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SHOOTING TRIALS ON HEADS OF DEAD PILOT WHALES GUIDELINES TO TEST THE EFFICIENCY OF RIFLE AMMUNITION USED FOR HUNTING AND EUTHANASIA OF SMALL WHALES

By
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BACKGROUND

Small cetacean like beluga (*Delphinapterus leucas*), narwhal (*Monodon monoceros*) and pilot whales (*Globicephala melas*) are hunted with rifles in several countries. The hunters are aiming at the brain. In Greenland hunters often use pointed, full metal jacket and soft point bullets to hunt species like beluga. The same is the case in some non-member NAMMCO countries like Nunavut (Canada). It is well known and investigations also have shown, that when a pointed bullet meets hard bone (such as the cranium), it tends to tip or ricochet, without penetrating to the brain and soft pointed bullets tends to disintegrate when hitting bones (REF). Blunt nosed bullets, with full metal jacket penetrate bone much better than pointed and soft pointed bullets (REF).

The effect of different rifle projectiles used on whales in connection with hunting or euthanasia was thoroughly discussed at The Workshop on Hunting Methods for Marine Mammals arranged by NAMMCO in Nuuk, Greenland in 1999. The workshop made a number of recommendations dealing with different subjects with the aim to improve hunting efficiency in its member countries (NAMMCO Annual Report 1999). Among others, it recommended that Greenland initiated studies in co-operation with the hunters, to test bullets commonly used for whale hunting on whale carcasses to determine the best ammunition for these hunts. The recommendation was endorsed by the Council of NAMMCO (NAMMCO Annual Report 1999) and at a later meeting in 2002 (NAMMCO Annual Report 2002), the Council endorsed a recommendation from the Committee on Hunting Methods to develop guidelines for controlled and standardised trials to study the efficiency of the different types of ammunitions and rifles regularly used for these species.

Such guidelines might apply to all species of whales. However, the use of rifles are not considered an adequate killing method for the largest species of whales except with respect to euthanasia of harpooned (REF) or stranded animals (REF) where rifles and ammunition under certain conditions may be adapted to certain species. Representatives from Nunavut offered to contribute to develop such guidelines.

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In principle, only one bullet should be fired at each head/brain. Several skulls of whales are therefore needed for such trials. As hunting in Greenland is usually taking place in remote areas it was difficult to obtain enough samples of skulls for the trials. However, pilot whales are caught in relatively large numbers in the Faeroe Islands and usually in close vicinity to roads and municipalities with capacities to conserve heads by freezing until trials can be set up. In the Faroese drive hunt of pilot whales the killing is done without using firearms. The heads are therefore not damaged prior to testing by projectiles from previous hunting activity. Heads of pilot whales from the Faeroe Islands hunt were therefore used for the trials.

SHOOTING TRIALS

The shooting trials were set up and conducted by Justines Olsen (Faroe Islands), Egil Ole Øen (Norway) and Glenn Williams³ (Nunavut). Hans Mølgaard⁴ (Greenland) was present at parts of the trials and Bergur Hanusson⁵ (Faroe Islands) assisted as photographer to document wound canals and bullet performance.

Materials and Methods

The shooting trials were performed outside Tórshavn, Faroe Islands, September 10-13, 2004, at a range well away from public traffic. One head of a pilot whale with torso and 17 heads from pilot whales of different sizes and ages retrieved from two different hunts in 2004 had been sampled and frozen. The heads were brought to the range, which had a flat tarmac area with good view of the surroundings, and were placed on the ground with an earth slope without large stones in the background to prevent ricochets and to catch projectiles that might penetrate and pass through the heads. An adjustable stepladder was used as a shooting bench. The shooting range was 10 m for the first 23 rounds, but had to be changed to 14 m for the last 9 rounds due to bad weather conditions.

Three calibres commonly used in the hunting of small whales .338, .308, 270 and one larger calibre, .375, were chosen for the trials (Tab. 1). The bullets were soft pointed (SP), Pointed with full metal jacket (P-FMJ), Round-nosed, full metal jacket (RN-FMJ), Round-nosed, solid (RN-S), and Barnes X.

The heads had been kept frozen until eight days prior to the trials. However, some of the heads were still not completely thawed during the trials. The heads were numbered according to Faroese directives (marked with hash key in Appendix 1 and both sex and size of the animal could be read from the hunting protocols. The Faroese skin value is indicated, as this gives an easy estimate of the age of the whale. A female whale with a skin value of 7 or more is always an adult whale, where as a male with a skin value above 7 can be juvenile. The skin value is not always correlated to the length of the whale because the body condition is taken into consideration in the evaluation. A whale in a poor condition can be longer than a whale in good condition. The different hits of bullets were numbered with roman numbers from I to XXXII, the heads were numbered with Arabic figures from 1 to 18. Some of the largest heads and the torso were used for more than one firing. This was indicated with small letters, i.e. 2a, 2b, etc. For each head a label indicating the roman figure and letter was fixed to the head when photo documented.

The heads were targeted frontally, from the side and from different angles to the side. Detailed information on the shooting trials is given in Appendix 1. At rounds fired from the side, the shooting

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angle is defined as the rostral (front) and caudal (back) angles to the sagittal plane) and degrees dorsal (over-side) when shooting from dorsal and ventral (under-side) of the head. Shots fired in the melon are indicated as frontal. The hitting point for each shot is indicated with an x on the head in Appendix 1.

Each head was autopsied consecutively with suitable equipment and tools, including measuring rods, fibre and metal probes, knives, bone saw, hammer, chisels and crowbar. A cranium of a pilot whale was used as a guide and for the comparison of anatomical structures.

The first step of the autopsy was a careful investigation with the fibre probe to check and measure the penetration depth without destroying the wound canal. The dissection of the wound canal started at the entrance wound by carefully slicing blubber and tissue following the probe into the wound canal to demonstrate the canal in its full length including any crater formation, fractures of bones and projectiles remains. The wound canal was described in a protocol and further documented by photos, except for head 14 where photo documentation was not done.

Results

The results of the trials are listed in Table 1 and Appendix 1.

Table 1. Bullet type, number of rounds and performance.

Caliber	Bullet weight (grains)	Bullet Type	No. of rounds	Shooting Range (m)	Brain penetration
.375	270 gr	SP	2	14	1
.375	300 gr.	Barnes X	3	14	2
.375	300 gr	RN-FMJ	3	14	2
.338	200 gr.	SP	4	10	0
.338	250 gr.	RN-S	3	10 + 14 (1)	3
.338	250 gr.	Barnes X	3	10	2
.308	150 gr.	SP	3	10	0
.308	MS	P-FMJ	4	10	3
.308	AS	P-FMJ	2	10	1
.270	150 gr.	SP	5	10	2

Calibre .375, eight shots:

270 grain, SP (2 shots)

Shot XXIV, head no. 12, adult female, was fired from the side. The bullet passed through the skull. The point of entrance was approx. 10 cm dorsal caudal (to the side) to the eye. The exit wound was approx. 5 cm rostral (in front) and ventral (under) to the eye. The total length of wound canal was 43 cm. The bullet was not retrieved.

Shot XXV, head no. 13, adult female, was fired from the front of the melon, approx. 8 cm. dorsal (up) from the mouth. The bullet did not penetrate to the brain. The wound canal was 36 cm. The bullet created a large crater in the melon tissue. Lead fragments were found in the crater and the jacket with some lead remains was found in the skull bone.

300 grain, Barnes X (3 shots)

Shot XXVI, head no. 14a, adult female, was fired from the side at the temporal region. The bullet did not penetrate to the brain. The entrance wound was approx. 5 cm dorsal (up) and caudal (behind) to the eye. The wound canal was 18 cm long. The bullet was found embedded in the skull bone tissue.

Shot XXIX, head no. 15, adult female, was fired from the side at the temporal region. The bullet penetrated to the brain. The wound canal was 36 cm. The bullet was found inside the cranial cavity against the skull bone on the opposite side of the entrance to the skull. The skull bone was fractured.

Shot XXX, head no. 16, adult female, was fired from the front. The bullet penetrated and passed completely through the skull. The wound canal was 54 cm. The bullet created a large crater in the blubber of the melon before passing through the cranial cavity. It went out in the occipital region of the skull. The bullet was not retrieved.

300 grain, RN-FMJ (3 shots)

Shot XXVII, head no. 14b, adult female, was fired from the side. The bullet did not penetrate to the brain. The wound canal was 34 cm. The bullet was found embedded in the skull bones.

Shot XXXI, head no. 17, juvenile female, was fired from the front. The bullet passed completely through the skull. The wound canal measured 51 cm. The bullet was not retrieved.

Shot XXXII, head no. 18, juvenile, sex not indicated, was fired from the side at the temporal region. The bullet passed completely through the skull. The wound canal measured ...42 cm. The bullet was not retrieved.

Calibre .338, ten shots:200 grain, SP (4 shots)

Shot I, head no. 1a, adult female, was fired from the side at the temporal region. The bullet did not penetrate to the brain. The wound canal was 24 cm. The bullet was found "coiled up" in the skull bones.

Shot IV, head no. 2b, juvenile female, was fired from the side into the melon and directed backwards. The bullet did not penetrate to the brain. The wound canal was 18 cm. The jacket was found in the bones of septum nasi and the lead core had left lead remains along the whole wound canal.

Shot XVIII, torso, 9a, adult, sex not indicated, was fired from behind and at a 45 degree angle. The bullet went in and touched the scapula and passed through the soft tissue in front of scapula and was retrieved in a completely expanded condition lateral (outside) to Foramen magnum in the skull bone. The wound canal measured 26 cm.

Shot XXII, head no. 11a, juvenile female, was fired from the front into the melon to check the bullet's ability of cavity formation. The bullet created a deep crater along the wound canal, and oil was pouring from the entrance wound. The bullet was retrieved in musculature that was still some frozen after 40 cm of penetration. It did not penetrate to the brain.

250 grain, RN-S (three shots)

Shot II, head no. 1b, adult female, was fired from the side into the melon about 15 degrees backward.

The bullet passed through the skull bones and penetrated to the brain. The wound canal was 48 cm. The bullet was retrieved. The only visible mark on the bullet was a small notch in the tail.

Shot XXIII, head no. 11b, juvenile female, was fired from the front. The bullet passed completely through the skull. It created a large crater in the melon and passed between the maxillas and out of the skull at the neck region. The wound canal was approx. 70 cm. The bullet was not retrieved.

Shot XXVIII, head no. 14c, adult female, was fired from the side in the temporal region. The bullet passed completely through the skull. The length of the wound canal was not measured. The bullet was not retrieved.

250 grain, Barnes X, (three shots)

Shot III, head no. 2a, juvenile female, was fired from the side at the temporal region. The bullet passed completely through the head. It was likely that the bullet also had passed through the brain, but the skull was not opened. The wound canal length was 41 cm. The bullet was not retrieved.

Shot V, head no. 2c, juvenile female, was fired from the side and 45 degrees backward through the melon. The bullet did not penetrate to the brain and the wound canal was measured to 26 cm. However, the bullet was not retrieved and the status of the bullet is uncertain.

Shot XIX, torso 9b, adult, sex not indicated, was fired from behind and 45 degrees frontward. The bullet passed under the brain and stopped in Septum nasi. The wound canal was 35 cm. The bullet was retrieved and was completely expanded.

Brno, Calibre .308, nine shots:

150 grain, SP (three shots)

Shot VI, head no. 3a, adult female, was fired from the side at the temporal region. The bullet was retrieved completely disintegrated after passing through 3 cm thick bones tissue. Wound canal was 23 cm. The bullet did not penetrate to the brain and remains from the lead core was visible in the whole length of the wound canal.

Shot XIII, head no. 7a, juvenile female, was fired 40 degree backwards hitting point between the melon and the temporal region. The bullet hit bone at 7 cm depth and passed through 4 cm of bone tissue before it stopped. The emptied jacket was retrieved in bone tissue.

Shot XX, head no. 10a, adult female, was fired from the front. The bullet was retrieved splintered up against bone after penetrating 30 cm into the tissue. The bullet had made a large cavity in the blubber of the melon of about the same size as for shot no. XVI.

Military Surplus, P-FMJ, (four shots)

Shot VII, head no. 3b, adult female, was fired 20 degrees backward in the temporal region. The bullet passed completely through the skull and splintered the occipital bone before exiting in the occipital region. The bullet was not retrieved.

Shot VIII, head no. 4a, juvenile female, was fired from the side in the temporal region right over the eye. The bullet penetrated to the brain and was retrieved with jacket and lead core disintegrated. The wound canal was 21 cm long.

Shot IX, head no. 4, juvenile female, was fired from the side at the temporal region. It passed completely through the skull and opened up the skull and splintered the occipital bone. The bullet was found in a splintered state after penetrating 34 cm into tissue.

Shot XXI, head no. 10b, adult female, was fired from the front into the melon. The bullet created a cavity in the blubber of the melon that was slightly smaller than for shot no. XX. Jacket fragments and remains of the completely disintegrated lead core were retrieved at the skull bone. The wound canal was 26 cm long and the bullet did not penetrate to the brain.

Army Surplus, P-FMJ (two shots)

Shot XIV, head no. 7b, juvenile female, was directed about 40 degrees backward and about 10 degrees downward. The hitting point was dorsal to the eye. The bullet hit bone and shattered after penetrating bone tissue under the brain. The bullet was broken at crimping zone and the jacket was partly emptied. The wound canal was 4 cm long.

Shot XV, head no. 7c, juvenile female, was fired from the side at the temporal region directing backward downward. The bullet passed completely through the head. The bullet cracked the skull bone. The bullet split up when entering the skull and was retrieved partly disintegrated. Lead fragments were found in the cracked bone. The entrance hole was 5 x 2 cm and the wound canal 37 cm long.

Parker Hale, Calibre W .270, five shots:

150 grain, SP, (five shots)

Shot X, head no. 5a, adult female, was fired from the side at the temporal region slightly over and behind the eye. The disintegrated bullet jacket and core were retrieved in bone tissue just behind cavum nasi. The wound canal was 26 cm long.

Shot XI, head no. 5b, adult female, was fired from the side at the temporal region 5 cm behind shot no. X. The bullet penetrated into the brain and bone fragments were retrieved in the brain. The wound canal was 30 cm long.

Shot XII, head no. 6, adult female, was fired from the side at the temporal region. The bullet passed through the head and broke up the skull behind the brain. The bullet was not retrieved.

Shot XVI, head no. 8a, juvenile female, was fired from the front into the melon to check bullet's ability of cavity formation. The bullet made a permanent crater of approx. 13x10 cm size in the melon tissue. The bullet was retrieved with partly emptied jacket at the skull bone. Wound canal 37 cm.

Shot XVII, head no. 8b, adult female, was fired from the front into the melon to check bullet's ability of cavity formation. The bullet created a crater in the melon and stopped in bone tissue making a groove in the bone. Wound canal 26 cm. The bullet was retrieved with partly emptied jacket.

CONCLUSIONS

The trials show that shooting projectiles into skulls of dead whales is a valid method to assess the performance of ammunition used for hunting of whales and its ability of penetrating the skull and brain and thereby causing instantaneous or rapid stunning effect on the animal.

Heads of pilot whales were used for the present study because of its accessibility. The ideal situation for testing would be to use heads from the targeted species. However, the result from one species will in most cases also be valid for other species of whales of the same or smaller size.

The present trials showed some contradictory results with respect to penetration abilities of some types of ammunition. The reason for poor penetration of a .375 RN FMJ bullet in one case was probably that this sample of an adult animal was not fully thawed when the trials were carried out. However, it is well documented that sharp pointed and soft pointed ammunition of calibres .375 and lower calibres do not in general penetrate the skull and brain before they stop or disintegrate and therefore are not qualified to be used for stunning of whales with the size of an adult pilot whale or larger.

The facilities chosen for these shooting trials (good view of the surroundings, placed on the ground with an earth slope behind) were very favourable and similar arrangements are recommended when conducting trials of this kind.

It is important to take the local climate (temperature) into consideration when deciding on ample thawing period. In this case 8 days were not enough for the biggest heads.

After having figured out the appropriate rifle and ammunition during performance of such a shooting trial it is recommended to make a conclusive or final test on a dead floating whale to confirm that the selected rifle and ammunition have the same impact on a floating whale as it has on a head of dead whale lying on the ground.

Based on the results in these trials the following general guidelines to assess the performance of ammunition used for hunting of whales can be recommended.

DRAFT GUIDELINES FOR SHOOTING TRIALS

Hitting area:

The target area shall be the brain or Medulla oblongata/upper neck of the animal.

Number of heads:

If possible, one head for each sample is preferable.

Size of heads:

The heads should be sampled from whales of different size and sex.

Number of samples:

At least three rounds should be fired for each type of ammunition using heads of different sizes and/or fired from different positions.

Several tests on same head:

If the same head must be used for several tests with different calibres and/or ammunition, the smallest calibre or weakest ammunition (soft point/pointed) should be used for the first rounds.

Testing facilities and firing ranges:

The trials should be performed at secure facilities and the shooting range should be within the ranges

considered usual for the type of hunting in question. At least one test should be fired from a range considered as maximum shooting ranges for the type of hunting.

Examination of wounds:

The wounds and wound canal shall be examined after standard post mortem principles.

Documentation:

The results of the trials and examination should be documented in written form and if possible with photos. The protocol should as a minimum contain the following:

Calibre

Type of ammunition

Number of rounds

Shooting range

Species and animal size and sex

Hitting area/hitting point/point of bullet entrance/shooting angle

Examination of trauma:

 Penetration depth/Length of wound canal

 Type of tissues penetrated

 If retrieved; state of the retrieved projectile

ACKNOWLEDGEMENTS

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Appendix 1

Results of shooting trials on heads of dead pilot whales
in the Faroe Islands 2004

Table 1a: Shooting trials on heads of dead pilot whales. The shots are numbered in succession from No. I to No. XI











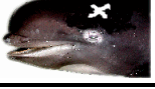
Shot No.	Head No. (Whale No.)	Skinn value	Sex	Lenght (cm)	Calibre	Ammunition description	Shooting distance	Shooting direction related to sagittal plane	Hitting point
I	1a (#358)	8	f	470	338	200 grain Soft Point	10m	At right angle At right angle	
II	1b (#358)	8	f	470	338	250 grain Round Nose, solid	10m	15° rostral At right angle	
III	2a (#365)	5	f	390	338	250 grain Barnes X	10m	At right angle At right angle	
IV	2b (#365)	5	f	390	338	200 grain Soft Point	10m	30° rostral At right angle	
V	2c (#365)	5	f	390	338	250 grain Barnes X	10m	45° rostral At right angle	
VI	3a (#356)	7	f	450	308	150 grain Soft Point	10m	At right angle 10° dorsal	
VII	3b (#356)	7	f	450	308	Military S. Full Metal Jacket	10m	20° rostral 15° dorsal	
VIII	4a (#306)	5	f	410	308	Military S. Full Metal Jacket	10m	10° caudal 20° dorsal	
IX	4b (#306)	5	f	410	308	Military S. Full Metal Jacket	10m	10° rostral 20° dorsal	
X	5a (#350)	7	f	450	270	150 grain Soft Point	10m	10° rostral At right angle	
XI	5b (#350)	7	f	450	270	150 grain Soft Point	10m	10° rostral At right angle	

Table 1b: Shooting trials on heads of dead pilot whales. The shots are numbered in succession from No. XII to No. XXII













Shot No.	Head No. (Whale No.)	Skinn value	Sex	Lenght (cm)	Calibre	Ammunition description	Shooting distance	Shooting direction related to sagittal plane	Hitting point 
XII	6 (#363)	7	f	450	270	150 grain Soft Point	10m	At right angle At right angle	
XIII	7a (#362)	3	f	330	308	150 grain Soft Point	10m	40° rostral 20° dorsal	
XIV	7b (#362)	3	f	330	308	Arm S. Full Metal Jacket	10m	40° rostral 10° dorsal	
XV	7c (#362)	3	f	330	308	Arm S. Full Metal Jacket	10m	10° rostral 20° dorsal	
XVI	8a (#370)	5	f	430	270	150 grain Soft Point	10m	frontal	
XVII	8b (#370)	5	f	430	270	150 grain Soft Point	10m	frontal	
XVIII	9a Torso	(9 est)	not indic.	(480 est)	338	200 grain Soft Point	10m	45° caudal 10° ventral	
XIX	9b Torso	(9 est)	not indic.	(480 est)	338	250 grain Barnes X	10m	45° caudal 10° ventral	
XX	10a (#307)	9	f	480	308	150 grain Soft Point	10m	frontal	
XXI	10b (#307)	9	f	480	308	Military S. Full Metal Jacket	10m	frontal	
XXII	11a (#369)	3	f	330	338	200 grain Soft Point	10m	frontal	

Table 1c: Shooting trials on heads of dead pilot whales. The shots are numbered in succession from No. XXIII to No. XXXII




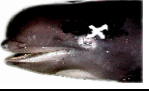





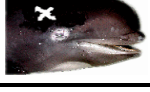

Shot No.	Head No. (Whale No.)	Skinn value	Sex	Lenght (cm)	Calibre	Ammunition description	Shooting distance	Shooting direction related to sagittal plane	Hitting point 
XXIII	11b (#369)	3	f	330	338	250 grain Solid	10m	frontal	
XXIV	12 (#360)	7	f	450	375	270 grain Soft Point	14m	20° caudal At right angle	
XXV	13 (#310)	8	f	460	375	270 grain Soft Point	14m	frontal	
XXVI	14a (#18S)	9	f	443	375	300 grain Barnes X	14m	At right angle At right angle	
XXVII	14b (#18S)	9	f	443	375	300 grain Full Metal Jacket	14m	At right angle At right angle	
XXVIII	14c (#18S)	9	f	443	338	250 grain Round Nose, solid	14m	At right angle At right angle	
XXIX	15 (#19S)	9	f	459	375	300 grain Barnes X	14m	At right angle At right angle	
XXX	16 (#13S)	7	f	411	375	300 grain Barnes X	14m	frontal	
XXXI	17 (#7S)	6	f	369	375	300 grain Full Metal Jacket	14m	frontal	
XXXII	18 (# S)	(5 est)	not indic.	400(est)	375	300 grain Full Metal Jacket	14m	10° rostral 10° dorsal	

Table 2: Shooting trials on heads of dead pilot whales. The shots are arranged according to projectile type

projectile type	calibre	weight	shot no.	head no	whale size	direction	penetration to brain	projectile fate
	375	270 grain	XXIV	12	7(adult)	sideways	yes, trough head	not found
			XXV	13	8 (adult)	frontal	no, stopped in bone	lead in bone
			I	1a	8(adult)	sideways	no, stopped in bone	bullet in bone
	338	200 grain	IV	2b	5(juvenile)	sideways	no, stopped in bone	bullet in sept. Nasi
			XVIII	9a	9(adult)	sideways	no, stopped in bone	expanded in bone
soft point			XXII	11a	3(juvenile)	frontal	no, stopped in bone	expanded in meat
			VI	3a	7(adult)	sideways	no, stopped in bone	disintegr. in bone
	308	150 grain	XIII	7a	3(juvenile)	sideways	no, stopped in bone	expanded in bone
			XX	10a	9(adult)	frontal	no, stopped in bone	expanded in bone
			X	5a	7(adult)	sideways	no, stopped in bone	disintegr. in bone
			XI	5b	7(adult)	sideways	yes, stopped in bone	expanded in bone
	270	150 grain	XII	6	7(adult)	sideways	yes, trough head	not found
			XVI	8a	5(juvenile)	frontal	no, stopped in bone	expanded in bone
			XVII	8b	5(juvenile)	frontal	no, stopped in bone	expanded in bone
			III	2a	5(juvenile)	sideways	yes, trough head	not found
	338	250 grain	V	2c	5(juvenile)	sideways	no, stopped in bone	not found
Barnes X			XIX	9b	9(adult)	sideways	yes, stopped in bone	expanded in bone
			XXVI	14a	9(adult)	sideways	no, stopped in bone	not found
	375	300 grain	XXIX	15	9(adult)	sideways	yes, stopped in bone	expanded in bone
			XXX	16	7(adult)	frontal	yes, trough head	not found
Sharp point			XXVII	14b	9(adult)	sideways	no, stopped in bone	found in bone
FMJ	375	300 grain	XXXI	17	6(adult)	frontal	yes, trough head	found in the bank
			XXXII	18	5(juvenile)	sideways	yes, trough head	not found
			II	1b	8(adult)	sideways	yes, trough head	found in bank
Round nose	338	250 grain	XXIII	11b	3(juvenile)	frontal	yes, trough head	not found
solid			XXVIII	14c	9(adult)	sideways	yes, trough head	not found
			VII	3b	7(adult)	sideways	yes, trough head	not found
Military Surpl.	308		VIII	4a	5(juvenile)	sideways	yes, stopped in bone	disintegr. in bone
FMJ.			IX	4b	5(juvenile)	sideways	yes, trough head	found, broken
			XXI	10b	9(adult)	frontal	no, stopped in bone	disintegr. in bone
Army Surpl.	308		XIV	7b	3(juvenile)	sideways	no, stopped in bone	found broken
FMJ			XV	7c	3(juvenile)	sideways	yes, stopped in bone	disintegr. in bone