having the bare shafts impact exactly with the fletched shafts using the Bare Shaft Planing Test, does not always mean your arrows will group well; it only indicates you have good arrow flight. For this reason, Easton has developed the Fine Tuning and Micro Tuning methods, to assist you in obtaining optimal grouping from your equipment.

Poor arrow flight and poor grouping - This is most often a problem of mismatched arrow spine or untuned equipment. The information and tuning procedures in this bulletin should help you correct this problem.

Good arrow flight and good grouping - This should be the end result of your efforts!

Arrow grouping patterns often reveal probable arrow flight problems. Two of the most common grouping indicators for determining arrow flight problems are described below. The examples provided are shown in FITA distances, although they easily correlate to any long- and short-distance shooting. Fig. 15 illustrates good grouping patterns at the distances indicated.

Excessive Drag

The grouping examples in Fig. 16 show a large pattern at long distances (90 m) but the grouping is within acceptable limits at closer distances. This pattern implies the arrow has too much drag. Excessive drag will cause the arrow to become unstable due to the rapid decay of its forward velocity. When forward velocity drops too quickly, instability occurs. This unstable flight causes poor grouping at long distances and extreme vulnerability to wind drift. On light weight arrows, it is very important to reduce drag to a minimum to maintain maximum downrange velocity. This can be done by reducing the size (height and/or length) of the fletching or by reducing the angle of the fletching, or both.

Insufficient Clearance

The grouping patterns in Fig. 17 show acceptable grouping at the two long distances. However, the shorter distance groups are not reduced in size proportionately to the longer distance groups. (Compare to Fig. 15). This usually indicates a clearance problem or micro distur-

bance within the bow and arrow system. To correct, see the section on Clearance on page 5 or the Fine Tuning and Micro Tuning sections on pages 12-14.

Fig. 18 illustrates why you may have problems with close distance grouping while long-distance groups are good. When an arrow is shot, it is at its maximum bending as it leaves the bow. As the arrow travels further, the amount of flexing reduces (dampens). If the flexing reduces, then so does the magnitude of any original disturbance. The example shows that the arrow has some disturbance and close range grouping is poor, although the arrow stabilizes at longer range and provides acceptable groups. Micro disturbances and clearance problems usually cause these disturbances.

Fig. 19 shows the path of the arrow when it leaves the bow without any disturbance. This is the path you are trying to achieve in the Fine Tuning and Micro Tuning processes.

ADJUSTMENTS WITHIN THE BOW AND ARROW SYSTEM

If you are having problems tuning your bow, you will need to make some modifications to your equipment to achieve a better tune. Here are some suggestions:

Bow Weight Adjustment

Virtually all compound bows, as well as some recurve bows, have an adjustable draw weight. If your arrow reaction is too stiff, increase the draw weight. If your arrow reaction is too weak, decrease the draw weight.

Bowstring

Bowstring “weight” can have a significant effect on arrow spine. Increasing or decreasing the number of strands in the bowstring can influence the arrow's dynamic spine enough to require a shaft size change of one full size weaker or stiffer. If your arrow reaction is too stiff, decrease the number of strands in your bowstring. If your arrow reaction is too weak, increase the number of strands. Serving weight (center serving) can also produce the same effect. For example, monofilament center serving will cause the arrow to react stiffer than lighter weight nylon center serving. Simply changing from a metal nocking point to a “tie-on” nocking point can have a noticeable effect on arrow spine, due to the weight difference between the two styles of nocking points.

The bowstring is a critical part of your technical equipment. If you have a very difficult time tuning your bow, the problem could be the bowstring. An incorrectly made bowstring can produce a tension imbalance in the strands of the string causing some strands to be looser than others. This imbalance forces the string to load and stretch at different rates, creating an inconsistent arrow launch which greatly decreases accuracy. If a problem exists, and tuning procedures don't seem to be working, try changing the string and retuning.

Point and Insert Weight

X10, A/C/E and A/C/C, & Beman ICS arrows can be tuned by using various point and/or insert weight combinations. External component systems use weight combinations of point plus outsert. Aluminum arrows can be point-weight-tuned by using 7%, 8% or 9% F.O.C. NIBB points. If your arrow is too weak, go to a lighter insert/point. If your arrow is too stiff, try a heavier insert/point. Continue to change insert and/or point weight within the acceptable balance point range (7-16% F.O.C.).

Brace Height

For recurve bows, another way of altering arrow spine is with the brace height. By increasing or decreasing the distance from the bowstring to the pivot point of the grip, the dynamic spine of the arrow can be made slightly weaker or stiffer. Increasing brace height will make the arrow shoot weaker, and decreasing brace height will make the arrow shoot stiffer.

Brace height affects arrow spine by increasing or decreasing the amount of energy delivered to the arrow at the moment of release. Raising the brace height (shortening the bowstring) compresses the limbs, increasing stress (prestress or preload) in the limb material. The more preloading of the limbs, the greater the actual bow poundage at full draw. The reverse is true when lowering brace height. A lower brace height (lengthening the bowstring) reduces the prestress in the limbs and reduces bow weight at full draw.

RECURVE BOW LENGTH	MAXIMUM BRACE HEIGHT RANGE
64"	7 3/4" - 9" (19.7 cm to 22.9 cm)
66"	8" - 9 1/4" (20.3 cm to 23.5 cm)
68"	8 1/4" - 9 1/2" (21.0 cm to 24.1 cm)
70"	8 1/2" - 9 3/4" (21.6 cm to 24.8 cm)

However, raising brace height produces some small loss in arrow velocity as the slight increase in draw weight does not equally compensate for the reduction in the bow's “power stroke.” When the power stroke is reduced, the amount of time the arrow stays on the bowstring is also reduced, in turn, decreasing the length of time the arrow has to absorb the bow's energy.

Although you may note a small loss in velocity when increasing brace height, do not let speed be the deciding factor when selecting the best brace height for your bow. As is often said, “Better to have a slow bull's eye than a fast miss.”

Adjusting the brace height on a compound bow is often overlooked as a tuning adjustment. This is because the changes in brace height will change the draw length and draw weight possibly requiring additional adjustments. Nevertheless, finding the correct brace height for your compound (usually higher than the manufacturer’s setting)

can, in many cases, greatly improve consistency and grouping and should be considered as a fine tuning adjustment.

The chart on the previous page shows the full range of brace height adjustments for most modern recurve bows. Changes within the brace height ranges shown can affect arrow spine as much as changing the arrow point and/or insert weight approximately 20 grains (1.3 grams). Remember, it is best to shoot your bow at its smoothest and quietest setting, (although most recurve bows perform well at two brace height settings). Easton does not suggest an extreme range of brace height. The chart offers a range wide enough to create a "between" size arrow spine.

If, after trying all of the tuning procedures listed, you find your arrows are still too weak or too stiff to fly properly, choose a different arrow size and retune.

BROADHEAD TUNING

In general terms, broadhead tuning is done by first shooting a group of arrows with field points into the target, and then by shooting a group of arrows with broadheads. The two groups are compared and the appropriate adjustments are made.

CAUTION: Never shoot unfletched shafts with broadheads—flight is extremely erratic and dangerous!

The field points should be as close in weight as possible to the weight of the broadheads. Because it is necessary to first establish a good group with field points, broadhead tuning can be done only after acceptable tuning has been established with field points.

Shoot a Group with Field Points

Set up a suitable broadhead target at a distance of 20 to 30 yards. Using a set of field-tipped arrows that have been tuned with your bow, shoot a group of 3 or 4 arrows into the target. Take care to shoot as good a group as you are capable.

Shoot a group with Broadheads

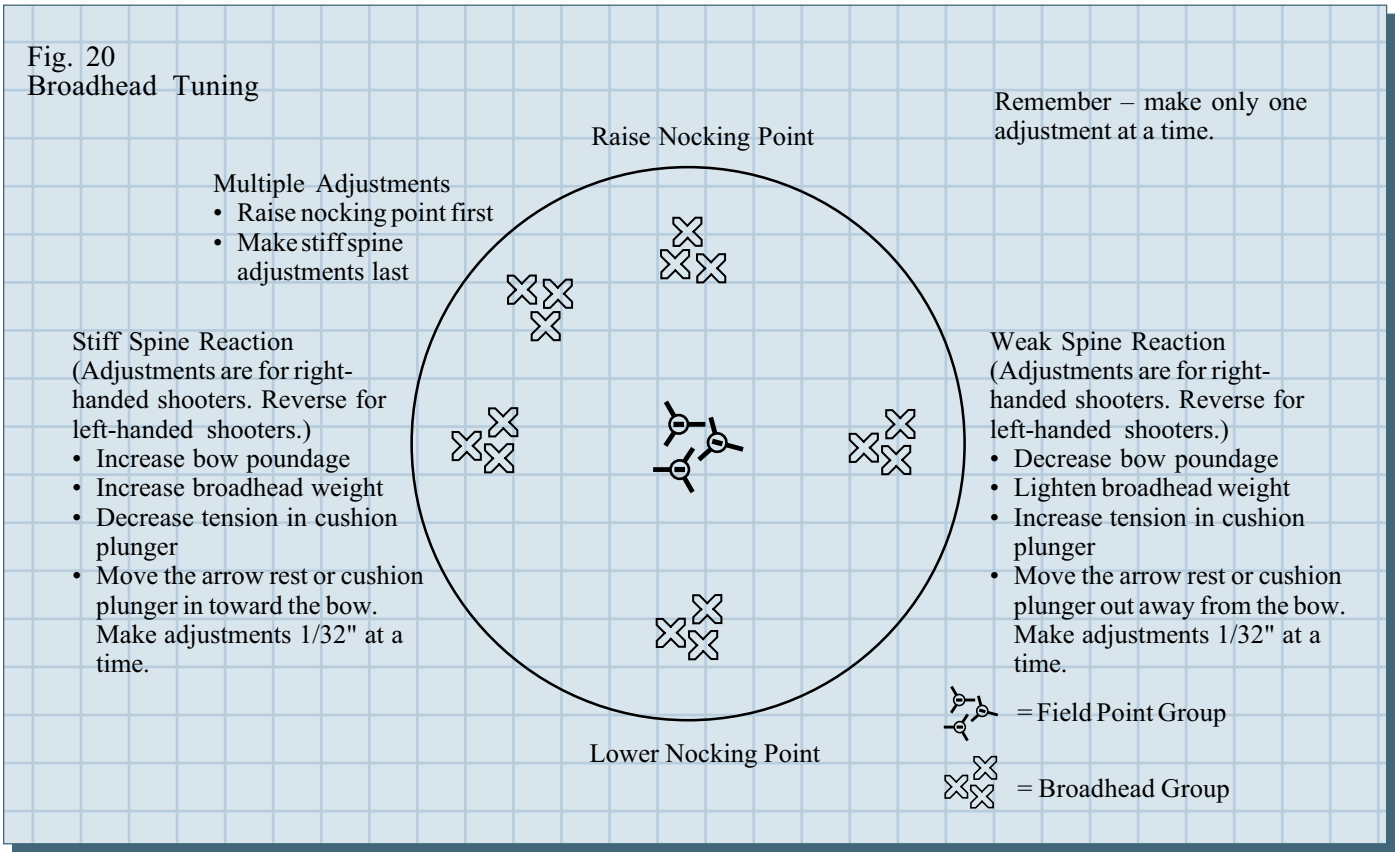
Using identical arrows tipped with broadheads, shoot a group of 3 or 4 arrows into the target. Use the same aiming spot that was used for the field points.

The shot group is the key. If you are content you have shot a respectable group based on your ability, then compare the position of the two groups. Make the adjustments listed below to your setup and shoot both groups again. Keep adjusting and shooting until both groups (field points and broadheads) group in the same area.

Make Adjustments

See Fig. 20 below and adjustments on next page.

Fig. 20
Broadhead Tuning



Adjustments

Adjustments sometimes effect more than is expected. It is best to always make the up/down adjustments first. Once the two groups are on the same horizontal plane, then make the left/right adjustments.

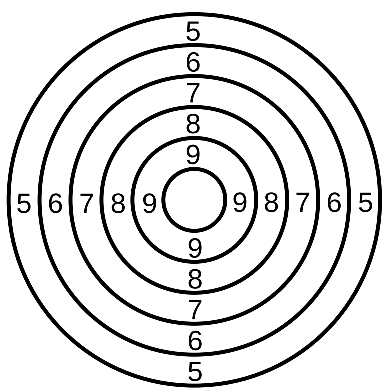
1. If the broadheads group above the field points, move the nocking point up.
2. If the broadheads group below the field points, move the nocking point down.
3. If the broadheads group to the left, they are behaving as if the shaft is too stiff (for a right handed archer). Any, or several, of the following can be done to correct the point of impact.
   - Increase the poundage on the bow.
   - Change to heavier broadheads.
   - If you are using a cushion plunger, decrease the spring tension.
   - Move the arrow rest or cushion plunger in toward the bow. Make adjustments $^1/_{32}$" at a time
4. If the broadheads group to the right, they are behaving as if the shaft is too weak. Any or several of the following can be done to correct the point of impact.
   - Decrease the poundage on the bow.
   - Change to lighter broadheads.
   - If you are using a cushion plunger, increase the spring tension.
   - Move the arrow rest or cushion plunger out away from the bow. Make adjustments $^1/_{32}$" at a time.

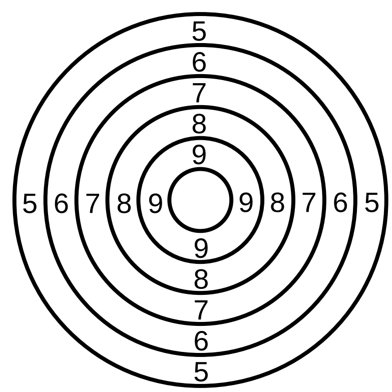
Remember, broadhead tuning can only be accomplished after the bow has been properly setup and tuned with field or target points.

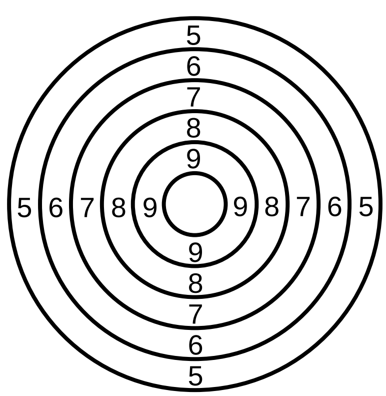
FINE TUNING

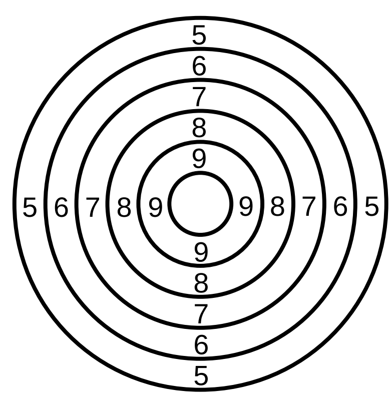
The Fine Tuning process is similar to Micro Tuning but slightly less refined. You will need a pencil and paper and several copies of the sample targets provided below.

1. Write down the exact measurements of your bow. For example:
   a. Nocking point height
   b. Brace height
   c. Tiller
   d. Number of strands in the bowstring
   e. Bow draw weight
   f. Type of stabilizers used, etc.
   In other words, everything you can think of to document your equipment.
2. Number your arrows. This enables you to plot groups and to plot each individual arrow impact.
3. Prepare to shoot from a comfortable distance, somewhere between 40 to 60 yards (meters).
4. Shoot an end or two to warm up before starting.
5. After warming-up, shoot a group of 6 to 10 fletched arrows.
6. Write down the number of each arrow and the impact point on the sample target.
7. Repeat steps 5 and 6 and compare. You want to achieve similar results initially.
8. Make adjustments as described on the following page.









Up-Down Impact

Adjust the nocking point 1/32" (.8 mm) either up or down. Shoot another two groups and plot the arrows in the same manner as described on page 12. For future reference, be sure to write down your bow adjustment on each arrow group you plot. Compare the groups to determine if the high and low arrow impact has improved or is worse. If it has improved, make another adjustment of 1/32" (.8 mm) in the same direction and shoot another two ends. If the high and low arrow impact is worse, go back to the original setting and make the same adjustment in the opposite direction. Continue this process until you achieve the most consistent group elevation.

Left-Right Impact

CF and CR shooters can adjust the left/right position of your arrow rest approximately 1/32" (.8 mm) either in or out. Shoot two groups and plot the arrows. Be sure to indicate your bow adjustment on each plotted arrow group. Compare the groups you just shot and determine if they are getting better or worse. If the groups improved, make another adjustment of 1/32" (.8 mm) in the same direction and shoot another two ends. If the groups are worse, go back to the original setting and make the same adjustment in the opposite direction. Continue this process until the best possible groups have been achieved with this single adjustment.

After left/right adjustment of the arrow rest or cushion plunger, CF shooters can adjust the spring tension of the cushion plunger 1/8- to 1/4-turn weaker or stiffer and continue the procedure, making 1/8-turn adjustments at a time to achieve a finer tune.

Remember, RF archers should adjust the cushion plunger pressure only, increasing or decreasing the spring tension 1/8-turn at a time. Do not move the in/out position of your arrow!

Reading the Plotted Arrow Groups

Carefully examine the arrow grouping patterns you plotted. Note the different shapes of the groups and how the adjustments altered the arrow impact and size of the groups. Examine each arrow by its number. Take careful note of any arrows that did not group consistently with the other shafts. You will probably want to mark these shafts so you will know not to use them in competition.

Identifying Arrow Problems

You may find an arrow that does not group well with the other arrows in the set. Examine it before you discard that arrow or retire it from competition. Sometimes a problem is easily identified. If a shaft is cracked or dented it should be discarded.

Some arrows may seem fine, but they may have problems which are not obvious and can cause the arrows not to group well. The following list includes the common arrow problems, many of which can cause tremendous impact variations.

Arrow Straightness

Arrows must be straight for tight grouping. Easton recommends straightness within 0.004" for best grouping.

Crooked Nocks

There are several ways to check nock straightness, including commercially available nock gauges and broadhead spinning wheels.

Nock Indexing

It is possible that one nock in the set may be turned more than the others. A clearance problem results if the nock is rotated too far, forcing the fletching into the arrow rest when shot.

Loose or Damaged Fletching

If the fletching becomes even slightly detached from the shaft, the arrow will not group with the others. In fact, the arrow may not even hit the target past 30 yards (meters) if the back of any fletch is slightly loose! Fletching that is slightly damaged will not usually affect arrow grouping unless you shoot a hard or rigid vane. Care should be taken to examine hard vanes each time you shoot to ensure that no vanes are damaged. If the rear of any hard vane is bent, it will produce a rudder effect, causing large deviation in impact.

Loose Points/Inserts

Many archers are not aware of this potential problem. Points must be properly installed with Easton's hot melt adhesive fully coating the entire length of the shank of the point or insert. Carefully follow the instructions on point/insert installation which follow later in this Guide. Easton recommends only Easton's hot melt adhesive. If you are using another hot melt ferrule cement, it may be too brittle and may fracture when the arrow impacts hard target butt materials. If the cement fractures or is improperly applied, it can result in a separation between the point/insert and the shaft. When the arrow is shot, the separation of the bond between the shaft and point can produce a secondary vibration which in turn affects the arrow's natural vibration and accuracy. To test for point vibration, simply hold the arrow near the fletching and lightly tap the point on a table, or drop the arrow on a hard floor from a height of one foot. If you hear a buzzing sound, the point/insert is probably loose. Heat and pull out the point/insert and properly reinstall per Easton's instructions on page 19.

Arrow Weight

Arrow weight is an important consideration for the serious tournament archer and should be checked if you have arrows which consistently impact a little high or low of your group.

A matched set of arrows should have no more than a three grain spread between the heaviest and lightest arrows in the set. Top tournament archers frequently match their arrows to one grain or less.

MICRO TUNING

Micro Tuning adjustments are similar to Fine Tuning and are designed to produce optimum grouping at all distances.

1. Prepare to shoot from the longest distance you would normally shoot in competition.
2. Shoot at least 8 to 10 arrows.
3. Measure and record the distance between your highest and lowest arrow.
4. Shoot a second group of arrows before making any adjustments.
5. Again, measure and record the distance between your highest and lowest arrow.
6. Repeat steps 2-5 with each of the following adjustments:

Up-Down Impact

Make no more than a 1/32" (.8 mm) change in nocking point height either up or down. Shoot two more ends and record the distance between the highest and lowest arrow. If the combined distance between the last two groups is less than the combined total of the first two groups, you are making the correct adjustment. Continue to make 1/32" (.8 mm) nocking point adjustments until you achieve the shortest possible distance between your high and low arrows.

If after several nocking point adjustments, you notice the group height starting to open back up, you have probably gone too far in the adjustment and need to go back to where you had the best setting.

Left-Right Impact

Once you are satisfied with the impact height of your arrows, you will need to correct the left/right impact. Continue shooting groups of 8 to 10 arrows. Shoot two ends and measure the distance between the furthest left and furthest right arrows for both ends.

For compound archers (CF and CR), move the in/out position of your arrow rest 1/32" (.8 mm) in either direction. Shoot two more groups and again measure the distance between the furthest left and right arrows. Compare these two ends against the previous two ends. If the total width of the grouping pattern has reduced, you are making the correct adjustment. If the group becomes wider, go back to your original setting and move the rest 1/32" (.8 mm) in the opposite direction and resume the test. Continue these adjustments until you have achieved the tightest possible grouping at that distance.

CF archers using cushion plungers should make the in/out adjustments first until you have achieved the tightest left/right impact possible. Then, you can use the cushion plunger spring tension the same as described for recurves to fine tune your arrow impact.

Recurve archers (RF) should adjust only the cushion plunger spring tension, not the in/out adjustment. Make adjustments to the cushion plunger spring tension in 1/8 turn increments only. Follow the same instructions as for compound bows by first shooting two groups and measuring the furthest left and right arrows. Make the first spring tension adjustment either stiffer or weaker and shoot two more ends. Again, if the group becomes wider, go back to the original setting and make an adjustment 1/8 of a turn in the opposite direction.

Once you have completed the long distance tuning, move up 20 yards (18 m) and work on the left/right impact again, making the same adjustments as at the previous distance. It should not be necessary to adjust the nocking point, only the adjustments for left/right grouping. After you have completed this distance, move 20 yards (18 m) closer and repeat this test again for left/right impact only.

Continue this process until your last distance is approximately 20 yards (18 m) from the target. You may find that as little as 1/8 of a turn on the cushion plunger or a 1/32" (.8 mm) in/out adjustment (for compound bows) can have a noticeable effect on short distance grouping. It is essential to continue testing and tuning in 20 yard (18 m) increments. This way, you will know that your equipment can perform well at any distance when shooting competition.

This same fine tuning procedure can be done with brace height for both compound bows and recurves. Make brace height adjustments in approximately 1/32" (.8 mm) increments and plot the arrow groups. After completing this procedure, you should find a combination of adjustments that will either slightly or significantly improve arrow grouping.

Points to Remember:

Install all accessories on your bow before you start any bow tuning procedures.

An essential part of your equipment is a good quality set of arrows.

Adjustments made to the bow, changes in bow components, or alterations in shooting form can affect the tune or your equipment. Remember, you and your equipment share a unique relationship and are totally integrated. Any change to either will produce varying effects.

Change only one variable at a time when tuning.

If, after trying all of the tuning adjustments outlined in this Tuning Guide, your arrows still do not fly true, it may be necessary to change your arrow size to a stiffer or weaker shaft and retune.

**The tuning methods were compiled and edited by Don Rabska with contributions from Terry Ragsdale, Fred Troncoso, and others.

ARROW ASSEMBLY

Cutting Shafts, Installing Components, and Arrow Maintenance

Contents

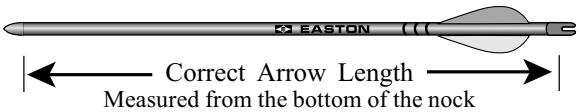
This section of the *Arrow Tuning and Maintenance Guide* contains instructions for the assembly of shafts and components. It starts with functions that apply to all types of shafts (with noted exceptions)—determining correct length, measuring shafts, and cutting shafts.

Methods for installing points and fletching vary based on the type of shaft being used, so these instructions are grouped based on their generic shaft type—Aluminum, Aluminum/Carbon, Carbon with internal components (ICS), and Carbon with external components.

Most shafts can be used with at least two types of nock systems, so the nock systems are all grouped together in one section following the point and fletching sections for the various shafts.

The last part of the Guide contains additional information of a more general nature, including F.O.C. calculations, AMO's minimum recommended arrow weights, and safety tips.

MEASURING AND CUTTING SHAFTS



Correct Arrow Length

Correct Arrow Length is measured from the bottom of the nock groove to the end of the shaft (see diagram). This distance includes a portion of the nock, the nock insert or outsert if any, and the shaft length. The point is not included. This is the length used for shaft selection.
The optimum length of a finished arrow for a specific archer is determined by several factors including the draw length of the archer, the style of point, the configuration of the bow, and the archer's shooting style. To determine your correct arrow length, use the procedures that follow.

Measuring Correct Arrow Length

Your Recommended Correct Arrow Length can be determined by drawing back an extra-long arrow and having someone mark the arrow. This distance is measured from the front of the bow or from the front of the place where the arrow contacts the most forward position of the arrow rest. Which method to use depends on the type of bow and arrow being set up.

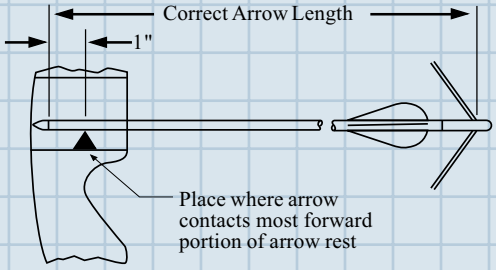
To determine the proper distance for a specific setup, find the appropriate illustration (Figures 21-26). From this you can measure your arrow length and know where the shaft should be cut.

Recommended Correct Arrow Length

X10, A/C/E, A/C/C, HyperSpeed, Aluminum, and Carbon Shafts with Internal Components

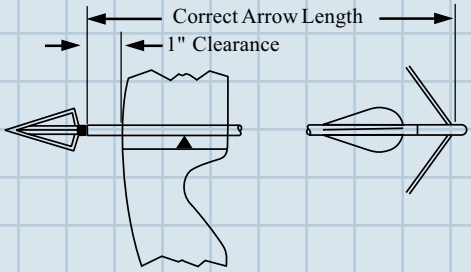
For hunting arrows shot from bows with cutout sight windows (including overdraw bows) and for target/field/3-D arrows shot from all types of bows, it is recommended that the Correct Arrow Length be determined by drawing back an extra-long arrow and having someone mark the arrow about 1" in front of the place where the arrow contacts the most forward position of the arrow rest. This extra 1" provides a measure of safety by allowing small variances in draw length to occur without resulting in a target arrow falling behind the arrow rest or an arrow with a broadhead falling off from contacting the arrow rest. This measurement is your Correct Arrow Length and is where your shaft should be cut (see figure 21).

Fig. 21
Correct Arrow Length for hunting arrows shot from bows WITH CUTOUT sight windows (including overdraw) and for all target/field arrows shot from any bow with or without cutout sight windows (including overdraws).



For hunting arrows on bows without cutout sight windows your broadhead should have at least 1" bow clearance past the far side of the bow. Have someone mark an extra long arrow while you're at full draw about 1" beyond the back (far side) of the bow (see figure 22).

Fig. 22
Correct Arrow Length for hunting arrows with broadheads shot from bows WITHOUT CUTOUT sight windows (or not cutout enough for broadhead clearance).

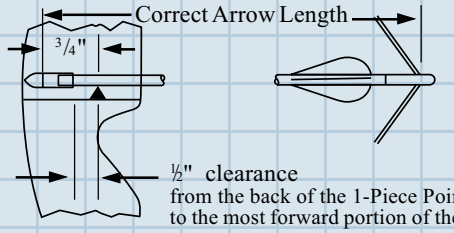


Recommended Correct Arrow Length
(Carbon Shafts with External Components)

Some shafts are fitted with components that fit over the outside of the shaft. To accommodate this, the outserts and one-piece points must be larger in diameter than the shaft. Therefore, all Correct Arrow Length calculations allow for at least ½" clearance from the back of the One-Piece Point or Standard Adapter to the most forward part of the arrow rest (as indicated by the diagrams). This prevents any disturbance to the arrow caused by the outsert as the arrow is drawn or released.

Fig. 23
Correct Arrow Length for target arrows with One-Piece Points shot from ALL TYPES of bows (with or without cutout sight windows and with or without overdraw).

For target points Correct Arrow Length is measured from ¾" in front of the most forward part of the arrow rest.



NOTE: Beginners with recurve bows may want to add an extra ½"-1" to their arrow length so that, as they become stronger and their shooting technique improves, the arrow will not be too short.

Fig. 24
Correct Arrow Length for hunting arrows shot from bows WITHOUT CUTOUT sight windows (or not cutout enough for broadhead clearance).

NOTE: On bows without cutout sight windows the broadhead cannot be pulled "into the bow." It is necessary, then to provide enough broadhead clearance in front of the bow when the arrow is pulled to full draw to prevent the broadhead from bumping against the bow.

Correct Arrow Length is measured from ¼" beyond the far side of the bow.

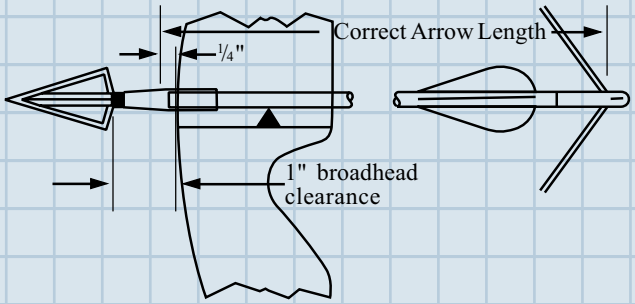


Fig. 25
Correct Arrow Length for hunting/field arrows equipped with Point Outserts and broadheads or screw-in points shot from bows WITH OVERDRAWS AND CUTOUT sight windows.

Correct Arrow Length is measured from 1⅛" in front of the most forward part of the arrow rest.

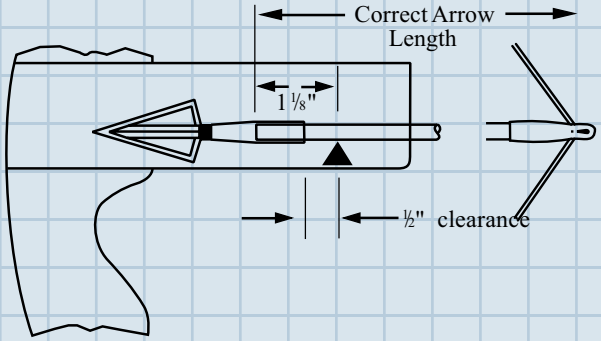
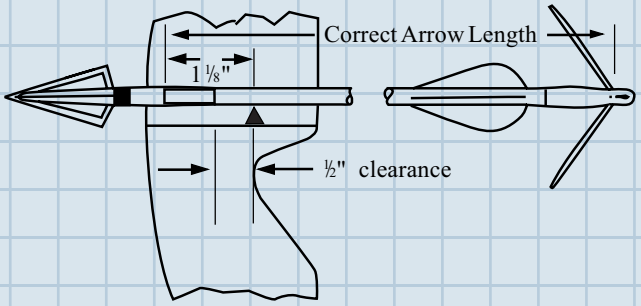


Fig. 26
Correct Arrow Length for all arrows shot from bows WITH CUTOUT sight windows (no overdraws).

Correct Arrow Length is measured from 1⅛" in front of the most forward part of the arrow rest.



Determining Shaft Cut length

Remember that your Correct Arrow Length is measured to the bottom of the nock groove and includes the small distance that the nock base extends beyond the nock taper. Therefore, your shaft cut length is slightly shorter than your Correct Arrow Length.

Cutting Shafts to Length

After determining Correct Arrow Length follow the steps below.

Note: Carbon shafts of all types must be cut carefully to prevent splintering of the carbon (graphite) fibers.

Never use rotary tube cutters, hack saws or other methods that can damage the shaft or leave a rough cut. Always wear a NIOSH approved dust mask and safety glasses when cutting arrow shafts !

1. Set up the Easton Pro Shop Cut-Off Tool to cut the shaft so that after the nock system is installed, the total length of the shaft plus nock system will equal your desired Correct Arrow Length. To do this you will have to temporarily install the nock system on one full length shaft and then use that shaft to measure and set up the proper cutoff length.
2. Set the shaft support on the Cut-Off Tool so the abrasive wheel only cuts about ⅓ through the diameter of the shaft as shown in Fig. 28 (above right).
3. While slowly rotating the shaft in the same direction as the cutoff wheel, gently push the shaft into the wheel and rotate the shaft until it is completely cut. Continue to slowly rotate the shaft two more revolutions to ensure a square cut.
4. Deburring and chamfering is the final step. What needs to be done varies with the type of shaft (see diagrams to the right).

   ALUMINUM—Deburr only the inside of the wall just enough to eliminate the sharp edge of the tube.

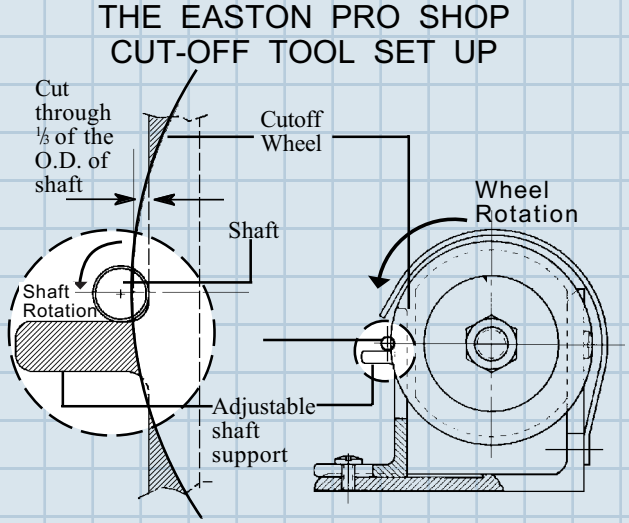
   A/C/E, A/C/C and HyperSpeed—Deburr the inner aluminum core tube very lightly using the more pointed deburring head on Easton's Cut-Off Tool. Be careful not to remove too much aluminum.

   Beman ICS (Internal Component System)—Do not chamfer the inside of the tube.

   ICS Hunter (Internal Component System)—Deburr the inside of the tube just enough to remove the burr.

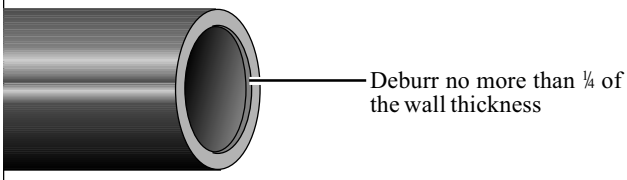
   All Carbon with External Components—These components fit over the outside of the shaft, so chamfering must be done on the outside edges of the shaft (see illustration on right). Use the recessed grinding stone on the Cut-Off Tool or lightly chamfer the end of the shaft with 180- or 240-grit sandpaper. Rotate the shaft as you lightly drag the edge of the shaft along the sandpaper. Three complete revolutions will produce a sufficient chamfer.
5. Easton recommends that you test-draw one arrow with all components installed (without adhesive) before cutting and finishing a complete set of arrows.

Fig. 28

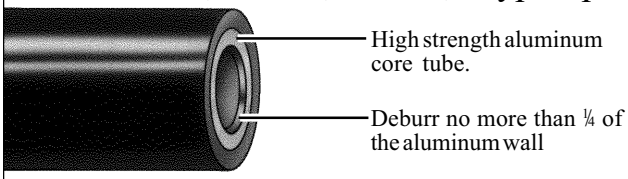


The Easton Cutoff Tool is designed to cut all tubular arrow material. The precision motor turns a thin abrasive cutting wheel for an exceptionally burr-free cut on aluminum and can prevent splintering of carbon fibers when cutting carbon shafts.

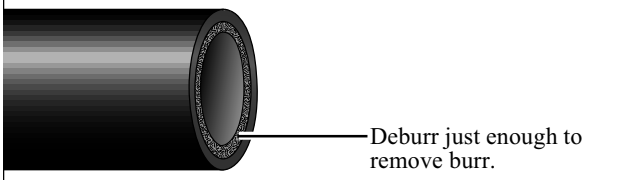
Easton Aluminum



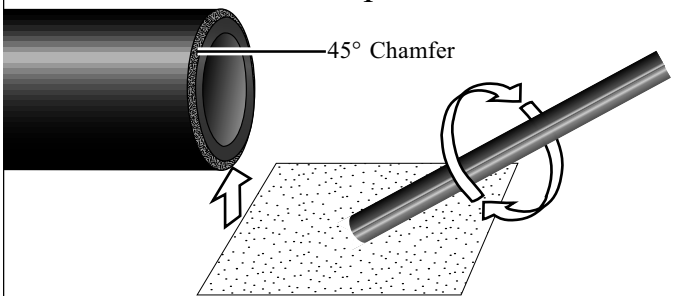
Easton X10, A/C/E, A/C/C, HyperSpeed



Beman ICS and ICS Hunter



Beman External Component Shafts



ALUMINUM SHAFT COMPONENT INSTALLATION

Shaft Construction

Easton shafts, depending on the model line, are produced from super high-strength 7178 or 7075 aluminum alloys. Both alloys are processed to their highest possible strength using Easton's proprietary manufacturing steps. This insures that Easton shafts will stay straight even through severe shooting conditions.

Easton shafts are cold drawn many times from an aluminum tube that has been fusion bonded from precision coil stock. This tube has a precisely uniform spine because it is made from uniform thickness coil stock, drawn many times, and thermally treated until the fusion line is totally absorbed into the adjacent metal. To further ensure integrity of every shaft, each Easton aluminum shaft goes through an eddy current tester that "looks" through the wall thickness and rejects any shafts with flaws or imperfections in the material.

Each Easton aluminum shaft of a given size and model is guaranteed to have the same inside diameter to a tolerance of ±0.0004". This close tolerance ensures a consistent point or insert fit. The outside diameter is made to ±0.0003" tolerance to ensure a uniform spine from shaft to shaft. In addition, the wall thickness is uniform to give consistent spine 360° around each shaft.

Shaft Size Identification

Easton uses various arrow shaft outside diameters and wall thicknesses to obtain the necessary number of shaft spines needed to shoot well from nearly all bow weight and arrow length combinations.

The Outside Diameter is the main factor in determining shaft stiffness. This diameter is coded in the first two digits of the shaft size number—for example, in 2312, the 23 = 23/64". This is the shaft diameter rounded to the nearest sixty-fourth of an inch. The Wall Thickness code is the second two digits of the shaft size number. These digits indicate the shaft wall thickness to the closest one thousandth of an inch—for example, in 2312, the 12 = 0.012". The wall thickness is the main factor in determining the shaft weight. For two shafts of the same stiffness, a larger diameter, thin-walled shaft will be much lighter than a smaller diameter, thicker walled shaft.

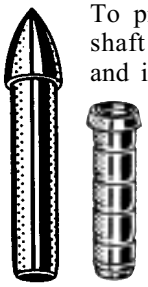
Easton Aluminum Shaft Weight Groups

Easton aluminum shafts are classified by weight groups, each with its own performance characteristics. There are shaft sizes in each weight group to match nearly every bow weight/arrow length combination.

- *UltraLite* aluminum – .012" wall thickness
- *SuperLite* aluminum – .013" - .014" wall thickness
- *Lite* aluminum – .015" - .016" wall thickness
- *Standard* aluminum – .017" - .020" wall thickness

INSTALLING POINTS AND ALUMINUM INSERTS

MATERIALS NEEDED FOR INSTALLATION OF POINTS AND ALUMINUM INSERTS	
• 91% isopropyl alcohol • paper towels • cotton swabs	• Easton hot-melt • torch or burner



To produce the most bend-resistant aluminum shaft possible, extremely high-yield strength and internal stresses are built into each Easton shaft. Therefore, care must be taken when installing a point or insert to prevent splitting the end of the shaft due to over stressing. Easton two-piece points and RPS aluminum inserts for aluminum shafts have an exclusive press-fit feature on the last ⅛" (3 mm) of the insert. This feature accurately aligns the component in the shaft and holds it in place while the adhesive hardens.

Follow the shaft cutting instructions carefully, then follow the steps below for point and aluminum insert installation.

NOTE: To facilitate handling, Easton recommends that a field point be screwed into the insert before heating and inserting.

CAUTION: Do not overheat aluminum shafts or points! This is especially true with thin wall *UltraLite* shafts which heat up more quickly than other aluminum shafts. Excessive heat (over 400°F [200°C]) will cause recrystallization and could permanently soften or damage any size aluminum shaft.

1. Clean the inside of the shaft with a cotton swab dipped in 91% isopropyl alcohol to remove the fine cutting dust. Let the shaft dry thoroughly before bonding.
2. With a small gas flame, apply enough heat to the end of the shaft to readily melt a ring of Easton's hot melt adhesive on the inside of the shaft. NOTE: Use Easton's Hot Melt Adhesive only. Arrow points can come out in the target mat if adhesives with lower melting temperatures are used.

CAUTION: Do not overheat!

3. Grip the point or insert with pliers and heat the shank end just enough so that when it is pushed partly into the shaft, the ring of adhesive is melted. Push the point or insert about ¼" (6 mm) into the shaft.

CAUTION: Do not overheat points!

4. Heat the exposed portion of the point or insert shank just enough so a thin layer of hot melt adhesive can be applied to the exposed shank of the point or insert.
5. After applying the adhesive, heat and remelt the adhesive on the shank of the point or insert.
6. Without delay, while the adhesive is still fluid, slowly push the point or insert into the shaft until it seats against the end of the shaft. Wipe off excess adhesive on a paper towel before hot melt hardens.

Removing Points and Aluminum Inserts

When removing an aluminum insert, first thread an RPS Field or Target Point into the insert.

1. Lightly heat the exposed end of the point for 3-5 seconds over a small gas flame.

CAUTION: Do not overheat the component or the shaft.

2. Immediately grip the point with a pair of pliers.
3. Twist and pull out the point (and insert if any).
4. If the point or insert cannot be removed, reheat for 3-5 seconds and try to remove again.
5. Repeat procedure #4 until adhesive softens just enough to remove the component.

Installing Carbon Composite Inserts

MATERIALS NEEDED FOR INSTALLATION OF CARBON COMPOSITE INSERTS	
• 91% isopropyl alcohol • paper towels • cotton swabs	• flexible, two-part, 24-hour epoxy (such as AAE epoxy) • wood toothpick or match stick

For an accurate, high-strength installation, be sure the shaft ends are cut square. Follow the shaft cutting instructions carefully.

1. Clean the inside of the shaft with a cotton swab dipped in 91% isopropyl alcohol to remove the fine cutting dust. Let the shaft dry thoroughly before bonding.

2. Evenly spread a drop of epoxy around the inside of the first ¼" of the shaft with a wood toothpick or match stick.

   NOTE: A twenty-four hour flexible epoxy such as AAE® Epoxy is best. Fast-drying epoxies are often brittle.

3. Apply a small amount of adhesive to the entire surface of the insert.
4. Install the insert, rotating it as it is pushed slowly into place. Wipe off excess adhesive.
5. Stand the shaft on the nock end while drying to prevent epoxy from entering the threaded area of the insert.

Removing Carbon Composite Inserts

Carbon Composite Inserts can be removed by *slowly* heating the shaft (aluminum shafts only) and breaking down the bonding adhesive with heat.

CAUTION: Do not overheat the shaft!

1. Put an RPS Field or Target Point into the insert.
2. Lightly heat the end of the aluminum shaft for 3-5 seconds over a small gas flame.
3. Grasp the point in the insert with pliers and try to pull the insert from the shaft.
4. Repeat steps 1 and 2 until the adhesive bond is destroyed by the heat and the insert pulls free. Remember, excess heat will destroy the shaft.
5. Immediately, while the shaft is still hot, clean the inside of the shaft by removing any adhesive residue with a bore cleaning brush or small blade.

Preparing Aluminum Shafts for Fletching

Unless your fletching jig has an adjustable nock indexing feature, you may choose to fletch your arrows with the nocks temporarily installed. After fletching, properly index and bond the nocks so that your style of vanes clears your particular arrow rest.

NOTE: If the nocks are installed without adhesive the UNI and Super UNI Systems allow you to rotate the nock to obtain proper alignment at any time.

Cleaning with Non-chlorinated Ajax® & Water

1. Rub the shaft in the area to be fletched with wet Ajax on a wet paper towel.

NOTE: Do not use chlorinated cleansers.

2. Rinse the shaft and repeat cleaning until water no longer beads, but "sheets" on the shaft surface.

Cleaning with Solvents

1. Carefully wipe down just the area of the shaft to be fletched with MEK, lacquer thinner, or acetone until no residue shows on a clean white paper towel.
2. For the best bond, follow with a wipe of 91% isopropyl alcohol using a clean white paper towel.

CAUTION: Do not use MEK, lacquer thinner, or acetone with the nock installed. Keep these solvents away from nocks, shaft identification marks, and UNI Bushings. Use protective gloves to keep solvents from penetrating the skin and use proper ventilation.

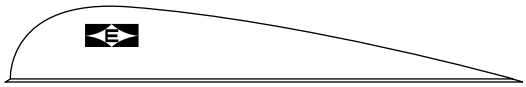
NOTE: Petroleum solvents can accumulate between the bushing and the shaft wall and weaken the adhesive bond. Also, the vapors from trapped solvents could cause the polycarbonate A/C/E or 3-D Super Nocks to fracture when shot. Be sure the shaft has dried thoroughly before installing nocks.

Cleaning with 91% Isopropyl Alcohol

(Recommended for shafts with UNI or Super UNI Bushings already installed)

1. Use 91% alcohol as a primary cleaner on shafts with UNI or Super UNI Bushings installed. 91% alcohol will not affect the A/C/E or Super Nocks or the bushing adhesive.

Fletching Aluminum Shafts



1. Because of the preapplied activator on Easton Diamond Vanes, no cleaning is required if AAE Fastset™ adhesive is used. If another brand of adhesive is used, or for other brands of vanes, wipe the base of the vanes with MEK or lacquer thinner to remove any mold release chemical from the vanes.
2. When preparing for fletching, observe these precautions and instructions:
   a. Do not touch cleaned areas of the shaft or vanes with your hands or other objects.
   b. Fletch as soon as possible after the shaft has dried. If shafts stand unfletched for over 8 hours, repeat the cleaning process.
   c. Do not attempt to fletch on very humid days.
3. Shafts cleaned as described above can be fletched directly using Saunders® NPV, Fletch-Tite®, AAE Fastset®, or similar fletching cement. For added adhesion, a thin dip of lacquer or coating compatible with the cement can be used.

CAUTION: Do not dip shafts with UNI Bushings or Super UNI Bushings in lacquer or use petroleum solvents to clean the fletching surface.

Notes on Fletching Aluminum Shafts

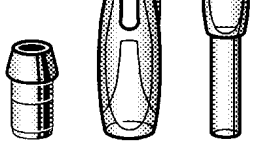
1. Use Saunders® NPV, Fletch-Tite®, AAE Fastset® or similar fletching cement.
2. Set the rear of the vane 1-1¼" from the bottom of the nock groove.
3. Attach fletching at an offset to the centerline of the shaft. To assure proper clearance, take into account the type of arrow rest being used. Do not use an angle of offset so great that the farthest right or farthest left corner of the fletching loses contact with the shaft. There should be no open spaces between the shaft and the ends of the base of the vane.
4. Allow cement to fully harden before shooting. Follow manufacturer's instructions for full cure time.

Removing Fletching

1. Carefully scrape off the vanes and excess glue with a dull knife.
2. Wipe fletching area with MEK or lacquer thinner to remove vane and cement residue.
   CAUTION: Keep solvents away from the nock and shaft identification markings.
3. For the best bond, follow with a wipe of 91% isopropyl alcohol using a clean paper towel.
4. Let dry and re-fletch.

Attaching Nocks

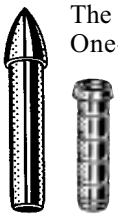
See *Installing Nock Systems* later in this guide.



ALUMINUM/CARBON COMPONENT INSTALLATION

Installing One-piece Points and Aluminum Inserts

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF POINTS AND ALUMINUM INSERTS	
• 91% isopropyl alcohol • paper towels • cotton swabs	• Easton hot-melt • torch or burner



The instructions that follow can be used for either One-piece Points or for aluminum inserts. For aluminum inserts, screw a point into the insert before you begin installation.

After cutting your A/C* Shaft to length as described, follow the point installation procedure carefully to prevent overheating the point. Overheated points can destroy the shaft's epoxy bond between the carbon and the aluminum tube. Use only Easton hot-melt adhesive.

1. Clean approximately two inches inside the point end of the shaft using a cotton swab dipped in 91% alcohol. Repeat the process until a fresh cotton swab is free of cutting dust residue. Let the shaft dry thoroughly before bonding.
2. Carefully heat a stick of Easton's hot-melt adhesive over a small gas flame; then apply a ring of hot adhesive to the inside of the point end of the shaft.

CAUTION: Do not apply heat directly to A/C shafts.

Use Easton's hot-melt adhesive only. The melting point of Easton's hot-melt adhesive is low enough that the shaft will not be damaged during installation and high enough to keep the point securely bonded during the frictional heating caused when the arrow penetrates the target mat. Arrow points can come out in the target mat if lower melting temperature hot-melt adhesives are used.

3. Hold the end of the point with your fingers. (Do not hold with pliers because it is then possible to overheat the point.) Heat the exposed portion of the point or insert until you feel it getting warm. It should be just hot enough to melt the adhesive.

CAUTION: Do not overheat points. If the point becomes too hot to hold in your fingers, it is too hot to put in the shaft. Set the point on a noncombustible surface until cool.

4. Heat the hot-melt adhesive and apply a generous layer of adhesive to the shank of the point or insert.

* "A/C" Shaft refers to all models of aluminum/carbon shafts. Current models are X10, A/C/E, A/C/C, and HyperSpeed.

5. After applying the adhesive, quickly remelt the adhesive on the shank of the point or insert. Reheat it enough that when it is pushed into the shaft, the ring of adhesive in the shaft is melted.
6. Without delay, while the adhesive is still fluid, install the point or insert into the shaft with a clockwise twisting motion until it seats against the end of the shaft.

NOTE: Do not force a point or insert into an A/C shaft.

7. With a paper towel quickly wipe off excess adhesive while it is still hot.

CAUTION: Do not apply heat directly to A/C shafts or overheat points! Overheating points installed in A/C shafts can destroy the bond between the carbon and the aluminum tube. Applying heat directly to A/C shafts can destroy the carbon fiber/epoxy matrix.

Removing Points and Aluminum Inserts

1. Grasp the shaft about ½" back from the component. There should be ½" to ¾" of shaft between your fingers and the component. (Screw a point into the aluminum insert before heating.)
2. Lightly heat only the exposed portion of the component in a small flame for 3-5 seconds.

CAUTION: Do not apply heat to A/C shafts directly.

3. When you feel the shaft just start to warm under your fingers, grip the component with a pair of pliers. Twist and pull on the component to determine if the adhesive has melted. (Or use a small wire hook to remove the UNI Bushing.)
4. If the component does not move, continue to heat in five second increments and twist the component after each heating period with pliers until it rotates and can be pulled free of the shaft.

Installing Carbon Composite Inserts

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF CARBON COMPOSITE INSERTS	
• 91% isopropyl alcohol • paper towels • cotton swabs	• flexible two-part, 24-hour epoxy (such as AAE epoxy) • wood toothpick or match stick

For an accurate, high-strength installation, be sure shaft ends are cut square. Follow shaft cutting instructions carefully.

1. Clean the inside of the shaft with a cotton swab dipped in 91% isopropyl alcohol to remove the fine cutting dust. Let the shaft dry thoroughly before bonding.
2. Evenly spread a drop of epoxy around the inside of the first ¼" of the shaft with a wood toothpick or match stick.

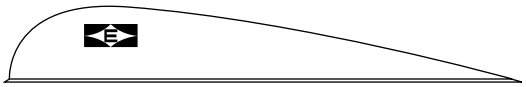
NOTE: A twenty-four hour flexible epoxy such as AAE® Epoxy is best. Fast-drying epoxies are often brittle.

3. Apply a small amount of adhesive to the entire surface of the insert.
4. Install the insert, rotating it as it is pushed slowly into place. Wipe off excess adhesive.
5. Stand the shaft on the nock end while drying to prevent epoxy from entering the threaded area.

Removing Carbon Composite Inserts

Carbon Composite Inserts are permanently installed with epoxy and cannot be removed without risking damage to the shaft. Attempting to remove the inserts voids the shaft guarantee.

Preparing Shafts for Fletching



Unless your fletching jig has an adjustable nock indexing feature, you should fletch your arrows with the nocks temporarily installed without adhesive. After fletching, index the nocks properly so the fletching clears your arrow rest. If you wish, use one of the recommended adhesives to attach your nocks (See pages 26-29).

NOTE: If no adhesive is used the UNI System allows you to rotate the nock to obtain proper alignment at any time.

1. Carefully wipe down just the fletching area of the shaft with M.E.K. or lacquer thinner using a clean, white paper towel. If your nock is already permanently installed, use 91% isopropyl alcohol in place of all other solvents. Continue wiping the surface with solvent until no dirt or carbon residue shows on a clean portion of the paper towel. Remember to use protective gloves to keep solvents off the skin and use proper ventilation. Do not soak carbon or aluminum/carbon shafts in any solvents.

CAUTION: Do not use lacquer thinner, M.E.K., or acetone with the nock installed. Keep these solvents away from nocks and shaft identification markings. Petroleum solvents could accumulate between the bushing and shaft wall and weaken the adhesive bond. Also, the vapors from trapped solvents could cause the polycarbonate A/C/E Nocks to fracture.

2. For the best bond, follow with a wipe of 91% isopropyl alcohol using a clean paper towel.
3. Because of the preapplied activator on Easton Diamond Vanes, no cleaning is required if AAE Fastset™ adhesive is used. If another brand of adhesive is used, or for other brands of vanes, wipe the base of the vanes with MEK or lacquer thinner to remove any mold release chemical from the vanes.

When preparing for fletching, observe these precautions and instructions:

a. Do not touch cleaned areas with hands or other objects.
b. Fletch soon after cleaning. If shafts stand unfletched for over 8 hours, repeat the cleaning process.
c. Do not attempt to fletch on very humid days.

Fletching A/C Shafts

EQUIPMENT AND MATERIALS NEEDED FOR FLETCHING	
• 91% isopropyl alcohol • paper towels	• fletching jig • fletching adhesive

Fletching for A/C target shafts should be as small as necessary to get good flight and grouping. Fletching for A/C hunting shafts should be large enough to stabilize the size and weight of the broadhead you use. Remember to always clean the shaft before attaching any style of fletching.

1. For Spin-Wing Vanes® use the 2-sided adhesive tape supplied. For Easton Diamond Vanes no cleaning is required if AAE Fastset™ or any cyanoacrylate adhesive is used. When installing other brands of vanes, wipe the base of the vanes with MEK or lacquer thinner to remove any mold release chemical.

   For plastic vanes or feathers, cyanoacrylate adhesives such as Bohning® Instant Super Fletch-Tite, AAE Fastset® or, other instant fletching adhesives give the most secure bond. Saunders N.P.V.® or Bohning Fletch-Tite® cement may also be used. Shafts must be properly cleaned before fletching.

CAUTION:

a. Cyanoacrylate instant adhesives (Super Glues) bond extremely well to carbon fiber, which can make vanes very difficult to remove without damage to the shaft surface. Easton recommends testing the adhesive on one A/C shaft before fletching an entire set to be sure the surface of the shaft is not damaged when the fletching is removed.
b. Some instant adhesives are brittle and can fracture if vanes are hit by another arrow. Loose vanes can drastically affect the flight and grouping of an arrow.

2. Set the rear of the vane 1-1¼" from the bottom of the nock groove.
3. Attach fletching at an offset to the centerline of the shaft. To assure proper clearance, take into account the type of arrow rest being used. Do not use an angle of offset so great that the farthest right or farthest left corner of the fletching losses contact with the shaft. There should be no open spaces between the shaft and the ends of the base of the vane.
4. Allow cement to fully harden before shooting. Follow manufacturer's instructions for full cure time.

Removing Fletching

CAUTION: Do not soak any carbon shaft in solvents to remove the fletching or fletching adhesive. The solvents will slowly absorb into the shaft and weaken the resin that bonds the carbon fibers.

1a. When using instant adhesives, carefully peel off the vanes with a very dull knife and remove most of the glue, being careful not to scrape deep enough to damage the carbon fibers near the surface of the shaft.

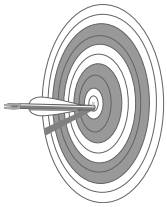
1b. If you're using standard fletching cements, pull the vanes or feathers off by hand or with pliers.

2. Wipe fletching area with lacquer thinner to remove remaining glue residue. Do a final wipe with 91% isopropyl alcohol.

CAUTION: Keep solvents away from the nock and shaft logo. See the CAUTION about solvents under "Preparing Shafts for Fletching."

3. Let the shafts dry before refletching per the instructions above.

Pulling Carbon Shafts from Target Mats



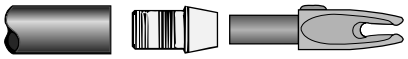
Particles from some target mats may stick on the shaft because of the heat generated during the frictional slowing of these high speed arrows. This frictional bonding may make the shaft difficult to remove from the mat. Several suggestions to help relieve this problem are:

1. Put a coating of hard paste wax or rub a bar of hard soap on the point end of the shaft as needed.
2. Use a cloth impregnated with silicone wax or similar material or use Saunders Friction Fighter® silicone applicator to wipe the lower quarter of the shaft. Be careful not to use too much or too often as the silicone will prevent adhesive from adhering to the shaft if it migrates to the fletching area.
3. Use a piece of natural rubber sheet or a commercially available arrow puller to grip the arrow and make pulling easier.

NOTE: Always pull the arrow straight out of the mat. Make sure no one is behind you when pulling arrows.

Attaching Nocks

See *Installing Nock Systems* later in this guide.



CARBON ICS COMPONENT INSTALLATION

Carbon Beman ICS* Shafts

Some models of Beman's Carbon shafts feature the Internal Component System (ICS). These shafts are made in a larger, more traditional diameter to accommodate internally fitted nocks and points. Even the industry standard RPS threaded points can be used. These shafts provide all of the benefits of carbon's light weight and straightness without the difficulties associated with narrow diameter shafts and externally fitted components. Currently, Beman's large diameter models of carbon shafts are the ICS Hunter and the Beman ICS.

Installing Points and Inserts

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF POINTS AND INSERTS	
• 91% isopropyl alcohol • paper towels • cotton swabs	• flexible two-part, 24-hour epoxy (such as AAE epoxy) • wood toothpick or match stick

Install with Epoxy

Note that the ICS Hunter shaft can be fitted only with ICS Hunter inserts and RPS points. The Beman ICS (target) uses either ACC-60 one piece points or an ACC-60 RPS insert fitted with RPS points.

1. With a cotton tipped applicator (Q-Tip) dipped in 91% isopropyl alcohol, remove the carbon dust from the inside of the tube.
2. Put a small ring of flexible, two-part, 24-hour cure epoxy into the end of the shaft to a depth of ¼", so it can coat the inside of the shaft as the point is pushed in. A match stick or toothpick may be used. Do not put too much epoxy in the shaft.
3. Evenly coat the exposed insert or point shank with epoxy. If installing an insert, it is easier to handle if an RPS field point is first threaded into the insert.
4. Rotate the shaft while slowly inserting the point or insert into the shaft. Once the point or insert is fully seated, rotate the shaft two more complete revolutions to ensure a thorough covering of epoxy on the point or insert shank and inside the shaft.
5. Wipe off excess adhesive.
6. Stand the shaft with the point up, in an exactly vertical position. This maintains correct alignment of the point and also prevents adhesive from flowing into the threaded portion of the insert. Allow the epoxy to fully cure.

NOTE: Do not use hot melt adhesive on carbon shafts.

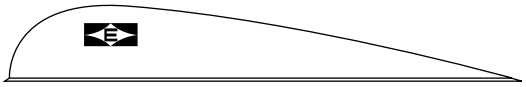
* "ICS" refers to all models of Beman shafts featuring an internal component system.

Easton Broadhead Adapter Rings

The Easton Broadhead Adapter Rings were developed for carbon shafts to provide a larger mounting surface when using broadheads with O-ring and other compression-based blade retention systems. The larger mounting surface allows O-rings to compress rather than roll of the top of the small diameter inserts. In addition, the adapter ring provides a smooth, tapered fit from the broadhead ferrule to the insert. Sizes are the same as the A/C/C point/insert sizes. Beman ICS Hunter uses the -60 adapter.

Removing Points and Inserts

Points and inserts installed with epoxy are permanently bonded and cannot be removed.



Fletching ICS Shafts

When preparing for fletching, observe these precautions and instructions:

1. Do not touch cleaned areas with hands or other objects.
2. Fletch as soon as possible after cleaning. If shafts stand unfletched for over 8 hours, repeat the cleaning process.
3. Do not attempt to fletch on very humid days.

Fletching instructions are the same as those used for Easton A/C shafts. For instructions see pages 21-22.

Attaching Nocks

See *Installing Nock Systems* later in this guide.

SAFETY AND HUNTING PRECAUTIONS

Shooting Precautions

WARNING: Carbon shafts should be checked for cracks or other damage before shooting. Although the Beman shaft is the most durable and strongest carbon shaft produced, it is not made with a reinforcing aluminum core (like X10, A/C/E and A/C/C shafts) and is, like any carbon shaft, more susceptible to cracking or breaking if the arrow hits a hard object, or is hit by another arrow. Any carbon shaft should be checked for cracking after each shot.

Procedure

Grip the shaft with one hand near the point and the other hand near the fletching. Rotate the arrow while bending it between the hands. If it feels flexible (rubbery), makes a creaking sound, or rotates strangely, do not shoot the arrow again. It could fracture upon release and cause serious injury to the shooter.

EXTERNAL COMPONENT INSTALLATION

Points and Standard Adapters

Some models of carbon Beman shafts utilize a component system that fits over the outside of the shaft. This style of attachment provides protection to the exposed ends of the carbon fiber filaments and adds strength to the shaft. To accommodate this, there are two methods of point attachment.

Beman One-Piece Target Points—These points have an outside diameter which fits over the outside of the shaft to provide protection and strength. In addition, the point shank fits inside the shaft to ensure good alignment.

Beman's Standard Adapter—This attaches over the end of the shaft and provides a threaded fitting for industry standard 8-32 RPS screw-in points or broadheads.

Installing One-Piece Points

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF ONE-PIECE POINTS	
• 91% isopropyl alcohol • paper towels • cotton swabs	• flexible two-part, 24-hour epoxy (i.e. AAE epoxy or Beman epoxy) • wood toothpick or match stick

Installing with Epoxy

Follow the instructions below for a secure and permanent bond:

1. Wipe both the front ¼" of the shaft and the one-piece point shank with 91% isopropyl alcohol until a clean paper towel shows no residue. Let dry completely before bonding. NOTE: Rubbing alcohol should not be used. It contains oils which could inhibit the adhesive bond.

2. Put a small ring of flexible, two-part, 24-hour cure epoxy into the end of the shaft, so it can coat the inside of the shaft as the point is pushed in. Do not put too much epoxy in the shaft. A thin coat is enough.

3. Thoroughly coat the exposed point shank with epoxy.

4. While rotating the point, slowly insert the point shank into the shaft. Once the point is fully seated, rotate the point two more complete revolutions to ensure a thorough covering of epoxy on the point shank and inside the shaft.

5. Wipe off excess adhesive.

6. Stand the shaft with the point up, in an exactly vertical position. To maintain correct alignment of the point, it must remain vertical and not lean at an angle during the cure time. Allow the epoxy to fully cure.

Removing Target Points

If installed with the recommended epoxy, one-piece points are permanent and cannot be removed without damage to the shaft.

Installing Standard Adapters

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF STANDARD ADAPTER	
• 180 or 240 grit sandpaper • 91% isopropyl alcohol • cotton swabs	• flexible, two-part epoxy • toothpicks or wooden match sticks • paper towels

Standard Adapters are installed to provide a method of attaching RPS Points and broadheads. Before installing adapters, be sure that the shafts have been properly chamfered if required (see pages 17-18).

1. Lightly sand the surface of the last ⅝" of the point end of the shaft with 180 or 240-grit sandpaper. Precutting the sandpaper into ⅝" wide strips simplifies this step.

2. Wipe the front of the shaft with 91% or higher concentration of isopropyl alcohol (available at most pharmacies) until a clean paper towel shows no sign of residue.

NOTE: Rubbing alcohol should not be used. It contains oils which may inhibit the adhesive bond.

3. Using a cotton swab, wipe the inside surface of the adapter with 91% isopropyl alcohol.
NOTE: Be sure the shaft and components are completely dry before bonding.

4. Thoroughly coat the front ¼" of the shaft with flexible, two-part, 24-hour cure epoxy such as Arizona Archery Enterprises® epoxy. Do not put epoxy on the end of the shaft because the excess epoxy could be pushed into the threads of the Adapter.

5. Spread a thin film of epoxy on the front ⅜" of the inside surface of the adapter with a toothpick or wood match stick. Be careful not to push epoxy into the threaded section of the outsert.

6. While rotating the outsert, slowly push it over the end of the shaft. Once the outsert is fully seated, rotate the adapter two more complete revolutions to ensure a thorough covering of the shaft and component with epoxy.

7. Wipe off excess adhesive.

8. Check for alignment by rolling the shaft on the wheels of an arrow straightener or on the top of a clean, flat table. If a visible wobble is present, pull the adapter about halfway off and then rotate and push in until fully seated and check again. If the adapter is still crooked, rotate the outsert about one-quarter turn at a time until it is straight.
9. Stand the shaft with the adapter up, in an exactly vertical position. To maintain correct alignment of the adapter, it must remain vertical and not lean at an angle during the cure time. Allow the epoxy to fully cure.

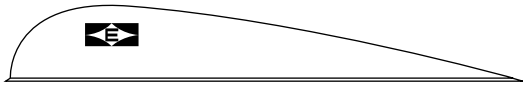
NOTE: Because shaft damage could occur from excess heat, do not use hot melt adhesive.

Removing Standard Adapters

Once installed with the recommended epoxy, Standard Adapters are permanently attached and cannot be removed without damage to the shaft.

CAUTION: Do not soak carbon shafts in any type of solvent to remove components or adhesive residue. The solvents slowly absorb into the shaft and weaken the resin which bonds the carbon fibers.

Preparing Shafts for Fletching



When preparing for fletching, observe these precautions and instructions:

1. Do not touch cleaned areas with hands or other objects.
2. Fletch as soon as possible after cleaning. If shafts stand unfletched for over 8 hours, repeat the cleaning process.
3. Do not attempt to fletch on very humid days.

If you are using Beman G-Nocks (same as Easton A/C/C "G" Nocks) with a Standard Adapter it is best to fletch your arrows with the nocks temporarily installed without adhesive. After fletching, index the nocks properly so that your style of fletching properly clears your arrow rest. If you wish, use an appropriate adhesive to attach your nocks (see pages 27-29).

1. Carefully wipe down just the fletching area of the shaft with 91% isopropyl alcohol using a clean, white paper towel. MEK or lacquer thinner is not used because it is incompatible with the glues used for attaching the Standard Adapter and with the plastic materials used in either style of nock.
2. If using Saunders® or Fletch-Tite® cement to attach your vanes, the fletching area must first be very lightly parallel sanded with 180 or 240-grit sandpaper then cleaned with 91% alcohol.

Fletching Carbon Shafts

EQUIPMENT AND MATERIALS NEEDED FOR FLETCHING	
• 180 or 240 grit sandpaper (optional) • 91% isopropyl alcohol • fletching adhesive	• fletching jig • paper towels

The fletching used for the target shafts should be as small as necessary to get good flight and grouping. Fletching for the hunting shafts should be large enough to stabilize the size and weight of the broadhead you use. Remember to always clean the shaft before attaching any style of fletching.

1. For Easton Diamond Vanes, no cleaning is required if AAE Fastset™ or any cyanoacrylate adhesive is used. When installing other brands of vanes, wipe the base of the vanes with MEK or lacquer thinner to remove any mold release chemical.

   For plastic vanes or feathers, cyanoacrylate adhesives such as Bohning® Instant Super Fletch-Tite, AAE Fastset®, or other instant fletching adhesives give the most secure bond. Saunders N.P.V.® or Bohning Fletch-Tite® cement may also be used. Shafts must be properly prepared before fletching.

   CAUTION: CyanoacrIylate instant adhesives bond extremely well to carbon fiber, which can make vanes very difficult to remove without damage to the shaft surface. Testing the adhesive on one shaft before fletching an entire set is recommended.
2. Set the rear of the vane 1-1¼" from the bottom of the Nock groove. If using a Standard Adapter, set the rear of the vane 1/16 - ⅛" from the end of the adapter.
3. Attach fletching at an offset to the centerline of the shaft. Do not use an angle of offset so great that the farthest right or farthest left corner of the fletching loses contact with the shaft. There should be no open spaces between the shaft and the ends of the base of the vane. To assure proper clearance, take into account the type of arrow rest being used.

Removing Fletching

CAUTION: Do not soak any carbon shaft in solvents to remove the fletching or fletching adhesive. This can weaken the resin that bonds the carbon fibers.

1. When using instant adhesives, carefully peel off the vanes with a knife (not razor sharp) and remove most of the glue, being careful not to scrape deep enough to damage the carbon fibers along the shaft's surface.
2. If using standard fletching cements, pull the vanes or feathers off by hand or with pliers.
3. Wipe fletching area with lacquer thinner to remove any remaining glue residue. Do a final wipe with 91% isopropyl alcohol.

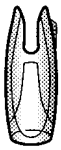
   CAUTION: Keep solvents away from both the nock and the shaft logo.
4. Let the shafts dry before refletching.

INSTALLING NOCK SYSTEMS

Nock Styles

There are three types of nocking systems used on Easton and Beman shafts—Taper fit (conventional nock system), Internal fit (includes UNI System and ICS System), External fit (used on some models of Beman Carbon shafts). Because shafts can be fitted with more than one style of nock system, all styles are covered in this one section.

CONVENTIONAL NOCKS



(Taper Fit System)

Conventional nocks (taper-fit) are installed on the aluminum shaft models featuring swaged tapered nock ends.

Attaching Conventional Nocks on the Shaft

Use the following procedure to attach conventional nocks to shafts with a swaged nock taper.

1. If the shaft has been dipped in lacquer or an old nock has been removed, use MEK or lacquer thinner on a clean, white paper towel and wipe the tapered end of the shaft until it is clean and free of old glue or paint. Hold the shaft in one hand and rotate it against the folded paper towel. Repeat this until all lacquer, glue or nock remains have been removed.

CAUTION: Nocks should not be cut off with a knife. Do not sand and do not scrape the shaft's nock taper. Uneven sanding or cutting into the taper by scraping can distort the precision cone shape and can make it difficult for nocks to be attached straight.

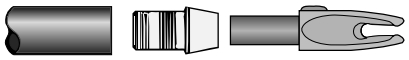
2. Apply a large drop of fletching cement to the clean nock taper surface.
3. Spread an even layer of cement around the taper with your finger tip.
4. Quickly, before the cement can dry, press the nock on the taper.
5. Once the nock is on the taper, rotate the nock several times counterclockwise to evenly spread the cement. Then, immediately rotate the nock clockwise (using a light downward pressure) until the nock groove is properly positioned and the nock is firmly seated on the taper.
6. Carefully wipe excess cement from the nock base. Check the nock for straightness and allow it to set at least two hours before shooting.

Removing Broken Conventional Nocks

1. Heat the conventional nock over a small flame.
2. When the nock starts to soften, gently grip the softened plastic with a pair of pliers and twist off.
3. Clean the nock swage (or UNI Extension) by wiping the taper with a clean cloth soaked in lacquer thinner until it is clean of all nock and glue residue.

CAUTION: Nocks should not be cut off with a knife. Do not sand and do not scrape the shaft nock taper. Cutting into the taper or distorting the precision cone shape by uneven sanding or scraping can make it difficult for nocks to be attached straight.

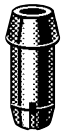
UNI SYSTEM



Universal Nock Installation (UNI) System (Internal Fit)

Aluminum shafts sizes smaller than 2012, as well as most sizes of A/C/C shafts, use the Standard UNI Bushing which has an inside diameter sized to fit A/C/E "G" Series nocks. Aluminum shaft sizes 2012 and larger use the Super UNI Bushing. This has a larger inside diameter which fits the Super Nock and the 3-D Super Nock. A/C/E shafts all have the same inside diameter as that of a Standard UNI Bushing, as does the -00 size A/C/C shaft, so no adapter is required. A nock can be inserted directly into the shaft.

Installing Carbon UNI Bushings



Carbon UNI Bushings should be installed with 24-hour flexible epoxy. Installation of Carbon UNI Bushings is similar to the installation of carbon composite inserts described on page 19.

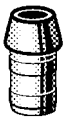
The pencil technique for holding the bushing during installation, as illustrated on the following page, may also be used, but do not attempt to use hot melt. Use only flexible epoxy on carbon composite components.

Removing Carbon UNI Bushings

1. To remove the bushing, select an Allen wrench that is slightly larger than the hole diameter. Heat the wrench over a flame until hot enough to melt into the bushing. Push it into the hole in the bushing and let it cool.
2. Lightly heat the end of the shaft for 3-5 seconds over a small gas flame.
3. Grasp the wrench with pliers and rotate to break the bushing free.
4. Repeat steps 2 and 3 until the adhesive bond is destroyed by the heat and the insert pulls free. Remember, excess heat will destroy the shaft.

Installing Aluminum UNI Bushings

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF UNI OR SUPER UNI BUSHINGS	
• 91% isopropyl alcohol	• Easton hot-melt
• paper towels	• torch or gas burner
• cotton swabs	• pencil for "holding tool"

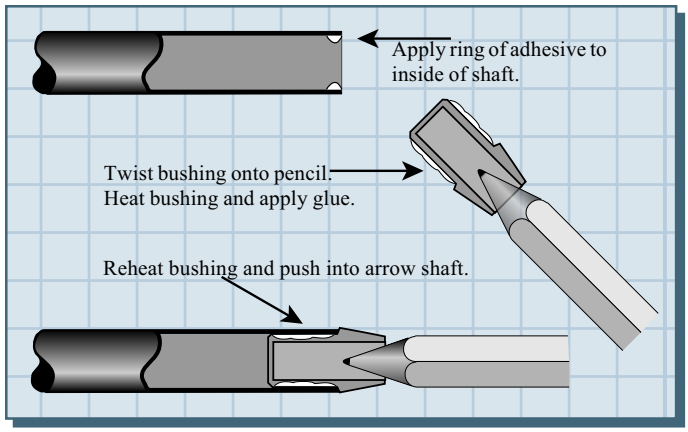


1. Lightly chamfer the inside of the core tube as described previously in the cutting instructions.
2. Clean inside the nock end of the shaft approximately one inch using a cotton swab dipped in 91% alcohol. Repeat the process until a fresh cotton swab is free of residue or cutting dust. Let the shaft dry thoroughly before bonding.
3. Heat a stick of Easton's hot-melt adhesive over a small gas flame; apply a ring of adhesive inside of the shaft.
4. Twist the bushing onto the end of a sharpened wooden pencil (see illustration below).
5. Using the pencil as a UNI Bushing "holding tool," heat the bushing just enough to apply a thin coating of hot-melt adhesive on the shank.

CAUTION: If the wood pencil chars, the bushing is overheated.

6. Lightly reheat the bushing to melt the adhesive and quickly insert it completely into the shaft.
7. Quickly wipe off excess adhesive, then remove the pencil after the adhesive has solidified.

CAUTION: Do not apply a flame directly to any Carbon or Aluminum Carbon shaft.



Instant-Set Glue Method

Some brands of quick setting glues are made to remain flexible after curing. These glues can be used to bond UNI Bushing to shafts. Bohning Instant Super Fletch Tight II™ and AAE Fastset Gel™ are two such glues.

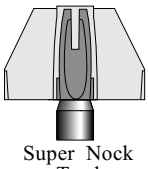
To glue, spread a thin film of glue on the bushing. Start the bushing into the end of the shaft, then quickly push the end of the shaft against a wooden bench or block of wood. The insert must be pushed into the shaft quickly with a single stroke, before the glue can set up.

Installing A/C/E "G" Nocks, X10 Nocks, and Super Nocks

(Directly into Shafts or UNI Bushings)

X10, A/C/E "G" Nocks, and Super Nocks are designed to be installed and shot without adhesive. If you prefer to use an adhesive, use a light removable glue such as Carter's® rubber cement (for gluing paper) or FaberCastell® Glue Stick. Certain adhesives contain solvents that attack the polycarbonate nock material. When this occurs, the nock becomes brittle and can break when shot. Do not use typical fletching cements which usually contain M.E.K. (Methyl Ethyl Ketone), toluene, acetone, or lacquer thinner. To determine if you are using a compatible adhesive, use the compatibility test described at the end of the Nock Installation section.

Installing without Glue


Super Nock Tool

1.Push the nock into the shaft by hand or with a nock tool.

2.Rotate the nock while inserting it into the shaft.

NOTE: Do not attempt to rotate the nock by inserting a coin or other instrument between the ears of the nock.

NOTE: A tighter fit is used with Super Nocks because of their use as a hunting nock. As a result, a nock installation tool is necessary when installing Super Nocks. See your dealer for Easton's Super Nock Tool.

Installing A/C/E and Super Nocks with Rubber Cement

1. Put a thin coat of Carter's rubber cement or FaberCastell glue stick on the shank of the nock.
2. Slowly insert the nock into the UNI or Super UNI Bushing while rotating the nock.
3. Immediately remove the nock and let it air dry for 5-10 seconds.
4. Reinsert the nock into the bushing.
5. Rotate to get proper nock alignment if shafts are fletched.

Alternate Procedure Using Cyanoacrylate Adhesive

1. Slip the nock into the shaft until there is approximately 3⁄16" (5 mm) remaining before the nock is fully seated.
2. Place a very thin layer of instant adhesive around the exposed area. (Do not cover entire shank as it will make removal difficult.) Properly align the nock with the fletching before fully seating the nock.

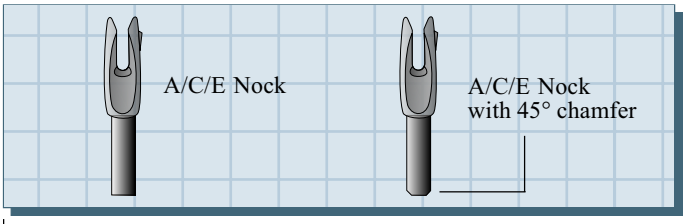
   CAUTION: This adhesive bonds very quickly.
3. Push the nock straight in, without turning, until seated.
4. Hold for five seconds or until the adhesive sets.

Alternate Procedure Using Thin Plastic Film

Another method for installing A/C/E and Super Nocks into UNI and Super UNI Bushings is to use a very thin plastic film such as plastic food shopping bags, dry cleaning bags, etc. The film provides an effective method for securing the nock in the shaft and also allows easy removal.

1. Place a small piece (¾" circle) of the plastic film over the end of the nock to be inserted into the bushing.
2. Gently push the nock to get it started into the bushing.
3. Push and twist the nock until it is fully seated against the bushing.
4. Remove any excess plastic film from around the nock with thumb and finger nail.

If the shank of the nock punches through the plastic rather than stretching it into the gap between the nock shank and shaft, try a thinner plastic or put a slight chamfer on the end of the nock shank.



To chamfer the end of the shank, simply hold the nock at the top and pull the nock shank at a 45° angle across a flat sheet of sandpaper, or along a fine file, while rotating the nock. This procedure will allow the nock to "grip" the plastic rather than punching a hole through it.

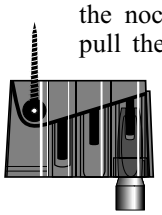
Removing Broken A/C/E Nocks & Super Nocks

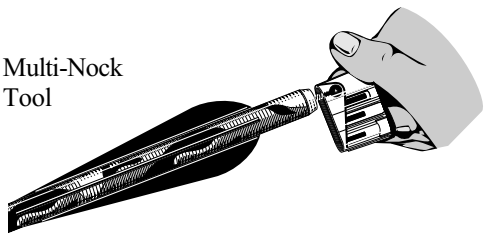
Pliers

Gripping the nock with a pair of pliers, twist and pull until the adhesive bond, if any, has loosened and the nock pulls free.

Multi Nock Tool

If the nock is broken off flush with the bushing or shaft end, use Easton's Multi-Nock Tool with Extractor. To remove, thread the tool down through the broken nock into the hollow core of the nock shank as shown in the illustration, and pull the nock out.


Multi-Nock Tool



Screw or Cup Hook Method

If a Multi Nock Tool is not available, use this method to remove a nock that has broken off flush with the bushing.

1. Twist a small screw or a cup holder into the hollow core of the nock shank.
2. Pull the screw out with pliers to remove the nock shank.

Allen Wrench Method

A/C/E nocks made prior to 1995 did not have a hollow core in the shank. To remove a pre-1995 A/C/E nock that has broken off flush with the bushing, use the following method.

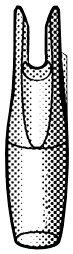
1. Grip a small Allen wrench with pliers and heat it until it is hot enough to melt into the shank of the nock.
2. Push the heated Allen wrench into the broken nock shank.
3. After the nock shank cools and solidifies on the Allen wrench, twist the Allen wrench with pliers to break nock shank loose, then pull out.

BEMAN OVERNOCKS

(External Nocks)

Some Beman carbon shafts require nock systems that fit over the outside of the shaft. Beman provides two ways to accomplish this: The Beman Overnock, which fits over the end of the shaft, and the Nock Outsert, which is an adapter that fits over the end of the shaft and allows an Easton A/C/E "G" nock to be used.

Installing Beman Overnocks



Overnocks can be installed either without adhesive or with Carter's® rubber cement or FaberCastell® glue stick. Do not use typical fletching cements which usually contain solvents incompatible with polycarbonate nocks. To be sure you are using a compatible adhesive, select adhesives that are recommended for A/C/E or Super Nocks or that have passed the compatibility test described on page 30.

1. If desired, apply a thin layer of compatible adhesive to the last ½" of the nock end of the shaft.
2. Slowly push the nock on the shaft while rotating one full turn.
3. Check the nock for straightness by rolling on the wheels of an arrow straightener or on a clean, flat surface. If the nock is not straight, rotate the nock and check it. Repeat this process until the nock is straight.

Removing Overnocks

1. Lightly grip the body of the nock with pliers and twist off.
2. If pliers don't work, cut the nock off with a dull knife, being careful not to cut into the shaft surface.
3. Clean off any nock or adhesive residue with a dull knife. Do not cut into the carbon material. Wipe shaft well with 91% isopropyl alcohol before rebonding another nock.

Installing Nock Outserts

EQUIPMENT AND MATERIALS NEEDED FOR INSTALLATION OF NOCK OUTSERTS	
• 180 or 240 grit sandpaper • 91% isopropyl alcohol • paper towels • cotton swabs	• flexible, two-part epoxy or cyanoacrylate adhesive • toothpicks or wooden match sticks

Follow the instructions for installing Standard Adapters on page 25, however, only sand the shaft ½" from the nock end. Cyanoacrylate adhesives such as Bohning® Instant Super Fletch-Tite, AAE Fastset®, Loctite® 454 (or Super Glue®) can also be used to install Nock Outserts. These adhesives bond very quickly and only a small amount of adhesive is required.

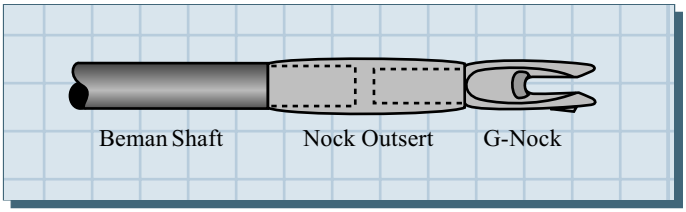
Removing Nock Outserts

If installed with the recommended epoxy, these outserts are permanent and cannot be removed without damage to the shaft.

Installing G-Nocks in Nock Outserts

G-Nocks (A/C/E "G" Nocks) have a precision, snug fit in the outsert and a uniform fit on the string. For Target or Field shooting, they can be shot without adhesive or with a low-strength adhesive that will ensure that the nocks do not rotate. If you prefer to use an adhesive, you should use a light removable adhesive like Carter's® rubber cement (for gluing paper) or FaberCastell® Glue Stick (or an adhesive that contains Naphtha and/or Hexane).

CAUTION: Do not use typical fletching cements that usually contain M.E.K. (Methyl Ethyl Ketone), toluene, acetone, or lacquer thinner on A/C/E Nocks, Overnocks or Nock Outserts. Certain adhesives contain solvents that attack polycarbonate nocks. When this occurs, nocks become brittle and can break when shot. To be sure you are using a compatible glue, use the adhesive compatibility test on page 30.



Procedure

1. Apply a thin coat of the Carter's® rubber cement or FaberCastell® glue stick or other compatible adhesive on the shank of the nock.
2. Slowly insert the nock into the outsert while rotating the nock.
3. Rotate to get proper nock alignment.

Removing Broken A/C/E Nocks

See methods described on previous page.

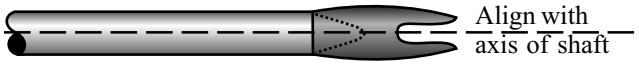
Adhesives for Nocks, Nock Outserts, and UNI or Super UNI Bushings

The following chart lists the components that make up the nock systems, and suggests glues that may be used for each. The installation procedures for each of the components are covered in the accompanying text.

ADHESIVES FOR NOCK SYSTEM COMPONENTS	
COMPONENT	ADHESIVE FOR INSTALLATION
UNI Bushing or Super UNI Bushing	Aluminum Shafts—Easton Hot Melt A/C* Shafts—Easton Hot Melt, 24-hour Epoxy, or flexible cyanoacrylates
Carbon UNI Bushing or Carbon Insert	Use 24-hour flexible epoxy or flexible cyanoacrylates (Bohning or AAE)
A/C/E Nock, Super Nock, or 3-D Super Nock	Can be installed without adhesive, or with Carter's rubber cement, FaberCastell Glue Stick, flexible cyanoacrylate adhesive (Bohning or AAE), or Thin plastic film
Conventional Nock:	Saunders NPV®, Fletch-Tite® Flex Bond®
Overnock	Can be installed without adhesive, or with Carter's® rubber cement, FaberCastell Glue Stick, or similar glues.
Nock Outsert Standard Adapter	Use 24-hour flexible epoxy or cyanoacrylate

* "A/C" Shaft refers to all models of aluminum/carbon shafts. Current models are X10, A/C/E, A/C/C, and HyperSpeed.

Checking Conventional Nock Straightness



1. Rest the shaft on the nails of your thumb and index finger (with the point against the palm of your other hand) and blow against the fletching. As the arrow spins, observe the nock rotation. A straight nock will spin without any wobble.
2. Roll the shaft on an arrow shaft straightener or a flat, smooth surface and watch for any nock wobble.
3. Use commercially available nock checking tools such as the Björn Bengtson nock alignment jig.

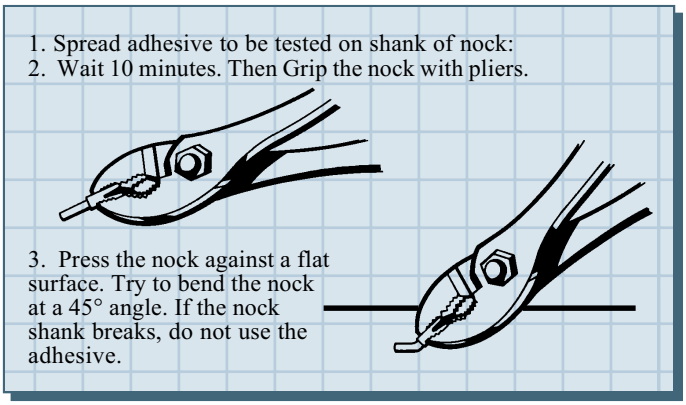
If the nock is crooked, before the cement sets twist and press the nock on the taper and check again. If it is still crooked, remove the nock, clean the taper and install another nock.

ADDITIONAL INFORMATION

Adhesive Compatibility Test

Here is a simple test to determine if the nock adhesive you wish to use is compatible with the various nock materials.

1. Choose a nock as a test sample.
2. Apply a small amount of the adhesive you intend to use on the nock shank and spread the adhesive evenly around the shank.
3. Let the nock set for approximately ten minutes.
4. Grip the nock with a pair of pliers at the top portion of the nock (the part that fits outside the arrow). See the illustration below.
5. Press the nock shank against a flat table surface and try to bend the nock shank to a 45° angle.
6. If the nock shank will bend without breaking, as shown in the illustration below, then the adhesive is compatible with the nock. If the nock shank breaks, do not use the adhesive.



Securing Screw-in Points

Due to the impact of the arrow, points may get loose during shooting. Grip the point with pliers and grip the shaft with a rubber shaft gripper to tighten the point. An alternate method is to screw in the points with a small dab of Easton hot melt adhesive.

Shooting Precautions

(All Types of Carbon Arrows)

WARNING: Check all carbon shafts for cracks or other damage before shooting. Although Beman shafts are the most durable and strongest carbon shafts produced, they are not made with a reinforcing aluminum core (like X10, A/C/E and A/C/C shafts). As a result, any carbon shaft is more susceptible to cracking or breaking if the arrow hits a hard object or is hit by another arrow. All styles of carbon shafts should be checked for cracking after each shot.

Procedure

Grip the shaft with one hand near the point and the other near the fletching. Rotate the arrow while bending it between the hands. If it feels flexible (rubbery), makes a creaking sound, or rotates strangely, do not shoot the arrow again.

Any carbon arrow that has cracked and is more flexible when twisted than a new arrow, could fracture upon release of the string (especially when shot from a high-energy compound bow) and seriously injure the shooter.

Hunting Precautions

There is always a possibility that an arrow shaft used in bowhunting will break after being shot into a big-game animal. If a carbon arrow breaks, it tends to shatter and produce many sharp, splinter-like carbon fragments. These fragments could be harmful if ingested, so when game is recovered, the hunter should always carefully determine whether the arrow has broken inside the animal. If the arrow has broken, follow the instructions below:

1. Use extreme caution when removing broken segments of the carbon arrow shaft.
2. When field dressing game animals, use care to avoid splinters of carbon fiber.
3. Carefully remove the flesh in the area of the wounds. It may contain carbon fibers, particularly at the entry and exit points.
4. Thoroughly clean the surrounding area of the wound and inspect for carbon fragments.
5. Carefully dispose of any meat that might contain carbon splinters.

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For more information call or write Easton. The address and phone number are on the back page of this manual.

Minimum Recommended Arrow Weight

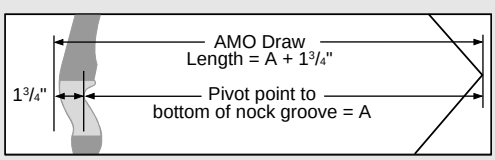
At the request of the bow manufacturers, AMO developed the Minimum Recommended Arrow Weight chart because breakage of high-energy bows has resulted from using arrows that are too light. The recommended minimum arrow weights were determined from tests performed on various brands of bows with cast metal risers. After determining the safe amount of energy left in the bow (23-28 ft./lbs.) when a 360-grain arrow is shot from a 60# speed cam compound bow at a 30" AMO Draw Length, the arrow weights for all other draw lengths and bow weights were calculated using this safe "retained energy" figure. Using arrow weights equal to or heavier than those recommended will reduce the possibility of damage to and/or breakage of bows and therefore help prevent injury to archers.

Bows with machined risers have become popular since this testing was performed. Due to their added strength, they may be able to shoot lighter arrows. How much lighter, if any, has not yet been determined.

Using the Minimum Recommended Arrow Weight chart

- Select the column that describes the type of bow you shoot.
- Move down that column to locate the bow weight range that includes your Peak Bow Weight.
- Move horizontally across that row to your "AMO Draw Length" column.
- The box at that location contains the minimum total arrow weight[1] recommended for your equipment.

IMPORTANT: The lengths shown in the chart below are "Draw Lengths," not arrow lengths.

ACTUAL PEAK BOW WEIGHT (LBS.)				AMO MINIMUM RECOMMENDED ARROW WEIGHTS[1] (GRAINS)								
RECURVE S.E.*/P.D.F.=.95 E.S.E. 62 B.H. 9.5	ROUND WHEEL S.E.*/P.D.F.=1.04 E.S.E. 65.6 B.H. 9.0	ENERGY WHEEL (Soft Cam) S.E.*/P.D.F.=1.20 E.S.E. 71.3 B.H. 8.0	SPEED CAM (Hard Cam) S.E.*/P.D.F.=1.3+ E.S.E. 75.1 B.H. 7.0	 AMO DRAW LENGTH **								
				25"	26"	27"	28"	29"	30"	31"	32"	33"
33	32	29	27	150	150	150	150	150	150	150	150	150
34-41	33-38	30-35	28-32	150	150	150	150	150	150	150	151	165
42-46	39-43	36-39	33-36	150	150	150	150	150	163	179	195	211
47-52	44-49	40-44	37-41	150	150	150	167	185	203	222	240	258
53-58	50-54	45-49	42-46	150	163	183	203	224	244	264	285	305
59-63	55-60	50-54	47-50	172	195	217	240	262	284	307	329	352
64-69	61-64	55-59	51-55	202	227	251	276	300	325	350	374	399
70-75	65-71	60-64	56-60	232	259	286	312	339	365	392	419	445
76-81	72-76	65-70	61-65	262	291	320	348	377	406	435	463	492
82-86	77-81	71-74	66-69	292	323	354	385	416	446	477	508	539
87-92	82-87	75-79	70-74	322	355	388	421	454	487	520	553	586
93-99	88-94	80-85	75-80	352	387	422	457	492	532	581	629	676

1 Arrow weight includes all arrow components—shaft, insert, point, fletching and nock.
* Based on: • 360 Grain Arrow • 30" Draw Length • 60# Peak Weight • Speed Cam
S.E. = Stored Energy, P.D.F. = Peak Draw Force,
E.S.E. = Energy Storage Efficiency, B.H. = Brace Height,

**Draw Length

NOTE: AMO Draw Length is not necessarily the same as your Correct Arrow Length. AMO Draw Length equals the distance from the bottom of the nock groove to the pivot point of the grip + 1¾" while at full draw position. This distance is approximately the distance from the bottom of the nock groove to the far side of the bow. Correct Arrow Length is measured from the nock groove to the end of the shaft. If you draw the end of the arrow flush with the far side of your bow, arrow length and draw length are approximately the same. If the end of your arrow is in front of the far side of your bow, or if you pull the end of your arrow inside the far side of your bow or use an overdraw, Draw Length and Correct Arrow Length will not be the same. You must use AMO Draw Length when using the AMO Minimum Recommended Arrow Weight chart above as this AMO Draw length determines the energy your bow has stored at full draw. Use Correct Arrow Length when using the Easton Shaft Size Selection charts.

F.O.C. (Front of Center)

The term F.O.C. (Front of Center) describes the percentage of the arrow's total weight that is located in the front half of the arrow. The more weight that is located in the front half of the arrow, the more forward is the center of balance of the arrow. Why is this important? It is generally believed that the F.O.C. balance position of the arrow is one of the more important elements affecting the shape of the arrow's trajectory curve.

Unfortunately there are too many variables affecting the path of an arrow to make it possible to precalculate the trajectory of an arrow simply by controlling its F.O.C.. Some archers, though, find it valuable to determine and record the F.O.C. of their arrows once they have achieved the flight characteristics they desire.

The importance of F.O.C. is greatest in archery events that emphasize long range shooting. FITA archery (Olympic Style) which requires archers to shoot up to 90 meters is the best example of this.

In short range events, such as indoor archery, the effect of F.O.C. is not significant. Other factors affecting arrow flight are more important to these archers.

Changes in the trajectory of an arrow, for whatever reason, are quite apparent in archery events or bowhunting conditions that call for shots to be made at both short and long ranges. Bows for these situations usually include the use of multiple sight pins or multiple premarked sight settings. Since changing the F.O.C. of an arrow may change the shape of its trajectory, it may also change the preset sight locations on the bow sight.

F.O.C. Guidelines

The balance of an arrow can be modified by adding weight to either the front or the rear of the shaft. Heavier vanes, for example, increase the weight of the rear portion of the arrow. Replacing vanes with feathers lightens the rear of the arrow. Various points, inserts, and even added weights are used to modify the weight of the front of the arrow.

Even though there is no established perfect F.O.C. for each setup, there are some general recommendations that provide a good starting point when either constructing a set of arrows or when analyzing an arrow's flight characteristics.

F.O.C. Recommendations

Aluminum Target Arrows	7-9 %
A/C/C Target Arrows	9-11 %
A/C/E Target Arrows	11-16 %
Hunting Arrows	10-15 %

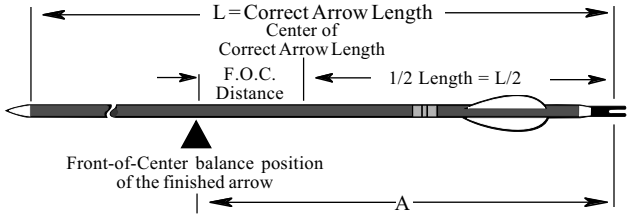
Use the following formula to calculate the exact F.O.C. of an arrow.

Determining F.O.C.%

AMO-Standard F.O.C. balance formula

$$\text{F.O.C.\%} = \frac{100 \times (A - L/2)}{L}$$

L = Correct Arrow Length—Distance from bottom of nock groove to end of shaft
A = Distance from bottom of nock groove to finished arrow balance position (includes weight of point [+ insert], nock system and fletching)



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The following is from Gene Wensel's new book "Buckskin and Bone - Postgraduate Whitetails"

If I had to name the single most common deficit among bowhunters who repeatedly fall short of their potential, it would have to be negligence, or ignorance, of the many ways wind can either help or hinder hunting situations. I remember a farmer asking us why we entered the patch of woods behind his house from different directions on various days. When we told him it depended on the wind, he pondered a few seconds before asking, “What’s the wind have to do with it?” Now, *that* is a classic quote!

Why this subject of wind seems to go in and out of so many ears is probably because it can be boring. It’s also very hard to explain things we can’t necessarily see. Wind currents are not exactly photogenic. Yes, we can feel air movement and we are often able to see results or activity, but some of the most subtle pitfalls of comprehension leave us with too many mysteries and unanswered questions. Even taking into consideration various obstacles, pitch of the terrain, trees with leaves vs. no foliage, air temperatures and whatnot, all air movement will differ according to even simple factors such as velocity. I categorize air movement into three classes: light air movement like thermals, with speeds under 3 mph; the medium movement of breezes 3-20 mph, and the effects of higher wind speeds over 20 mph. The important thing is that air reacts differently at increased velocities.

Before I go any further into the subject of wind and odors, I probably should state that I am NOT a scent control freak. I don’t wear carbon suits. I don’t spray myself down with various misted potions, nor do I chew special gum. I don’t quit eating red meat before hunting season. I don’t shower with magic formula soaps every morning before I go hunting; unscented brands will do. Although I change underwear and socks every day, I don’t launder my hunting clothing on a daily basis, nor do I carry them around in tubs filled with fresh dirt or forest debris. I chew leaf tobacco and pee right out of my stands. But, I ***do*** pay attention to the wind at all times when I’m in the woods. I have trained myself to be constantly aware of it, as well as how it reacts to various structural deviations and various velocities. My puff bottle is always handy. I use unscented tooth paste, soaps and deodorant. I shower every evening, not right before I go out into cold weather. I always wear rubber boots to minimize ground odor. I guess what I’m trying to say is that I’m very aware of odors but not a freak about it. I tend to avoid most commercial crutches. I’m lots more interested in paying attention to the wind. I believe no matter what species, no matter how sensitive a nose we’re dealing with, game animals are ***physically unable*** to smell any free floating scent or odor upwind of its source without a back draft or residual attachment.

Since human beings are not blessed with acute olfaction at birth, hunters must ***train*** themselves to constantly be attentive to wind direction and air movement. Aside from understanding exactly how breezes and thermals react with structure, the first and most important part of wind training has to do with being habitually alert to whatever direction the slightest breezes are drifting. I don't remember ever reading anything from any outdoor writer about the necessity of "training" for this awareness, but training is exactly what we all should have done during our "hunting apprenticeship" years. Sadly, many modern hunters seem to skip or fast forward through their apprenticeship years. Many people just say, "Ya, ya….I pay attention to the wind." For some reason, many hunters hear but don't listen. Many don't carry any sort of wind detection tools, or they neglect to use them often enough with slight breezes when they are needed most. Wetting a finger just doesn't get it! We must train ourselves to be conscious of even minimal breezes any time we are outdoors. Since it's a repetitive training process, almost everyone will eventually get much better at it. The sad part is you'll never really know when you get there; but trust me, awareness is worth the time and effort.

Whitetail deer know they are a prey species. I'm also convinced *visual* and *auditory* predators such as felines and raptors know which species are prey. On the other hand, *olfactory* predators like canines or snakes put most of their trust in their noses. Humans are essentially visual predators; whitetails are olfactory, auditory and visual prey, usually in that order. As far as physical facilities, olfactory and auditory skills usually favor prey species rather than predators, an important fact to remember. How a prey species uses its nose to perceive scents and various odor mixtures is a study all by itself; the same can be said for predators. Prey species always rely on their noses to choose bedding areas, to pick hiding places or decide on security cover.

Daily weather forecasts are very valuable to hunters. If you don't have access to the internet or television, a weather radio is your best option. I want to know the forecast as well as the predicted wind direction and velocity. With that said, in all honesty, I don't pay much attention to forecasts past two days. Nor do I pay much attention to a rising or falling barometer to predict game movement because I'm going out regardless. I feel pretty much the same about moon charts and solunar tables; I'm going out anyway. I don't want to start my hunting day with a negative attitude because a chart told me today

won’t have good game activity. I mostly want to consider stand options, hunting strategies and know what to wear.

Okay, big words like perception, apprehension, recognition, comprehension and appreciation have been laid on the table. Now let’s talk about how to use wind to our best advantage as hunting predators. The influence of outdoor air flow is a challenge that can present entirely different results, far above and beyond simple cat and mouse scenarios.

Always think of wind as invisible water *without the effects of gravity*. As it flows at various speeds, it will pretty much carry your scent “downstream.” Picture in your mind what happens when invisible water hits various objects in its path. It might divert at angles, increase speed, or swirl into slower pools or eddies. An obstruction will never permanently stop it, only alter velocity or direction.

Moving air often acts differently in the exact same spots seasonally. As an example, air moving across an open field will react differently when it hits heavy foliage on trees than it does after all the leaves have shed. Results also depend on the size and shape of various species of leaves or trees. It will also act differently with and without a canopy of trees overhead as well as the density of understory.

Air movement is a study itself, but for hunting purposes, there are basic rules to learn and remember. Warm air rises, cool air falls. When cool morning air is hit by sunshine, it quickly warms to rise as thermals. When black dirt absorbs sunlight, the resultant warmth causes rising thermals. This means thermalization will occur quicker when sunlight hits a newly plowed dirt field than it will when it hits a grassy meadow. Warming and/or cooling of air takes place almost every day of the year.

Perfectly calm outdoor air is really quite rare, at least for any length of time. Scent seldom pools for long periods. Almost any given area will have **one** *prevailing* wind direction but **two** *predominant* wind directions. The predominant winds for an area might be out of either the northwest or southwest but the prevailing wind for that same area today could be out of the southeast. Vegetation often gives clues to predominant wind direction. In open areas, notice which way trees lean. Also note which way tall weeds or long grass in vast open areas grows. Winds often change with the seasons in many given regions. Ask a local farmer or skilled woodsman, check with a regional weatherman, a pilot, or any small airport. Northwest and/or southwest winds are probably the most common on a national basis but many areas such as southern or coastal regions have lots of southeast winds. I hang most of my stands according to predominant wind directions but hunt each according to prevailing wind direction. Make it a point to always have a few stands set up for odd winds. Easterly winds, uncommon but not rare in my hunting areas, require enough

foresight to allow back up options on days with unusual wind directions. We make it a habit to not only name or number our stands, but also record the best wind directions to hunt each. We also label each as best for morning, evening, all day, or "anytime" hunts.

I want to address the subject of wind and the deer themselves. I will even go so far as to say some deer understand perfectly things like updrafts and eddies and even use them to disperse their scent from directions predators might approach. This is exactly what causes certain deer to hold tight at close range while others run first and hide later. A lot of these reactions to disturbance depend on age, sex and personality of each deer. What most whitetails don't seem to grasp is the fact that man the predator cannot smell

worth a hoot. Most deer *visually* soon learn that humans can't see very well in low light but they still assume we can smell as well as they can.

Wind velocity is an important factor. Most game animals don't like wind velocities over about 20 mph. High winds often put game down to where they hold tight until it subsides. The main reasons they don't like windy conditions are because they can't smell as well, can't hear as well, and can't see movement as well while all foliage is moving. They can't trust high winds enough to pin point trouble, yet they can't do much about it except to lay low until higher winds subside. If we were able to ask whitetails what sort of wind velocity they prefer, I'm sure the answer would be steady, damp breezes, faster than thermals but under 10 mph. Along the same lines, many bucks don't like calm air. They will often move very slowly and even stop or stand in one spot until they feel a slight wind that allows them to move forward. My brother labels these deer "slow walkers." They are most often mature bucks.

Most game animals realize scent lingers longer in damp air. Deer use and rely upon their noses for directional information. Of course all deer pay attention to whatever scents a breeze brings, but they also learn to tell direction of travel from what is retained on the ground. Many humans fail to realize the almost incomprehensible powers of excellent noses in many species. Think about this; when a beagle hits a rabbit track, even on bare ground, the dog very seldom follows the trail the wrong direction. What that tells us is the dog can almost immediately tell the tracks a couple feet to the left (or right) are fresher than the ones they just had their nose in. Very impressive!

Deer not only use their noses for defensive purposes, but to "communicate" among themselves through olfactory powers. Above and beyond defensive measures, scent left on rubs, in scrapes, on licking branches, along trails, and even on themselves, all relay useful information to whitetails. With all that being said, here comes the kicker…. **All deer pay attention to wind but not all of them ever learn how to use it!** Once again, it seems to be a timely training process that some whitetails don't ever master. I see many deer moving up wind, downwind, or cross wind all the time. You do too.

Almost all mature deer have learned to use moving air to their advantage. In fact, in my opinion, one of the main reasons they live long enough to become mature deer in the first place is the fact they have learned to utilize wind currents to the best of their abilities and advantages.

Mature deer, both bucks and does, realize, and eventually learn there are certain terrain structures that make air more stable. For instance, air on slopes is more stable than that at the bottom of a draw or on top of a ridge. Or, game movement patterns will always be better on the prevailing upwind side of any large body of water.

Lone deer will almost always bed with the wind at their backs, using their eyes to protect their front. More than a couple deer bedded together will lay facing in multiple directions *on purpose* to protect themselves visually even better. Bucks bedding together in bachelor groups usually face in opposite directions because looking at each other could be interpreted as aggression. You can easily prove directional bedding to yourself by studying fresh deer beds in snow right after you jump a group of whitetails.

Bucks that have learned to use wind often move downwind, especially at night, using their noses to protect their most vulnerable rear while relying on their eyes to protect their frontal area. With mature bucks cruising in broad daylight, those that have learned to use the wind prefer to move *quartering downwind* rather than with a nose wind to find ripe does. This allows them to cover much more olfactory ground while using less energy.

Terrain influences deer movement. The reason the up wind side of a lake will almost always have more deer movement is due to the fact most deer eventually learn that danger never comes from out in the lake. Another example: rows of corn in a field act as baffles to mess up any sideways wind; by the same token, breezes coming right down rows of corn allow a buck to scent check an entire corn field by simply walking the downwind edge of multiple rows.

A frequently asked question has to do with whether a hunter should move if, or when, wind changes direction. Like I already said, I don't rely too much on weather forecasts more than two days in advance, but if the local forecast calls for a given wind direction, I'll trust meteorologist skills, always remembering that forecasts are only predictions. If a breeze changes to my disadvantage, I usually wait things out for at least a half hour before deciding whether it's time to vacate. I don't want to stay on a stand with a bad wind that does more harm than good by revealing my ambush site. In areas with quite regular air directional changes, consider erecting two stands on opposite sides of the area you are hunting. Although we don't routinely put up opposing stands, moving across a trail or funnel to an alternate stand doesn't take a whole lot of effort if you provide yourself with the option.

Aside from the knowledge that deer always pay attention to wind, don't forget they are constantly looking for other deer. Ripe does look for bucks; bucks look for all deer. Good eyes are one thing, but excellent noses are by far their strongest defensive asset. They learn to trust their noses infinitely more than their eyes or ears. If there is one trait that annually saves the lives of thousands of mature bucks, it is their ability to pay attention to their noses and use the gift of an excellent olfactory system to avoid trouble in the first place. Our ability to play the wind might increase our odds but never really levels the playing field.

Now let's look at a few of the many factors that affect wind movement against terrain features and various obstacles in an attempt to try to better understand how wind is used by deer. Since hunting styles of humans can be classified as predator types such as canines, felines and raptors, let's look at examples.

When dealing with whitetail predators, the canine group consists of wolves, coyotes, bears and dogs. The feline list takes in only cougars, lynx and adult bobcats. Canines use their noses, eyes and ears to find prey. Felines depend more on their eyes and ears, with lesser dependency on olfactory skills except at very close range. Human hunters trust their eyes and ears far more than our all but worthless noses. For the most part, we humans are essentially visual predators.

Many years ago, during my apprenticeship days afield, I learned a lot about deer behavior by watching male dogs interact among themselves in suburban neighborhoods. Even more information can be noted by watching a good hunting dog work any piece of cover. Most bird dogs cast back and forth, alternating between checking ground scent and slightly higher air updrafts. By the same token, most hounds, with the exception of trained strike dogs, keep their noses close to the ground to find tracks. Have you ever noticed that flushed birds often defecate shortly after take off? I watched a wild turkey do it just yesterday. Many people think the bird just had the crap scared out of it. In reality, by letting things rip, they are instinctively dropping scent that causes their pursuer to stop to sniff it, giving the bird an extra few seconds head start.

We've all watched rutting bucks put their noses to the ground to follow a ripe doe track. We've also seen approaching deer stop suddenly on red alert, lifting their noses higher into the air to get a better whiff of whatever alarmed them. Chances are it was not enough odor to make them flee, but just enough to warrant further attention. Why do they lift their noses higher? It has to do with updrafts in weak air movement. Prey species are constantly aware of the possibility of impending danger. It's part of what makes them tick and survive. They know they can be prey.

One of the biggest advantages of hunting during the rut is that bucks often forfeit normal caution for that of a juicy doe's scent. Sexual urges for reproduction over-ride all natural and instinctive security. They take risks they wouldn't normally try. If it wasn't for man's understanding of the powerful urges brought on by the whitetail rut, our hunting success would be remarkably lower.

Air movement is a very complex subject best suited for people a lot smarter than me, but a study of basics can help us realize how slight drafts and stronger air movement around and/or over obstacles can make or break many hunting situations.

There are a lot of ways for a deer to escape a predator. One is to run fast and far, taking giant strides in a relatively straight line to gain distance, hoping any visual or olfactory pursuer quickly loses interest in working out the trail by use of only its nose. Another tactic is to hold tight, especially when they're bedded in thick cover or deep snow. Other than fleeing or holding, there are also other common ways to shake a pursuer, especially a predator following by scent. The first is to find other deer and join the group, hoping their pursuer gets confused and takes off on another track. A second way is to cross or walk in water to wash away ground scent. A third might call for making a big loop to cross one's own tracks. A fourth requires jumping sideways to disguise an established track. I tend to think a lot of evasive maneuvers are instinctual but I can't help but ask myself if any degree of reasoning is involved. Whitetails are not supposed to be able to reason but they are indeed born with natural instincts to escape. A newborn fawn instinctively holds tight, sometimes within feet of a predator. This instinct often lasts less than two weeks before they learn to jump up to run for all they're worth instead of hiding. Untold numbers of fawns are sadly killed by innocent farmers during mowing. Many people will disagree with me, but I feel coyotes kill more whitetail fawns than wolves, dogs, bears or cats combined. Most of these kills occur the first couple weeks after birth but I've seen lots of evidence that leans toward this theory. I've even seen coyotes search an area in pairs or small packs during late May and early June in what appears to be organized specific hunts for newborn fawns. Fawns are supposedly all but odorless but I don't buy the 100% theory. One of the main reasons various species groom themselves or each other has to do with cleaning themselves of odors. Mammal grooming has absolutely nothing to do with looks.

I once had a ringside seat to a predator's quest. I was sitting in a tree one January many years ago during Iowa's late season. Two button bucks were feeding on locust pods in front of me at about 25 yards. Unexpectedly, I saw slight movement out of the corner of my left eye. I turned slowly to see a huge male bobcat in full sneak just to my left. He was locked onto the young

deer with sincere intent and was big enough to close the deal if he could close his jaws on one of their windpipes. His moves were pure poetry. Fluid and perfectly silent, he froze when he had to, taking careful steps to close the distance inch by inch whenever he could. I wish I had a camcorder. I was intently watching the cat when one of the deer obviously smelled or saw him. Both young bucks exploded with loud snorts to vacate the impending crime scene. I thought it was interesting the cat just got up, turned and walked away. He didn't look or act frustrated or disappointed whatsoever. For him, it was just another foiled stalk.

Let's talk about air movement in the woods. Again, always consider it as invisible water without the effects of gravity. Secondly, remember, warm air rises, cool air falls. A third rule, just as important but rarely considered, is how various obstacles lay, what they are made of, their shapes, sizes and consistency. These are all factors that require attention and can affect how smells drift through the woods, especially at lower velocities. Above and beyond structure, terrain and natural turbulence, factors such as wind velocity, canopy (overstory), ground brush (understory), objects like rocks, logs, blowdowns, open water, species of trees, trunk size, foliage, and even shapes of various leaves all play roles in air movement.

Let's consider a light breeze coming across a relatively flat field bordered by timber. What happens to air movement is dependent upon many things. Deciduous trees retaining leaves will affect air differently from those same trees after they have shed foliage. Tree leaves differ according to species, size, shape, whether they are brown (dead) or green. Even how leaves hang is a factor as a result of leaf stems. For instance, quaking aspens have flat stems that lie at right angles to their leaf, which causes them to shake when air hits two opposing flat surfaces and gives them the name of "quaking" aspens in the first place. Other leaves are too big and heavy for their stems and hang almost straight down. Others, with even heavier stems, only angle their leaves downward. When low velocity breezes hit drooping leaves facing outward due to sunlight, air is lifted into a slight updraft directly into the middle of the tree. As it passes through the tree, the same breeze is then forced downward as it hits the underside of the hanging leaves on the opposite side, moving air back downward toward the ground. Now throw in more complex factors such as higher wind velocities or softwoods versus hardwoods, and we see different results. The same holds true with softwood species, some of which have branches slanted up or down at angles dependent upon the species.

Dense brush on a field edge often causes wind eddies that allow a deer seemingly upwind of you to smell danger. Again, let's consider air movement of invisible water as it hits various obstacles like rocks, vertical tree trunks, horizontal logs, etc. As slowly moving air hits a big rock or large vertical tree trunk, it accelerates going around the rock or tree, then slows down again on the back side, causing slight eddies before it moves on. Picture a huge mound of dirt sitting in the middle of a flat, open field. When a light breeze hits the hill, most of it will go around rather than up over the top of the obstacle. But when wind velocity increases, air moves over the hill as well as around it.

Updrafts and turbulence are caused when air flow is interrupted by structure. There are many rules of thumb that come into play when dealing with velocity of air movement in any given piece of cover dependent upon terrain or densities. These rules are often voided when velocities increase or when structural deviations differ.

Thermals are caused by temperature changes in air. When warm air cools, or when cool air warms on a hillside, the air flow usually follows vertical drainages, once again much the same as water would do. Breezes across a large body of water or at the beach usually come toward shore during the day and move away from shore at night. When pooled, calm air sitting essentially still in the woods is eventually hit by a breeze, it spreads in a widening cone that narrows in width dependent upon the velocity of the wind that moves it. In other words, the invisible cone is no longer a cone but a narrower band moving directly downwind with higher wind velocities.

Not even taking into consideration terrain and structure, how air moves through woods, above the ground but below overhead canopy, is affected by understory on the ground as well as the size and number of tree trunks and height of the treetop canopy. Clean, “pretty,” hardwood stands of mature timber won’t affect winds as much as forest with heavy understory ground brush. As previously noted, deer wanting to move through areas of calm air will often stop to wait for subtle changes that indicate its safe enough to move forward.

People who manage land for whitetail habitat frequently suggest thinning of heavily timbered woods, opening clearings to allow sunlight to filter through the canopy in an effort to stimulate growth of understory brush. Any increase in density of ground brush eventually makes very attractive security cover for deer. This is usually a good plan when clearings are kept fairly small but remember open canopy often causes down drafts during evenings. When sunlight warms calm grounded night air on level ground, the warming air rises up to be replaced by the cooler air surrounding the clearing; not a bad deal for morning stands. But for evening hunting, when the sun starts to go down, shaded leaves in surrounding treetops keep air cooler than at ground level, causing light downward thermals that can give away even an elevated hunter in a treestand. I suspect many stands hung on the edge of wooded clearings are not very good for evening hunting even on level terrain due to regular light down drafts. With higher breeze velocities, this factor is many times voided, but I don’t like to hunt wooded clearings during calm air until after foliage sheds.

South facing slopes are always better for hunting during cold weather; north slopes during warm weather. When I lived in Montana, I would always find September elk on north slopes during warmer weather. South slopes retain heat longer, allowing more time for updrafts, at least until late afternoon. On the other hand, north slopes usually have thicker vegetation, providing better bedding cover and more security against visually sensitive predators on north slopes, olfactory sensitive prey on south slopes. For these reasons of rising thermals and warmth, most fawns or elk calves are probably dropped on south slopes in hilly terrains.

Mature whitetails does habitually use wind to their advantage when rearing fawns. People who use IR trail cameras during late June and early July, will notice they hardly ever get photos of spotted fawns after dark. This is because fawns instinctively don't move much during the night when most predators are up and about. I suspect whitetail fawns remain bedded nightly until they are several months old. You'll seldom see a mature whitetail doe go directly to a bedded fawn. Instead, the doe calls her fawn to her to protect its hiding place and to keep scent to a minimum. Very few "orphaned" fawns picked up every spring are in fact orphans.

Whitetails regularly use ridge saddles as funnels for movement over a hill. One of the reasons saddles on ridges become potential hotspots has to do with the fact a saddle is often the shortest, easiest way for any deer to cross a ridge without having to climb over the very top. It is also the shortest, easiest way for wind to get over a ridge, so the second reason a saddle lends itself to be a prime funnel has to do with drafts of rising or falling thermals. If a ridge top sits parallel (the same direction) to the prevailing wind, air tends to move around the ends and along the sides of the ridge unless we're dealing with gusty or high winds. By the same token, if breezes come up the sides of a ridge, at right angles, they pass over the saddles first. Rising warm air seems to "seek" saddles, probably just because it is acting like water minus the gravity factor. As warm air moves up or down the side of a ridge, it tends to follow drainages. These drainages don't necessarily lead right to ridge saddles, but often do.

Another tendency noticed with both rising and falling thermals is that they tend to move in very slight gusts or variable low speeds, not at a steady velocity. I suspect this has to do with ground obstacles or terrain.

Many ridges have shelves on one or both sides, sometimes more than one, dependent upon the height of the ridge. If a ridge has a shelf 30 to 50 yards down from the top, this shelf will be well used by deer. Shelves and resultant wind eddies make preferred places for bedding and/or for bucks to move along a ridge. Our problem lies in the fact when these shelves create wind eddies, especially with downward air flow that comes directly over the top, a waiting hunter often gets busted. That is probably the reason deer like them in the first place. Stands erected on shelves usually must be placed higher than usual.

Eddies also form at the bottom of a ridge during evening thermal cooling. I often hear, "I used to have a stand down in the bottom but swirling winds always gave me away."

Swirling is just another word for an eddy but we must realize that swirling winds can move air circling horizontally to one side or another but swirling can also move air up and to your front.

Colored smoke bombs available around the 4th of July are good tools for off season or non-hunting (scouting) days. I think soap bubbles would be even better but I've never tried soap formulas that make bubbles tough enough to last very long. I recently learned the secret to making tough bubbles requires use of distilled water and glycerin, but I've not tried any secret recipes.

Figuring out subtle air movement can become a very complex study because of so many variables. I'm not saying hunters need to become meteorologists. I'll be the first to admit I'm probably not smart or serious enough to figure in factors like inversion or atmospheric pressure on different days. Understanding winds and breezes of all speeds that move past any blind or treestand site will help very much in determining when and how to hunt any particular place. More often than not, they also explain why we regularly get busted!

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