APPENDIX I

TRAPPING AS AN IMPORTANT PRE-CONTACT PERIOD PURSUIT

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By

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ABSTRACT

Traditional trapping has been downplayed or outright ignored in archaeological reconstructions of pre-contact settlement and subsistence. In this appendix, the case is presented that pre-contact trapping played a seasonally important role in pre-contact subsistence, was an important factor in defining wintertime settlement patterns, and was an activity that created literally millions of short-term, limited-activity sites.

A circumstantial case is presented. It is shown that pre-contact inhabitants of Delaware had the motive, the means, and the opportunity to trap a wide variety of species. The motive is shared with hunting: the need for meat, furs, bone, antler, and sinew. The means – effective traditional traps – is established from a review of seventeenth and eighteenth century accounts, from early twentieth century ethnographies conducted among eastern tribes, from oral history among Delaware's surviving Native American communities, and from review of late nineteenth and twentieth century trapping guide books. It is shown that traditional snares and deadfalls were known to the eastern tribes, and that such traps are highly effective. Lastly, opportunity is demonstrated by considering data on the modern and historic fur harvests. It is shown that Delaware has an excellent furbearer biomass, and probably did throughout the pre-contact span.

Having argued that trapping was important to pre-contact inhabitants of Delaware, the archaeological signatures of various trapping-related sites are defined. In addition, the impact of the recognition of trapping on regional models is discussed.

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1.0 INTRODUCTION

A general theme of the Site 7NC-B-54 (Ronald McDonald House) Phase III study is that many pre-contact activities are hard to recognize and predict, and that low-labor activities should not be lumped into meaningless, generic labels such as “extractive stations” or “resource procurement locations.” In keeping with this theme, it is appropriate to consider in some detail a set of activities (animal trapping) and a range of site types rarely addressed in the archaeological literature.

The possibility that some of the loci at Site 7NC-B-54 were trapping-related came from initial field impressions. The author of this appendix had trapped muskrats and opossum while growing up in the North Carolina Piedmont. To him, the small wetlands in the site vicinity would have attracted many furbearers, and therefore, may have attracted native trappers. Likewise, the low-density, short-term loci evidenced at the site might be consistent with trapping-related activity. This overview is not intended to demonstrate that any locus of the site was definitely related to trapping, but rather to suggest that archaeologists have generally downplayed the importance of trapping and the frequency of trapping-related sites.

An early study in Delaware offered the promise of recognizing key faunal and floral resources and then modeling settlement to address seasonal and spatial variability in those resources. Thomas *et al.* (1975:35) undertook “a comprehensive survey of environmental resources in the Delaware coastal plain.” The researchers recognized the significant numbers of bear, deer, beaver, otter, muskrat, raccoon, and turkey in various Coastal Plain settings. However, they never specifically address trapping, instead subsuming such activity under the vague definition of hunting as “the procurement of large and small mammals, land fowl, water fowl, and other animal foods.” Thomas *et al.* (1975:56) then develop models based on Indians targeting the “most nutritious, most reliable, and most easily and efficiently procured” food items. Having no understanding of the efficiency of trapping, and having lumped trapping with generalized hunting, Thomas *et al.* (1975:56) surmise:

> The most easily procured foods are those that require the minimum input of energy for the total food acquisition. . . Hunted resources, generally, should be the most difficult.

In actuality, as argued below, traditional trapping is judged as considerably more efficient than stalk hunting with a bow or atlatl, and in the right seasons and settings, trapping was probably highly reliable and easy. Because Thomas *et al.* (1975) were dismissive of hunting and ignored

trapping as a separate activity, none of their five subsistence-settlement models include fur-bearers other than deer. The detailed environmental reconstructions of Thomas *et al.* (1975) led subsequent researchers to build on their questionable models.

In 1984, Jay Custer published *Delaware Prehistoric Archaeology: An Ecological Approach.* In 1995, Richard Dent published *Chesapeake Prehistory: Old Traditions, New Directions*. Neither Custer nor Dent even mentions trapping as a Native American subsistence activity (although Custer does mention fish traps in passing and does address "fur hunting" in the Contact period). Even after finding evidence of single-family, winter occupations at a number of sites, Custer does not consider trapping as a possible explanation (Custer and Hodny 1989; Custer *et al.* 1995; Custer and Watson *et al.* 1996; Custer and Riley *et al.* 1996). Custer also continues to label limited-visit sites as "staging/processing sites" (Custer and Bachman 1984; Riley and Custer *et al.* 1994) or "hunting/processing camps" (Custer *et al.* 1988). Taken literally, the two major researchers in our region would have us believe that these Indians survived by hunting, gathering wild plants, shellfish collecting, fishing, and, in later periods, horticulture.

Custer and Dent are not alone in their downplaying (or outright ignoring) the importance of trapping in Delaware. In a series of Phase III reports, the following activities were posited:

- "While at the site they hunted game, probably white-tailed deer" (Hawthorn site: Custer and Bachman 1984:87).
- "a hunting/processing camp" (Dairy Queen site: Custer *et al.* 1988).
- "a small base camp or procurement staging site" (Hockessin Valley site: Custer and Hodny 1989:i).
- "a micro-band base camp" (Lewden Green site: Custer *et al.* 1990:77).
- "short term transient camps" (Dover Downs site and 7K-C-360; Riley and Watson *et al.* 1994:i).
- "a staging/processing station" (Paradise Lane site; Riley and Custer *et al.* 1994).
- "most of the bifaces and unifaces were used in hunting and associated processing tasks" (Two Guys site: LeeDecker *et al.* 1996:86).
- "a Woodland II procurement site" (Drawer Creek site: Wall *et al.* 1997:110).
- a series of single-family wintertime houses (Pollack Prehistoric site; Custer *et al.* 1997).

- "a procurement and processing station for game and plant resources" (Whitby Branch site; Jacoby *et al.* 1997).

- "the processing of nuts was probably a major focus of activity" (Lum's Pond site; Petraglia *et al.* 1998:183).

- "a fishing camp" and "a campsite used for brief stays, possibly because it was located on a trail, near a canoe landing, or near an extinct spring" (Puncheon Run site; LeeDecker *et al.* 2001:i)

In fact, a review of 20 Phase II or Phase III reports from Delaware failed to find a single mention of trapping as a possible activity (however, Heite and Blume [1998] mention trapping as a seasonal activity at a possible late eighteenth-early nineteeth century Indian community). Instead, hunting, fishing, nut-gathering, or general procurement are suggested. When in doubt, the presence of projectile points is apparently considered enough to kick the sites into the hunting camp category. Even for limited-use sites overlooking some of the most productive muskrat marshes in the eastern United States, no mention is made of trapping. Even when single-family, wintertime households are posited, trapping is not mentioned as a likely subsistence activity.

It is not argued here that all pre-contact sites, or even a majority of pre-contact sites in Delaware were trapping-related, but there were undoubtedly thousands of trapping-related locations used in pre-contact times. It would provide a fuller picture of pre-contact life if archaeologists would at least consider the possibility that trapping-related activities occurred at a site under study.

Trapping is a labor-efficient means of increasing encounters between animals and their human stalkers (Goodchild 1984). Unlike hunting, which requires a human presence during the kill, trapping can capture animals at any time, especially when humans are gone. To view trapping in human terms, imagine that each trap set was actually a family member left to guard a location. Only with a very large, extended family (of people with excellent night vision, perfect aim with a bow or atlatl, no scent, and no need to sleep) could the many animal burrows and trails be covered full-time. A trap stays functional (until tripped) for the entire time it is set. With a few notable exceptions (e.g., the Inuit who guards a seal's breathing hole for hours on end), the return from hunting does not justify investment of hours and hours of labor on a single location. In addition, most of the furbearers of the eastern United States are nocturnal, thereby reducing the chance for human-prey encounters; a trap works all night. The capture and killing of game demands encounters; trapping significantly increases the opportunities for encounter. McPherson and McPherson (1994:152, emphasis in original) summarize:

> One thing that about all outdoorsmen/woodsmen/survivalists will agree on is the fact that the trap line is the MOST expedient method of keeping a supply of meat on hand with a minimum of effort.

Holliday (1998) sampled the global ethnographic record to determine the ecological settings in which trapping played the greatest role. He found that trapping was most important to groups in the Boreal/Northern Deciduous Forest setting, his category that most closely matched Woodland I conditions in Delaware. For the warmer ranges of this zone (that portion best mimicking Woodland I period Delaware), Holliday (1998:717) surmises that "the mixed hunting/fishing/trapping strategy" was most commonly adopted. Holliday (1998:715) also notes that trapping intensity increases as groups move from nomadic to semi-sedentary to sedentary.

With this view of trapping (and the efficiency of trapping will be discussed in greater detail below), it is baffling that trapping is so often slighted in the archaeological literature. The importance of trapping no doubt varied culture to culture, family to family, and season to season. However, it is hard to imagine any group that would not have taken advantage of an efficient means to capture meat and fur.

The downplaying of trapping in native Delaware is even more difficult to understand given the reputation of the Nanticoke. Heckewelder (1971:92) reports of the Nanticoke:

> The Mohicans, for instance, call them *Otayáchgo*, and the Delawares *Tawachguáno*, both of which words in their respective languages, signify a "bridge," a "dry passage over a stream;" which alludes to their being noted for felling great numbers of trees across streams, to set their traps on. They are also often called the *Trappers*.

Likewise, Morgan (1962:93) reports that among the Iroquois "trapping game of all kinds, from bear and deer to the quail and snipe, was a common practice."

In this appendix, pre-contact trapping in the Northeast will be discussed through a consideration of ethnographic data. There is a certain risk in pushing back Contact period behavior into prehistory, but we know enough of European trapping methods to recognize introduced behaviors and technologies. Lacking the surviving artifacts of pre-contact trapping or pre-contact depictions of trapping (but see Shaffer *et al.* 1996 for a discussion of trapping behavior illustrated on Mimbres pottery bowls from the southwestern United States), we must assume that Contact period technologies were also in use in the pre-contact period.

After considering the ethnographic data, information on historic to modern trapping behavior is presented, information which was gained through interviewing members of the local

Native American communities and modern Euro-American trappers. Given the unevenness of the written ethnographic coverage of local groups, oral history of remnant groups is important. It was also considered important to address changes in the distributions of furbearers relative to modern land use.

The data on historic and modern trapping participation and yield will be considered to address questions of the efficiency of trapping and the potential of the furbearing biota of Delaware. These data suggest that trapping in pre-contact periods had the potential to provide a significant portion of the meat diet, as well as culturally important furs. In addition, the spatial distributions of the major furbearers are discussed, especially as those distributions may have affected pre-contact settlement strategies.

The last part of this appendix is a consideration of the archaeological site types that should be expected as a result of pre-contact trapping. The author agrees with Holliday (1998:711) that "the problem with identifying trapping in the archaeological record, however, is that only rarely are the raw materials from which traps are made preserved." A major goal of the definition of trapping site signatures is to broaden the perspective of archaeologists. For example, the recovery of hafted knives/projectile points and hide-scraping tools does not necessarily mark the location of a successful hunt.

2.0 TYPES OF TRADITIONAL TRAPS

This discussion of native trapping was informed by ethnohistoric and ethnographic accounts (Cooper 1938; Feest 1978; Fenton 1978; Speck 1915, 1946a; Speck *et al.* 1946; Weslager 1943), as well as interviews with the Nanticoke Indians of Oak Orchard, Delaware, the Leni Lenape Indians of central Delaware and southern New Jersey, and modern trappers. The three basic forms of traditional traps were snares, deadfalls, and pit traps. Steel, leg-hold traps were not used by Indians in the region until late in the eighteenth century (Cooper 1938:12).

A snare is a cordage or (post-contact) wire loop that is placed across an animal path, at a bait, or in a den entrance, and that tightens on the animal's throat or mid-section (Figure I-1). Certain snares are intended to simply hold the animal, while others are designed to choke the prey or break its neck.

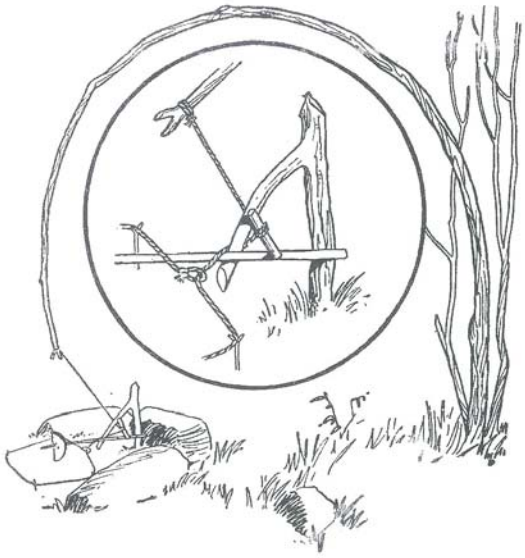
The second class of traps is deadfalls, which rely on falling objects to kill or immobilize the prey (Figure I-2; Photographs I-1 and I-2). Deadfalls can be baited or simply set on animal travel routes.

With the last class of traps, pit traps, animals are lured or stumble into excavated pits from which they cannot escape. The animals are often still alive after capture in a pit trap.

Regardless of the type of trap, the device must be placed where the prey lives or travels. The most obvious location is often the den; Photograph I-3 shows an easily recognized skunk or woodchuck den after "Spring cleaning." Although baits can attract prey from some distance, the best success comes from locating or creating a travel corridor for the prey. This can be done by constructing artificial constrictions in existing trails or by establishing a new, convenient travel route. The Nanticoke tradition of felling logs across streams (Feest 1978:244) is characteristic of the latter alternative. Animals will use fallen trees to cross streams, and such trees bring prey to a well-defined location. Furbearers may avoid a freshly chopped tree, but are likely to be using a Spring-chopped tree by the following Fall.

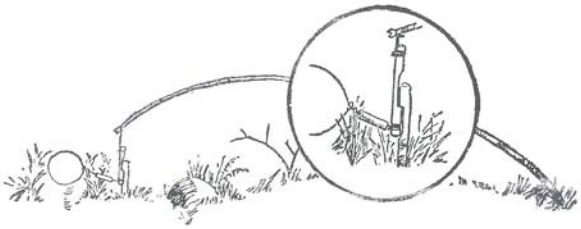
2.1 Snares

Snares were recorded in the Nanticoke community of Indian River Hundred (Speck 1915) and at the Cheswold Leni Lenape community (Weslager 1943). Two types of snares were used by the Rappahannock to capture rabbit, raccoon, opossum, mink, "and the like" (Speck *et al.* 1946). Cooper (1938:131) reports that the Seneca used snares for deer, mink,



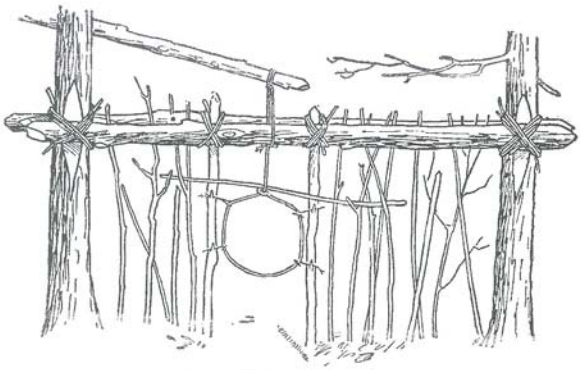
A SPRING POLE RABBIT SNARE

A SKUNK SNARE



A SNARE FOR FOXES

SNARES FOR SNOWSHOE RABBITS



A SNARE FOR BEARS

SOURCE: HARDING 1951

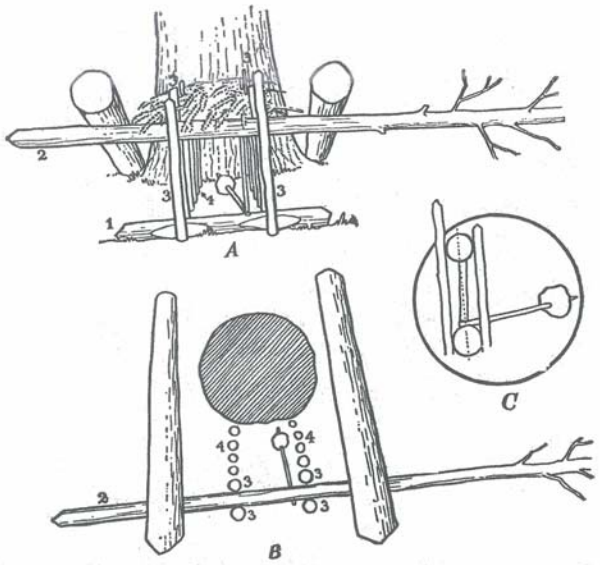
DELAWARE DEPARTMENT OF TRANSPORTATION

BLUE BALL AREA TRANSPORTATION IMPROVEMENTS
PHASE III
RONALD MCDONALD HOUSE SITE (7NC-B-54)
BRANDYWINE HUNDRED NEW CASTLE COUNTY

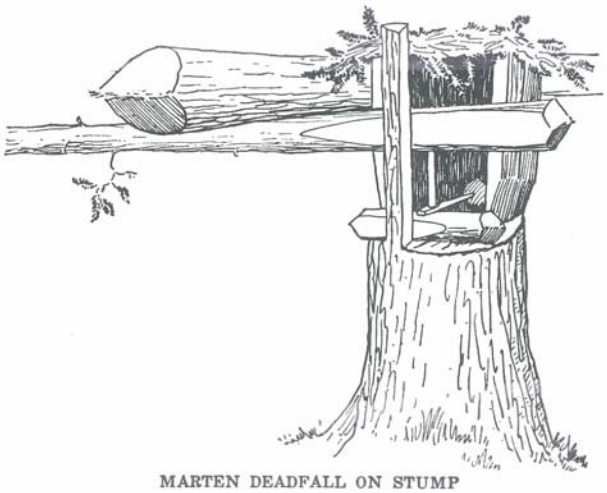
VARIOUS SNARES

FIGURE I-1

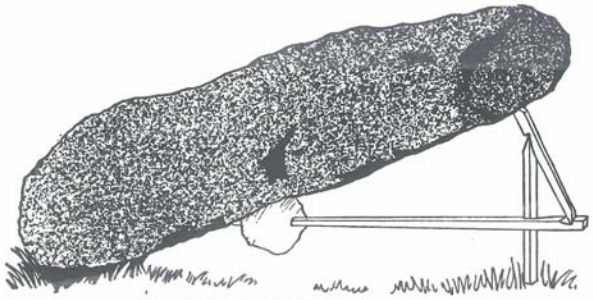
SKELLY and LOY Inc.
CONSULTANTS IN
ENVIRONMENT - ENERGY
ENGINEERING - PLANNING



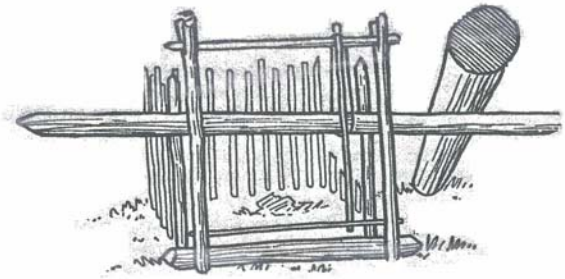
THE STICK-AND-SPINDLE DEADFALL. A, FRONT VIEW. B, TOP VIEW. C, POSITION OF TRIGGER STICK.



MARTEN DEADFALL ON STUMP



STONE DEADFALL FOR SKUNKS



THE TRIP-STICK DEADFALL

SOURCE: HARDING 1951

DELAWARE DEPARTMENT OF TRANSPORTATION	
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY	
VARIOUS DEADFALLS	
FIGURE I-2	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

Photograph I-1. Ojibwa deadfall (from Irwin 1984b).

Photograph I-2. Innu deadfall (from Innu Nation 2005).

Photograph I-3. Skunk or woodchuck den, New Castle County, March 2005. Note obvious fresh dirt from den cleaning.

rabbit, skunk, groundhog, and grouse (Figure I-3). The twitch-up snare was also used for turkey among the northern Iroquois (Fenton 1978:298). Among the northern Algonquian and northern Athapaskan, Cooper (1938:9) reports:

> More commonly snares are set for grouse (ruffed grouse and ptarmigan, not Canada grouse), rabbit, fox, lynx, caribou, moose, and bear; sometimes, too, skunk and ground-hog. Snares are not used, so far as I have ever seen or heard, for fisher, marten, mink, weasel, muskrat, beaver, and otter.

Morgan (1851:93) reports the Iroquois use of spring-pole snares for deer. Deer snares were also used among the Indians of southern New England (Day 1978:154), and Feest (1978:244) reports that "spring-pole snares for catching deer are reported from Kickotank in Maryland." Of the Catawba, Speck (1946a:16) reports "the choke snare was formerly set for deer." Cooper (1938:131) described the Seneca deer snare:

> The snare line used was of hemp, not of basswood fiber, the noose itself being about 2 ½' in diameter. The snare was set up between two standing trees; the snare line was tied securely to one of these trees, while the noose was attached lightly to a limb on the other tree. It was so attached merely in order to keep the noose in rounded shape, not for the purpose of helping to hold the snared animal. The deer was snared by the neck, not by the feet. No spring pole was used.

Harding (1951), in a modern trapping manual, suggests snares are suitable for rabbit, skunk, fox, bear, opossum, lynx, and bobcat. Harding (1951:31) specifically notes "to catch a skunk in a snare is almost as easy and as reliable a way as to take the animal in a steel trap, while it also does away almost entirely with the scent nuisance."

A static snare, such as the deer snare described above, was also known among the Indians of Delaware. Weslager (1943:181) illustrates a static snare that he attributes to the Cheswold community (Figure I-4). Weslager (1943:182) offers a description of the static snare:

> A third trapping device for catching game is locally known as a "snoose" or "snooge." Its name is a result of combining snare and noose. It consists of a slip noose arranged in the animal track and concealed by brush. The loose end of the noose is fastened securely to a tree or fence post. The unsuspecting rabbit enters the noose, which is larger than his head but not large enough for his body. As he tugs to escape, the noose tightens and he cannot free himself. The more he struggles, the tighter the noose is drawn around his body, and the end anchored to the tree prevents his running away.

Fig. 20

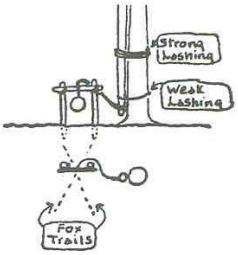


Fig. 21

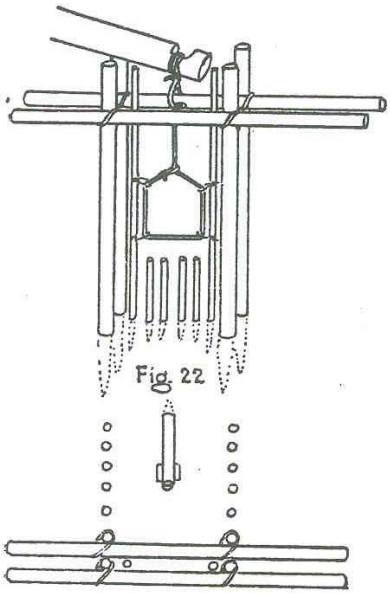


Fig. 22

Fig. 23

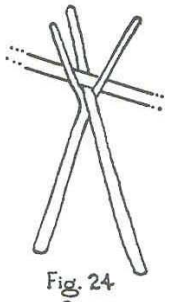


Fig. 24

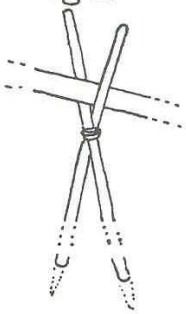


Fig. 25

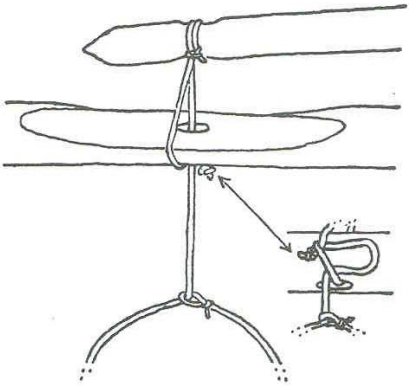


Fig. 28

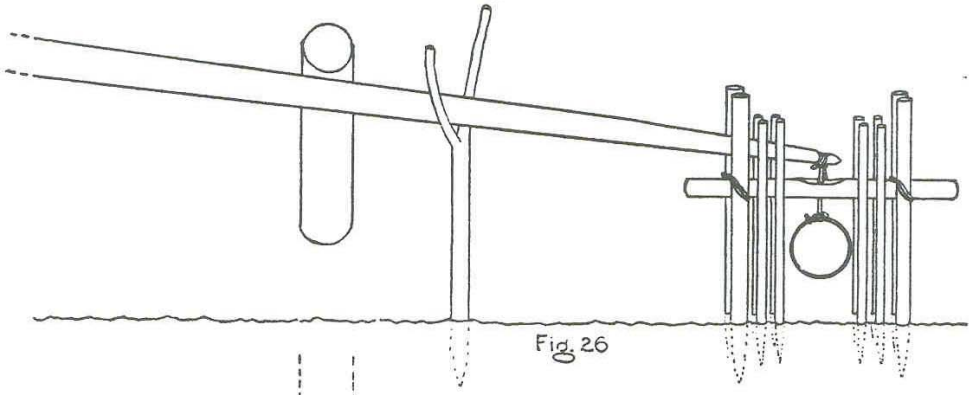


Fig. 26

Fig. 27

SOURCE: COOPER 1938

DELAWARE DEPARTMENT OF TRANSPORTATION	
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY	
SENECA SNARES	
FIGURE I-3	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

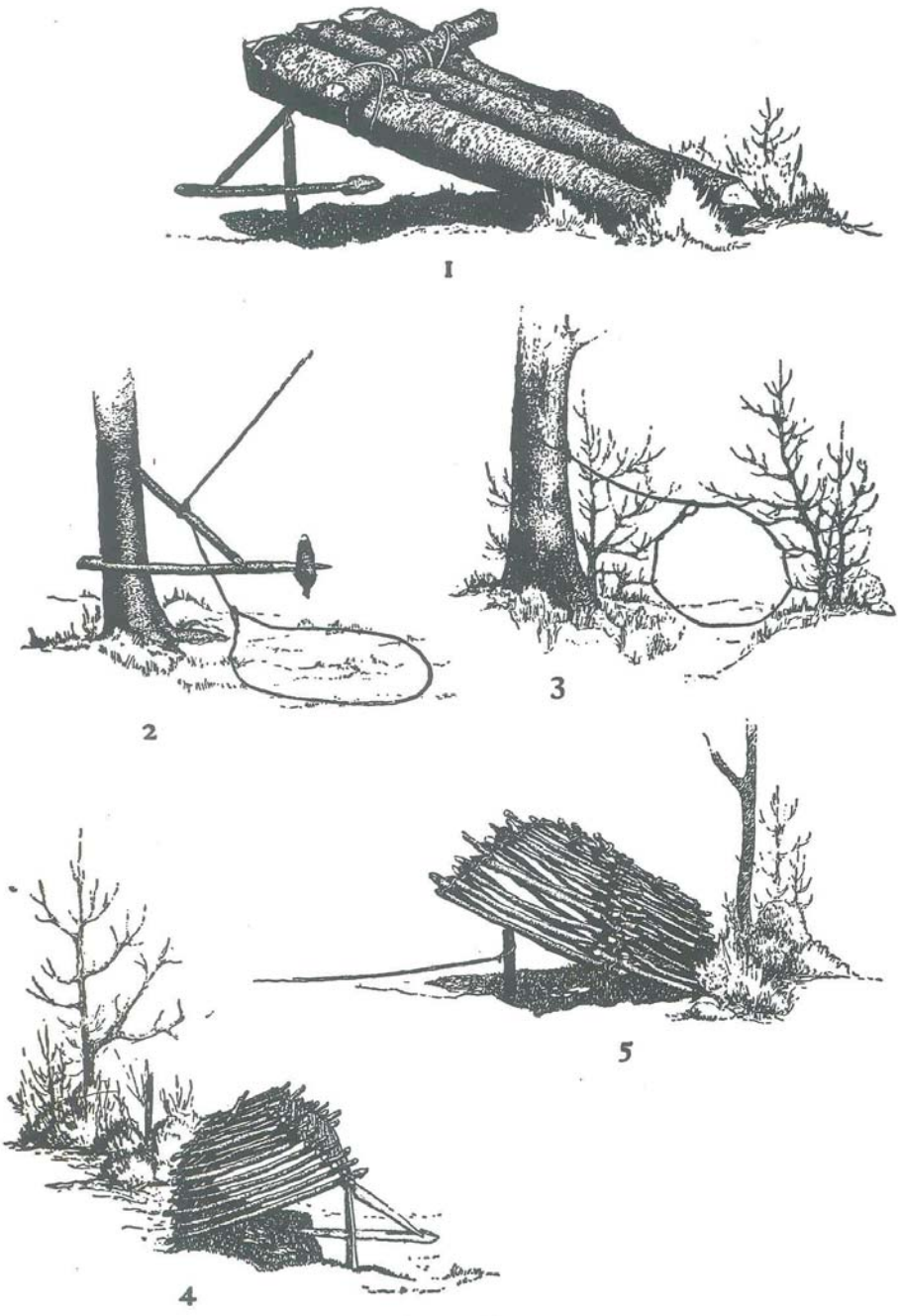


FIGURE I

ANIMAL TRAPS FORMERLY USED BY CHESWOLD MOORS

SOURCE: WESLAGER 1943:181

DELAWARE DEPARTMENT OF TRANSPORTATION
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY
CHESWOLD TRAPS

FIGURE I-4	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

There were various versions of spring-pole snares used in the eastern United States (see Figure I-4; Figure I-5). All use a green pole or living tree to lift the ensnared animal off the ground, thereby tightening the snare and lessening the ability of the animal to escape. A spring-pole snare can use a notched wood trigger or a string-and-toggle trigger. Both types of triggers rely on the initial jerk of the animal being snared or the jerk of the prey grabbing the bait to release the trigger, allowing the bent pole or sapling to straighten. A properly constructed spring-pole snare can prevent escape by chewing. Cooper (1938:132) describes the capture:

> The animal, when entering or leaving the den or burrow, puts his head and forepaws through the noose, and so drags the snare line until the spring pole is released. He is then hoisted up by the noose around his body between the fore and hind legs, and hangs head down, about 6' to 8' above ground level.

There have been very few studies of trap efficiency, but one modern European study compared the capture rate of static and spring-pole snares for alpine marmots, distant relatives of the American groundhog (Bassano *et al.* 1993). The researchers found that spring-pole snares were six times more efficient than static snares.

Related to the spring-pole snare, the lifting pole snare uses a pole balanced on a tipping point, commonly the tall stump of a small tree. Left to gravity, the pole would drop on the end away from the snare and raise the end with the snare attached. When making the set, the pole was kept in place at the snare end by either a notched trigger or a line tied in a snare hitch, or at the heavy end by careful balancing on an upright stick. As with spring-pole snares, the initial struggling of the animal released the balance pole and the animal was lifted off of its legs. In 1649, Colonel Norwood (Norwood and Force 1963:38-39) described deer snaring among Indians of the eastern shore of Maryland and Virginia:

> As soon as I had dispatch'd this midnight venison feast, and sent the rest to my comrades, the king was greatly desirous to make me comprehend, by our common dialect of signs and motions the ingenious stratagem by which they use to take their deer in the winter season, especially when the surface of the earth is cover'd with snow. He shewed me in the first place a small leather thong, in which (said he) any kind of deer should be invited to hamper himself and he fast ty'd on his back, until the engineer (or some body else for him) should take quiet possession of him. I could not conceive the particular structure of this machine, so as to direct the making of it elsewhere; but thus much in the general I did understand; they would fasten a pine green branch at the end of a pole (such as hops grow upon) which should lie athwart an oak, like the pole of a turner's lath, and the green hanging dingle-dangle at the pole end, fastened by a string; it

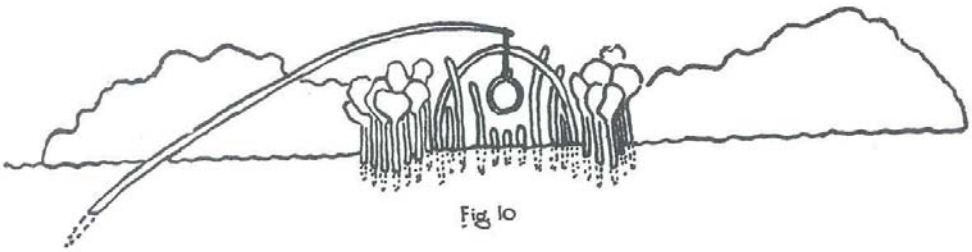


Fig. 10

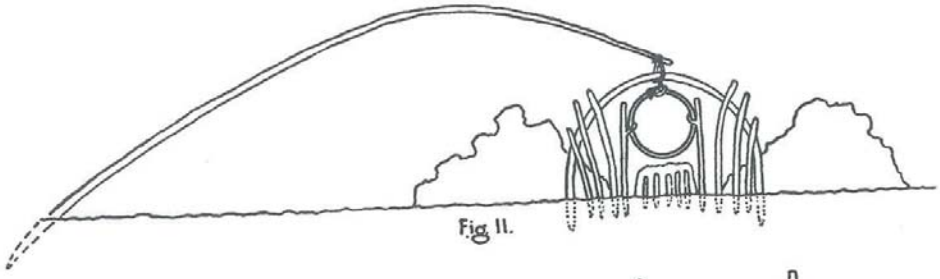


Fig. 11.

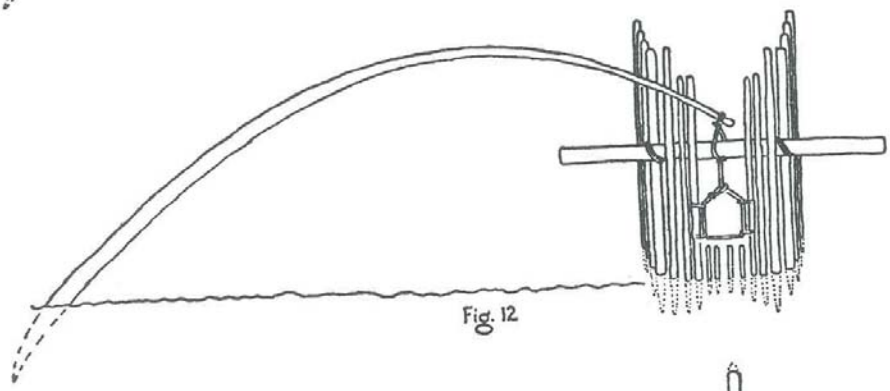


Fig. 12

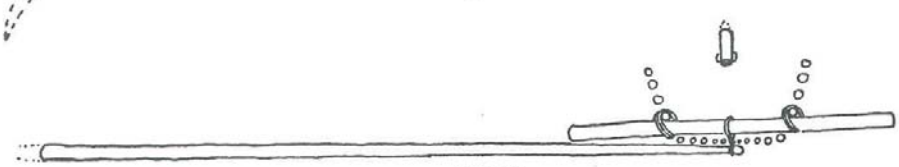


Fig. 13

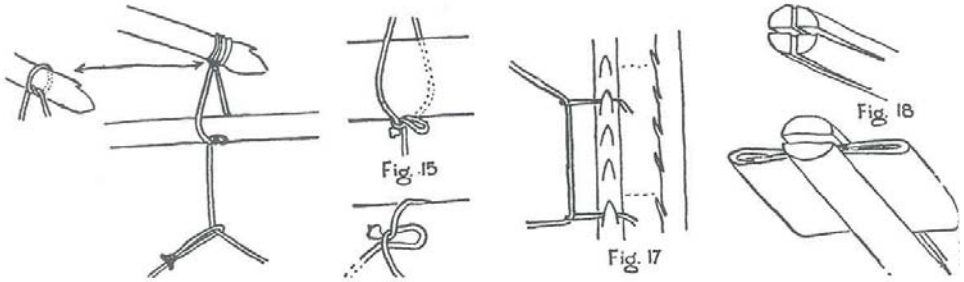


Fig. 15

Fig. 17

Fig. 18

SOURCE: COOPER 1938:34

DELAWARE DEPARTMENT OF TRANSPORTATION

BLUE BALL AREA TRANSPORTATION IMPROVEMENTS
PHASE III
RONALD MCDONALD HOUSE SITE (7NC-B-54)
BRANDYWINE HUNDRED NEW CASTLE COUNTY

SENECA SPRING-POLE SNARES

FIGURE I-5

SKELLY and LOY Inc.
CONSULTANTS IN
ENVIRONMENT - ENERGY
ENGINEERING - PLANNING

> should be set at a heighth for a deer to reach, but not without mounting and resting on his hinder legs, that so in pulling the branch, as at a trigger, the machine discharging, his heels are struck up to fly in the air, and there he remains on his back so straitly hamper'd, that the least child may approach to touch and take him.

Speck (1915:23-24) illustrated two types of spring-pole snares used by the Nanticoke; both rely on movement of the bait stick to release the snare (Figure I-6). Speck (1915:21) reports:

> Several choking or spring snares are also interesting. The illustrations show all the needed details. A slip noose is attached to a bent sapling or pole. In one variety the trigger stick, attached by the middle to the string, is caught vertically in the crotch of a stick driven into the ground, where it is held by the bait-stick. In the other, the trigger holds in the notches by the pull of the string, the moving of the bait-stick freeing it from the notch. In both of them, the loop is commonly supported upon three of four small forks, so that it rests in front of the bait, just beneath where the animals head comes.

The trigger system on the second of Speck's example closely resembles a figure-4 deadfall trigger, and this may represent a post-contact borrowing. Weslager (1943:181) likewise illustrates a spring-pole snare (see Figure I-4:2) that was used by the Cheswold community (although later, Weslager [1956] repeats the illustration as a Nanticoke trap).

Although spring-poles require more preparation effort than a static snare, both are worth the effort. A properly placed snare can yield repeated catches over a short time span, and can be used intermittently over several months.

Lewis Henry Morgan (1852) collected an Iroquois quail snare (Figure I-7). Morgan (1852:93) described the trap:

> It consists of a rounded strip of elm bark about eight inches long by four wide, with an eye cut in one end and a piece of bark twine with a noose attached to the other. After the bark is secured upon the ground, a few kernels of corn are dropped through the eye upon the ground, and the noose adjusted around it. When a bird attempts to pick up the corn the ruffed plumage of the neck takes up the string, and brings the noose around the neck, which is tightened the moment the bird attempts to fly, and either strangles or holds it in captivity. The trap is said to be very successful.

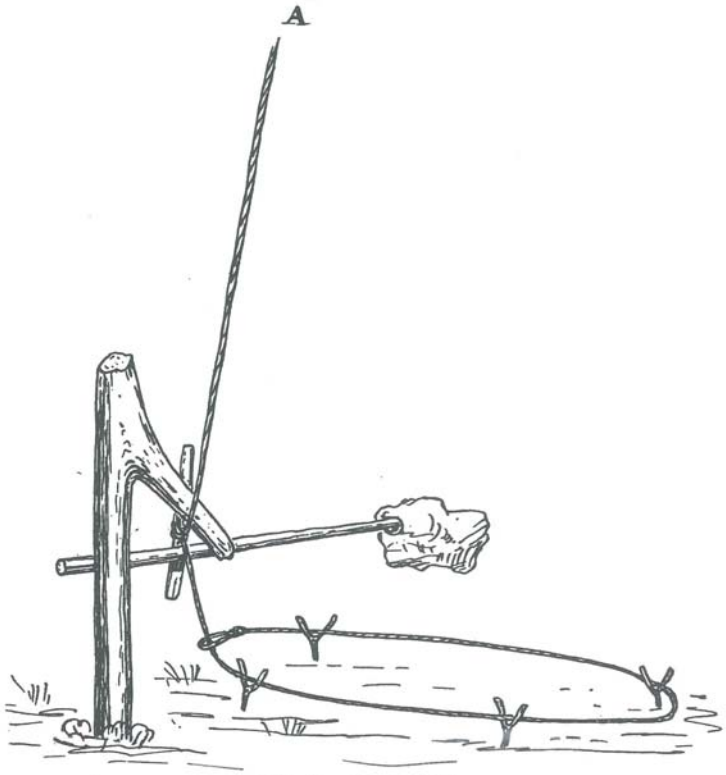


FIG. 16.—Spring snare.

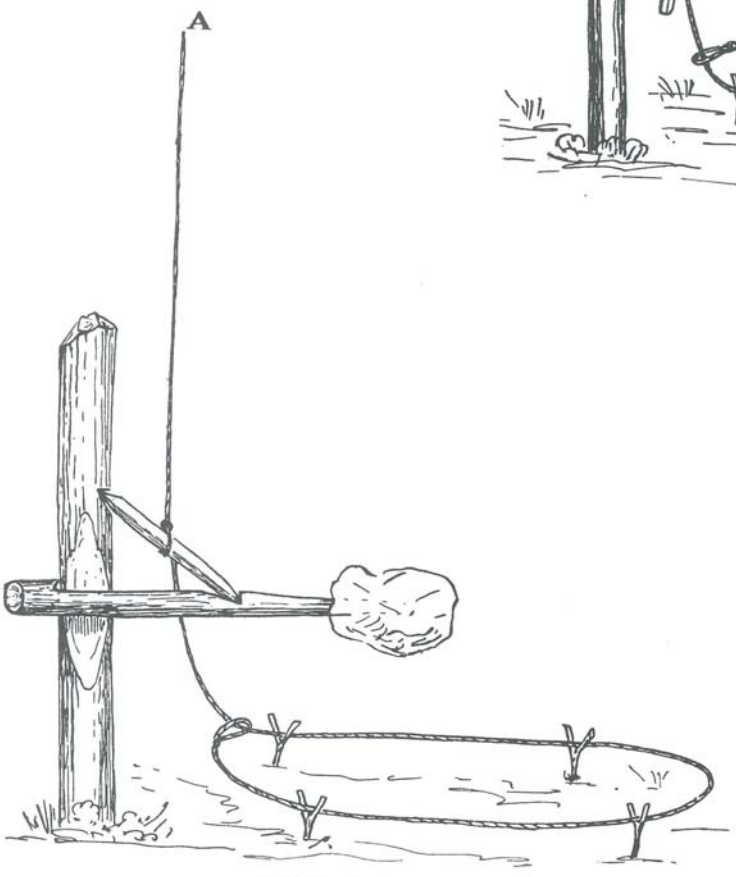


FIG. 17.—Spring snare.

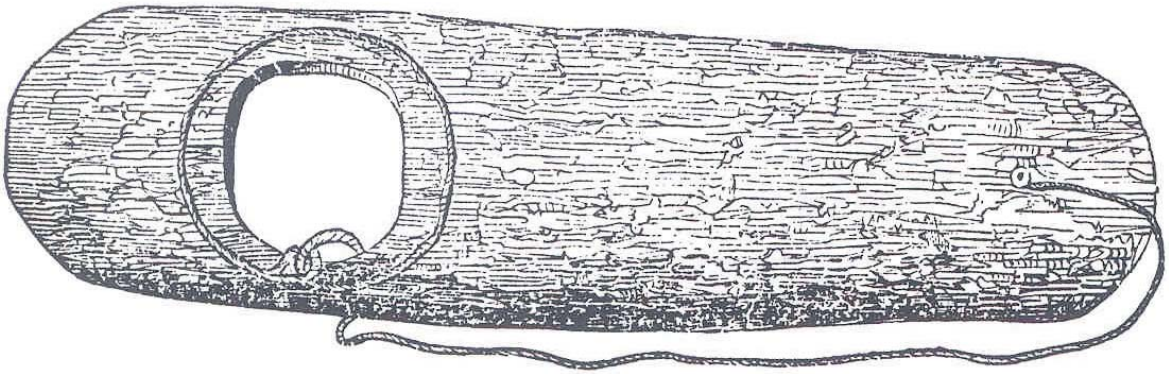
SOURCE: SPECK 1915

DELAWARE DEPARTMENT OF TRANSPORTATION
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY
NANTICOKE SNARES

FIGURE I-6	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

BIRD TRAP.

No. 891-2.



SOURCE: MORGAN 1852

DELAWARE DEPARTMENT OF TRANSPORTATION

BLUE BALL AREA TRANSPORTATION IMPROVEMENTS
PHASE III
RONALD MCDONALD HOUSE SITE (7NC-B-54)
BRANDYWINE HUNDRED NEW CASTLE COUNTY

IROQUOIS QUAIL SNARE

FIGURE I-7

SKELLY and LOY Inc.
CONSULTANTS IN
ENVIRONMENT - ENERGY
ENGINEERING - PLANNING

Morgan's (1852) drawing and modern photographs (New York State Museum 2004) of the example he collected suggest that the curvature of the bark was needed to assure that the bird's head and neck adequately penetrated the snare loop.

Photographs I-4 and I-5 show modern replicas of traditional snares. To make these examples easier to understand, the trigger sticks have been painted red and the cordage is Day-glo green.

2.2 Deadfalls

Weslager (1943:180-181) describes and illustrates a figure-4 deadfall formerly used among the Cheswold community (see Figure I-4:1). Weslager (1943:180) notes that "originally the trap was placed along the bank of a stream to catch muskrats, beaver, and otter."

Cooper (1938:134-135) reports that the Seneca used dead-falls for bear, groundhog, mink, raccoon, and muskrat. Cooper (1938:53) further states:

> Deadfalls are set among the northern Algonquians and northern Athapaskans chiefly for the following animals: Marten, mink, fisher, weasel, lynx, fox, bear, otter, and beaver. They are also set, although not so commonly it would seem, for muskrat, skunk, and ground-hog.

Morgan (1851:93) notes that among the Iroquois "bear traps were constructed in such a way as to let down a heavy weight upon the back of the animal, when sprung, and thus pin him to the earth." Harding likewise (1951:47) notes that "deadfalls may be used for the largest as well as the smallest fur-bearing animal. These traps are very effective for catching bears." Irwin (1984a:282) notes that in the eastern woodlands "animals ranging in size from the tiny weasel to the black bear were caught in deadfall traps."

All deadfalls work on a basic pattern. The trap is placed such that the prey must move beneath the killing log or stone. One end of the killing object rests on the ground, and the trap does not have to support the full weight. The trap is triggered either by the prey clumsily stumbling over a trip stick or by the prey moving a bait stick. When triggered, the animal does not have time or space to escape the falling log and is crushed. It is a combination of the weight and the velocity of the falling log/stone that kills the animal. If the load is too close to the ground, it may simply pin the animal, allowing it to eventually dig out. For the Native American trapper, the ideal result is for the trap to break the neck of the animal, quickly killing or

Photograph I-4. Replica of a baited, spring-pole snare.

Photograph I-5. Replica of a spring-pole snare on a trail. Entanglement in snare triggers spring-pole.

immobilizing it. A properly set deadfall can be used for skunks with little risk of them fouling the trap with their spray.

A stick-and-spindle deadfall is best suited to animals that will pull strongly on the bait stick. The spindle is a rounded pebble or knot of wood placed on the ground surface. The bait stick is placed on the top of the spindle, and the support stick is placed on the bait stick where the bait stick contacts the spindle. The carefully balanced system will stay in place until an animal begins to move the bait stick. At that point, the support stick tumbles off of the spindle and the killing weight falls on the prey. The stick-and-spindle deadfall is best used with a pen, to assure that the animal is beneath the killing log when the trap is tripped. Cooper (1938) illustrates several forms of Seneca stick-and-spindle deadfalls (Figures I-8:48 and I-9).

The trip-stick deadfall also uses a pen with bait at its back, or a narrow spot in a game trail. In order to get to the bait or pass down the trail, the prey must move under the suspended killing load. The trip-stick is placed such that a furbearer will accidentally step on it, thereby freeing the killing load. It must be remembered that animals are used to stepping on sticks, branches, and brambles without adverse effect; the prey need not be particularly clumsy to step on "just another stick." The trip-stick deadfall is ingenious because none of the pieces alone bears the weight of the killing load. The stress is spread throughout the system and utilizes friction, allowing relatively thin cordage and trigger sticks to hold a great weight. The trip-stick deadfall is known among the Seneca, northern Algonquians, and northern Athapaskans (Cooper 1938). The Seneca trapped bear, raccoon, mink, groundhog, skunk, muskrat, and rabbit with the trip stick deadfall (Cooper 1938:135). Cooper (1938) illustrates various forms of Seneca trip-stick deadfalls (Figures I-10 and I-11:87-88).

Photograph I-6 is a modern replica of a trip-stick deadfall. To make the operation easier to understand, the static elements are painted blue, the cordage is Day-glo green, and the trigger stick is painted red.

Among Euro-American trappers, the figure-4 deadfall was commonly used, but there is some question if this type of trap was known to pre-contact Native Americans. Cooper (1938) found no knowledge of the figure-4 deadfall among the northern Algonquians, northern Athapaskans, and Seneca; his review of the literature suggests this trap is an Old World invention. Weslager (1943:181) documented the figure-4 deadfall among the Cheswold community, Speck (1946a) reported it among the Catawba, and Speck *et al.* (1946) found it among the Rappahannock. It is discussed here because many people consider it the quintessential Indian trap, and it was certainly used by post-contact Indian groups.

DEADFALLS

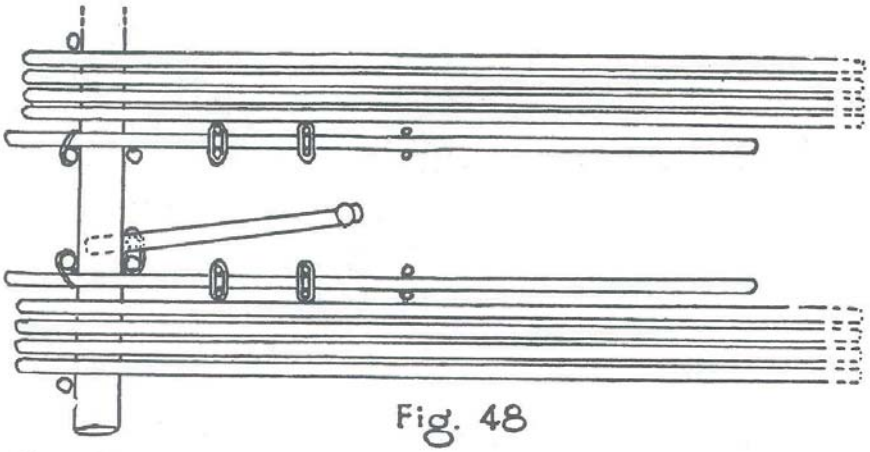


Fig. 48

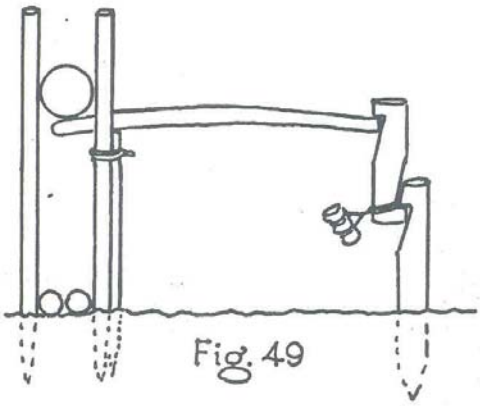


Fig. 49

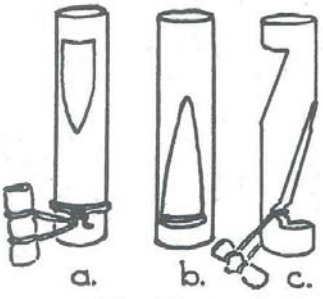


Fig. 50

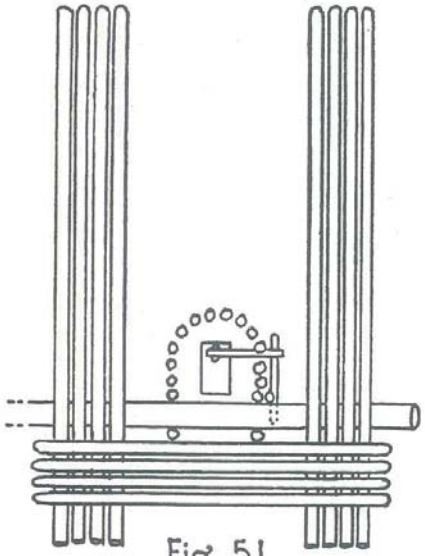


Fig. 51

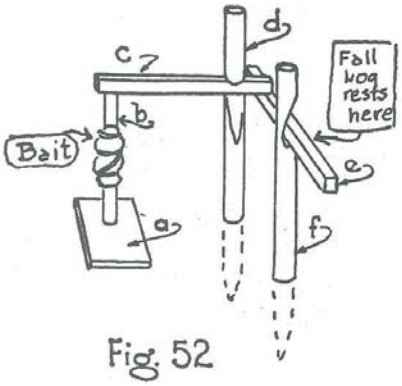
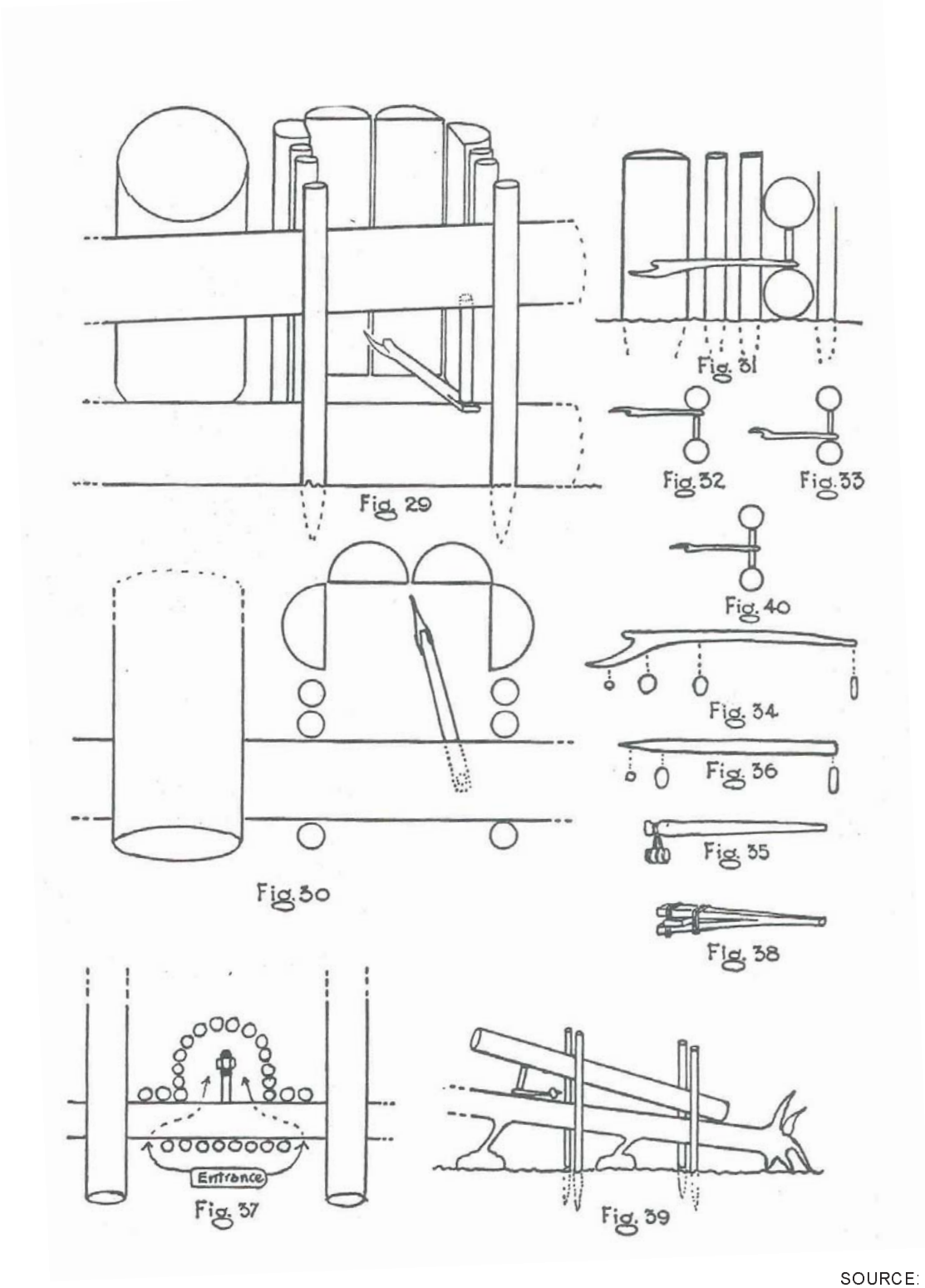


Fig. 52

SOURCE: COOPER 1938

DELAWARE DEPARTMENT OF TRANSPORTATION	
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY	
SENECA DEADFALLS	
FIGURE I-8	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING



SOURCE: COOPER 1938

DELAWARE DEPARTMENT OF TRANSPORTATION	
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY	
SENECA DEADFALLS	
FIGURE I-9	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

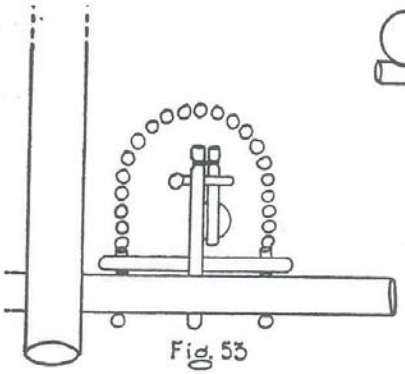


Fig. 53

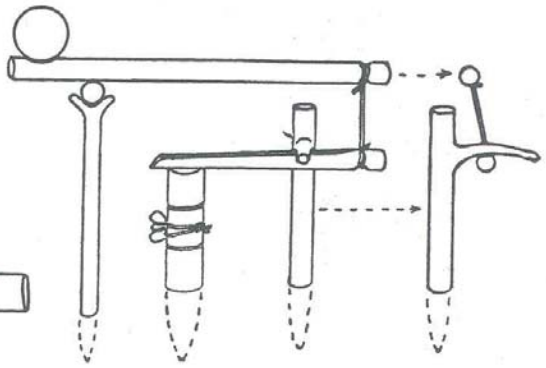


Fig. 54

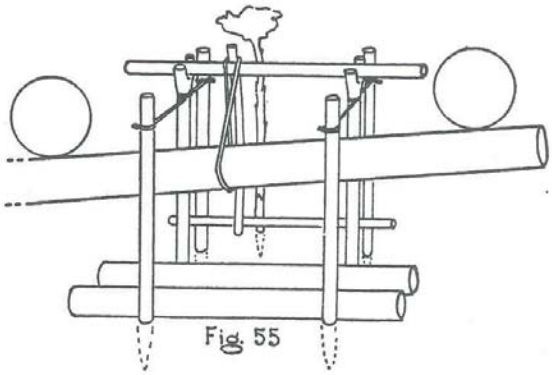


Fig. 55

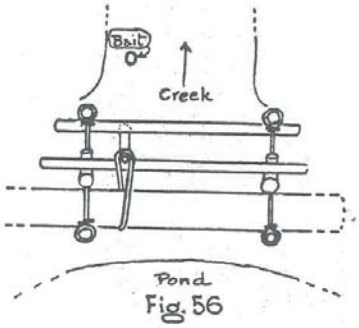


Fig. 56

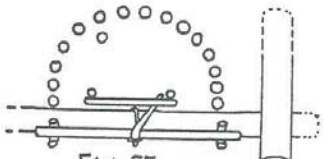


Fig. 57

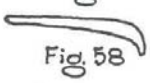


Fig. 58

Fig. 59

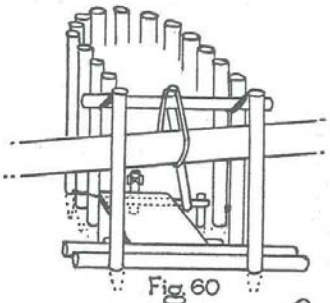


Fig. 60

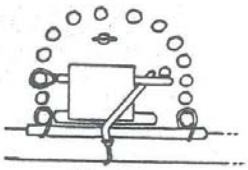


Fig. 61

Fig. 62

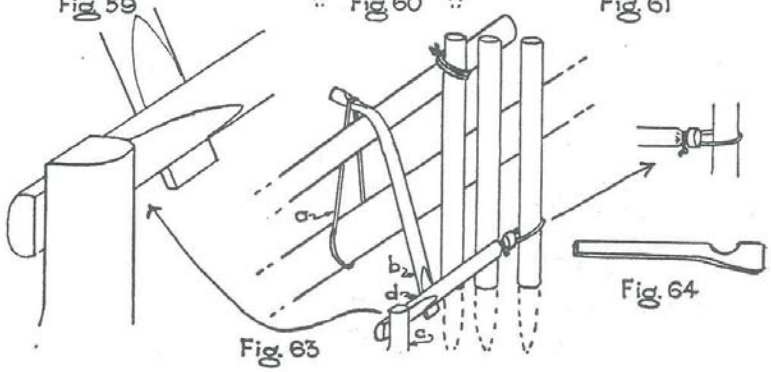


Fig. 63

Fig. 64

SOURCE: COOPER 1938

DELAWARE DEPARTMENT OF TRANSPORTATION	
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY	
SENECA DEADFALLS	
FIGURE I-10	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

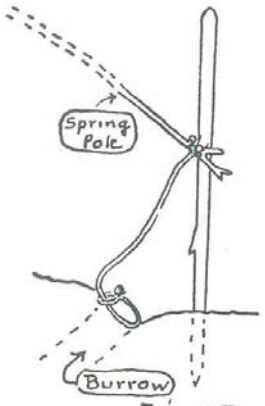


Fig. 83a

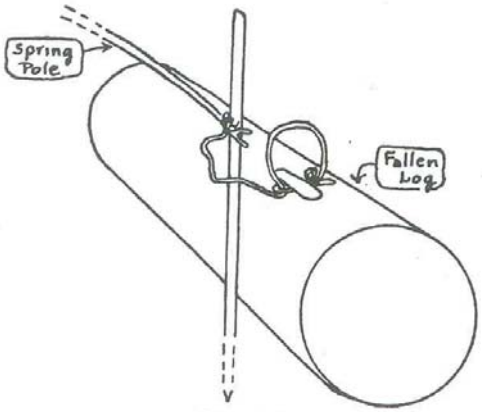


Fig. 85

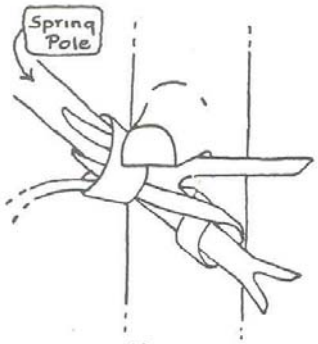


Fig. 83b

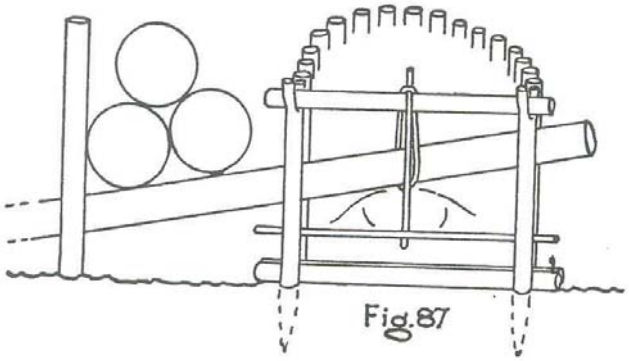


Fig. 87

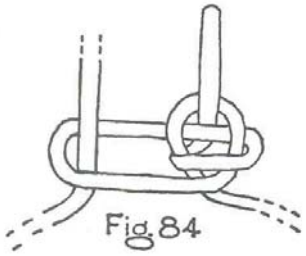


Fig. 84

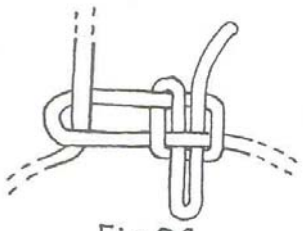


Fig. 86

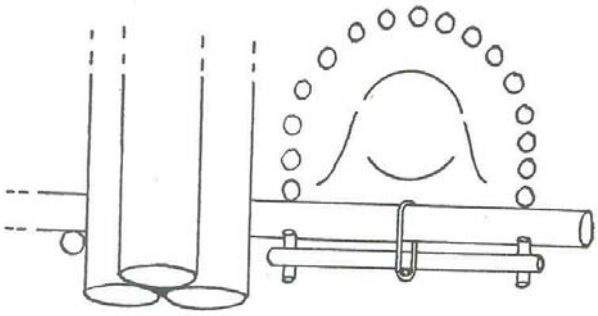


Fig. 88

SOURCE: COOPER 1938

DELAWARE DEPARTMENT OF TRANSPORTATION
BLUE BALL AREA TRANSPORTATION IMPROVEMENTS PHASE III RONALD MCDONALD HOUSE SITE (7NC-B-54) BRANDYWINE HUNDRED NEW CASTLE COUNTY
SENECA DEADFALLS AND SNARES

FIGURE I-11	SKELLY and LOY Inc. CONSULTANTS IN ENVIRONMENT - ENERGY ENGINEERING - PLANNING

Photograph I-6. Replica of a trip-stick deadfall.

The figure-4 deadfall requires only three wooden sticks and a killing log or stone. The figure-4 is ingenuous in its simplicity, reflecting a practical knowledge of physics and geometry. Curtis Coker (personal communication, 2005) of the Cheswold Community reported that "when I couldn't afford traps, I'd use a Figure-4 trap." This type of deadfall generally uses bait to draw the prey well under the killing load. When the prey moves the trigger stick, the figure-4 quickly collapses. The figure-4 is often used in conjunction with a natural pen, which prevents the prey from jumping to the side to avoid the falling load. The figure-4 can be used for almost any animal from mice to bears. As with all natural traps, the figure-4 works best when the sticks, pen, and killing load are well weathered. It is common to prepare the location many months in advance of actually setting the trap. This aspect of trapping – preparation long in advance of the actual pursuit – allowed trappers to craft devices and sets throughout the year for use in the preferred seasons. Whenever idle time presented itself, the trapper could scout, make traps, or prepare sets. Harding (1951:47) reports:

> When a man traps the same ground year after year a deadfall in a good location will usually pay well for the work of building. After the first season, the trap has the weather-worn, gray appearance and is more effective as a trap than when newly made. Its life may be four or five seasons and it needs only a little straightening of the stakes or an occasional set of new trigger sticks to keep it in perfect condition.

Photograph I-7 illustrates a modern replica of a figure-4 deadfall. The trigger stick has been painted red to clarify its operation.

It may sound incongruous to talk about a deadfall that captures animals live, but such traps were known for several groups. The killing load was replaced by a wooden box or basket. The Rappahannock used the pen-fall trap (a live trap with a figure-4 deadfall) for quail, snow birds (juncos), and smaller birds (Speck *et al.* 1946), and similar traps were known in the Cheswold community (Weslager 1943:181).

The Cheswold trappers also had a pen-fall trap that was triggered by the human pulling of a string once the prey had entered (Weslager 1943). The Catawba (Speck 1946a) and Rappahannock (Speck *et al.* 1946) had similar string-pull traps, but their versions used a board as killing weight.

Among the twentieth century Nanticoke at Oak Orchard, a string-pull deadfall was used for turtle doves. Charlie Davis (personal communication, 2004) described the process:

Photograph I-7. Replica of a figure-4 deadfall.

> But we did trap for birds. Now, we didn't make a deadfall like you saw there [referring to Seneca illustrations]. We took an old barn door and put it out next to a fodder stack somewhere in the wintertime on the sunny side where the snow melted first, on the way to hay stacks or fodder stacks, birds, particularly doves, would come there for gravel. You just used a wooden stake about one foot high and put it under the door at an angle, and have a long string and let it run over to the barn so then you could hide. Sprinkle cracked corn or something down in the space where the snow had melted, and the birds would soon learn to come there. One or two the first day, half a dozen the next day, and a dozen the next day. Then you just sprinkle the cracked corn so that it was underneath the door. When you see you've got a fairly large amount of turtle doves there, you snatch the string. And the door would fall down on them, and you just take them out one at a time, and kill them and pick them, and have a turtle dove pot pie or whatever. That's the kind of trapping that I grew up with.

2.3 Pit Traps

Also known as pitfalls, pit traps must successfully get the prey to the bottom of a pit or buried object, from which the animal cannot escape. Pit traps can be essentially deep, bell-shaped pits or buried barrels. Among the Seneca, pit traps were used for muskrat, mink, skunk, and raccoon (Cooper 1938:137).

In their unbaited form, pit traps are covered with light grass, twigs, and other items that will not hold the prey's weight. Such unbaited pit traps are best excavated along major trails, where brush screens can be placed to guide the prey over the trap.

Pit traps can also be used with bait, which tempts the prey into the pit. Cooper (1938:137) describes a baited pit trap among the Seneca:

> The mink pitfall consists of a pit dug about 4' deep and about 2' to 3' across the top, round or square in shape. The mink is lured on by clams placed at intervals in his den and in the pit itself. The animal after having its appetite whetted without being satiated goes after the clam bait in the pit and is unable to climb out.

A relative of the pit trap is the scratch or pen trap. This type of trap was used by the Rappahannock for turkey, quail, and other ground birds. The trap consists of a lattice-work pen in the form of a truncated pyramid. The pen is closed on the sides and top, and is placed on the ground. On one side, an opening is excavated to allow the prey bird to squeeze under the edge of the pen, in pursuit of corn or seeds spread inside and out as bait. Having leaned over and entered head first, these species do not think to escape in the same manner. Instead, they are

found standing tall, having forgotten how they entered the trap (Speck *et al.* 1946). Similarly, this author inadvertently trapped quail in a plastic-covered excavation unit; in feeding, the birds slipped under the edge of the plastic and fell into the unit. The quail could not fly out of the "trap" because of the plastic cover.

The rabbit gum is a hybrid trap type; it is technically a pit trap that replaces the pit with a horizontal, hollow log. It captures the prey, generally a rabbit, without strangling or crushing it. The gum is traditionally a hollowed-out section of gum trunk, with a solid back. Bait may be placed in the back of the gum, or the gum can simply be left as a possible dry den. When the rabbit hits a trip stick in the back of the gum, a trap door falls, capturing the rabbit. Rabbit gums function much like modern Hav-A-Hart® box traps. It is unclear if the rabbit gum was introduced or native. Hassrick (1943:8) discovered during his visit with the Indian River Nanticoke that "in an old carriage house stood a hollow gum log trap for taking rabbits." Speck (1915:21) likewise documents this type of trap among the Nanticoke:

> A common device for trapping rabbits and opossums is a box-trap made of a hollowed gum-log. From a single hollow log, eight or nine sections may be cut off to make as many traps. The back is closed with a piece of board, the front opening is provided with a drop door . . . and a trigger attachment with dropping aperatus."

Speck felt that some features of the trap, especially the trigger system, may be native.

The rabbit gum, now termed a "box trap" was used through the nineteenth and twentieth century by the Nanticoke. In the second half of the twentieth century, snares were not used. Charlie Davis (personal communication, 2004) reported "Box traps was too convenient for us. I think Mr. Link Hennings and Mr. Joshua, I think they may have been familiar with snares and all. But that's a generation older." The Nanticoke of the twentieth century used box traps for rabbits, but occasionally caught opossum and raccoon as well. Charlie Davis (personal communication, 2004) described a typical 0.5 to 1.0 mile trapline that he worked before school, in the period 1928-1936:

> Now, I walked a trapline every morning during that period I was telling you about, and it was always a pleasant surprise for Mom or Daddy if I brought one or two rabbits in two or three times a week, you know. It was food for the table, and that was better than hunting with a gun, although I like to do both of them.

There was apparently an evolution in this type of trap among the Nanticoke. The fathers and grandfathers of the informants had used hollow logs, the informants had used traps made of dressed lumber, and Tran Norwood (personal communication, 2004) reports today that “Even my box traps now have turned to stainless steel.”

The “hare gum” was used by the Rappahannock for trapping rabbit, opossum, and small game (Speck 1946b). Speck *et al.* (1946:16) report “the box trap is constantly doing its work among the Catawba, as well as among Whites and Negroes in the area, to bring rabbit and opossum meat to the cooking pot.”

There is no history of rabbit gum use among the Cheswold Community in the twentieth century. In contrast with the Nanticoke and their focus on rabbit, the Cheswold relied heavily on muskrat trapping for meat for the table (Dennis Coker, Anna Coker, and Curtis Coker, personal communications 2005).

3.0 TARGETED SPECIES

Ideally, it would be possible to examine species lists from archaeological excavations in the state to determine the species regularly captured. For example, Guilday (1971:20) considers the 14 deer to 1 beaver ratio at a Susquehannock site in Lancaster County, Pennsylvania, as indicative of much trapping activity. Likewise, sixteenth century Mohawk sites in New York have significant contributions of minimum numbers of individuals (MNIs) by diverse furbearers (Funk and Kuhn 2003; Ritchie and Funk 1973) (Table I-1).

Table I-1.
Furbearer Remains at Mohawk Sites

Site	Vertebrate MNI or Fragments	MNI or Fragments of Key Furbearers
Klock	122 MNI	52 white-tailed deer 9 beaver 5 black bear 5 woodchuck 2 raccoon 2 marten or fisher 1 bobcat 1 marten 1 fisher 1 rabbit 1 muskrat
Smith-Pagerie	1,753 fragments	746 white-tailed deer 218 beaver 84 black bear 14 raccoon 1 woodchuck
Garoga	82 MNI	25 white-tailed deer 11 beaver 5 black bear 3 red fox 2 gray fox 2 raccoon 2 woodchuck 1 wolf 1 snowshoe hare 1 muskrat 1 porcupine 1 fisher 1 pine marten 1 otter

Sources: Funk and Kuhn (2003): Ritchie and Funk (1973). Note MNI denotes minimum number of individuals.

However, there are a number of factors limiting the utility of such a direct zooarchaeological approach, including: 1) faunal preservation is poor on most sites in Delaware, excepting those with shell middens or shell-filled pits; 2) it is not possible to know if an individual animal was trapped or hunted; and 3) trapped animals may have undergone primary processing (skinning, butchering) at remote, non-residential locations, producing a significantly reduced bone record in the residential site. The recovery of beaver incisors from several Delaware sites indicates that beaver were being captured. However, beaver incisors are among the densest and least prone to decay of all mammalian remains, creating the risk of overstating the importance of beaver at the sites.

It is important to remember that native trapping was not necessarily limited only to the furbearing animals pursued by modern trappers. Yong's early account of the Delaware River (Myers 1937) discusses the furbearing resources:

> The River aboundeth with beavers, otters, and other meaner furs, which are not only taken upon the bankes of the mayne River, but likewise in other lesser rivers, which discharge themselves into the greater. . . the Countrey is very well replenished, with deere and in some places stores of Elkes.

The idea of trapping deer, for example, is foreign to most modern hunters, but deer snaring is known for a number of northeastern tribes.

Table I-2 provides a summary of the species trapped by eastern tribes. There are no good comprehensive trapping data for all eastern tribes, and the following information was drawn mainly from those groups for which trapping is fairly well documented. However, although Cooper (1938) documented a number of traps and target species for the Seneca, for example, there may have been additional species trapped in the past. The best documented groups in the region, in terms of trapping, are the Seneca (Cooper 1938), Northern Athapaskan (Cooper 1938), Northern Algonkian (Cooper 1938), the Nanticoke (Speck 1915), the Cheswold community (Weslager 1943), the Catawba (Speck 1946a), and the Rappahannock (Speck *et al.* 1946). The trapping by other groups is often mentioned in passing, and it is likely (based on the results from well documented groups) that many eastern tribes had a well developed trapping technology and a relatively broad range of target species.

Caution must be exercised when considering target species. If all other factors were equal, and if it were equally easy to catch all species, we would expect the traditional trapper to focus on the largest meat packages (i.e., deer and bear). However, all other factors are not equal. The density of individuals varies significantly by species, and it will often be more

productive for a trapper to focus on the more plentiful species (e.g., muskrat, rabbit). In a recent article on mass collection of small animals, Ugan (2005) notes that trapping can provide a high return for investment when densities are high; he specifically mentions beaver, muskrat, and rabbit as examples. In Delaware, where muskrat, rabbit, and historically beaver occur at significantly higher densities than deer or bear, a focus on the smaller animals may be expected.

Most of the sources utilized in generating Table I-2 were early twentieth century ethnographies focused on hunting and trapping methods. Although sixteenth, seventeenth, and eighteenth century accounts were examined (indeed all of the primary sources gathered by John Bedell in his ethnographic review for the Puncheon Run site report [LeeDecker *et al.* 2001] were examined), direct references to trapping were rare. These included: a mention of deer snaring in New Netherlands (Van Der Donck 1656:97); snaring of beaver and otter by the Virginia Indians, reported by Capt. John Smith (1623:110); use of snares and gins for beaver and otter in Virginia, from Strachey (1612:125); and use by the New England Indians of spring-pole snares for deer and deadfalls for otter and beaver (Wood 1634:99-100).

Table I-2.
Data on Species Trapped By Eastern Indian Groups

Species	Group	Trap Type
Bear	Seneca Iroquois N. Athapaskan N. Algonkian	Deadfall Deadfall Snare and deadfall Snare and deadfall
Deer	Iroquois Seneca S. New England Kickotank E. Shore MD/VA Delaware	Spring-pole snare Snare Snare Spring-pole snare Balance-pole snare Snare
Beaver	Lenni Lenape N. Athapaskan N. Algonkian E. Virginia Powhatan New England	Deadfall Deadfall Deadfall Snare Gins (deadfalls?) and snares Deadfall

Species	Group	Trap Type
Otter	Lenni Lenape N. Athapaskan N. Algonkian Rappahannock E. Virginia Powhatan New England	Deadfall Deadfall Deadfall Deadfall Snare Gins (deadfall) and snares Deadfall
Muskrat	Lenni Lenape Seneca N. Athapaskan N. Algonkian Rappahannock	Deadfall Deadfall and pit trap Deadfall Deadfall Deadfall and snare
Rabbit	Nanticoke Leni Lenape N. Athapaskan N. Algonkian Rappahannock Catawba	Snare and rabbit gum Snare Snare Snare Snare and rabbit gum Snare and rabbit gum
Skunk	Seneca N. Athapaskan N. Algonkian Rappahannock	Snare and pit trap Snare and deadfall Snare and deadfall Deadfall
Groundhog	Seneca N. Athapaskan N. Algonkian	Snare Snare and deadfall Snare and deadfall
Fox	N. Athapaskan N. Algonkian Rappahannock	Snare and deadfall Snare and deadfall Deadfall
Lynx	N. Athapaskan N. Algonkian	Snare and deadfall Snare and deadfall
Raccoon	Seneca Rappahannock	Deadfall and pit trap Deadfall and snare
Mink	Seneca N. Athapaskan N. Algonkian Rappahannock	Deadfall, snare, and pit trap Deadfall Deadfall Deadfall and snare
Marten/Fisher	N. Athapaskan N. Algonkian	Deadfall Deadfall
Weasel	N. Athapaskan N. Algonkian	Deadfall Deadfall
Opossum	Nanticoke Rappahannock Catawba	Rabbit gum Deadfall, snare, rabbit gum Rabbit gum

Species	Group	Trap Type
Turkey	N. Iroquois Rappahannock Catawba	Twitch-up snare Pen trap Pen-fall trap
Grouse	Seneca N. Athapaskan N. Algonkian	Snare Snare Snare
Quail	Iroquois Rappahannock	Snare Pen and pen-fall traps
Snipe	Iroquois	Snare
Mourning Dove	Nanticoke	Deadfall
Junco (snow bird)	Rappahannock Catawba	Pen-fall trap, pen trap, deadfall Pen-fall trap

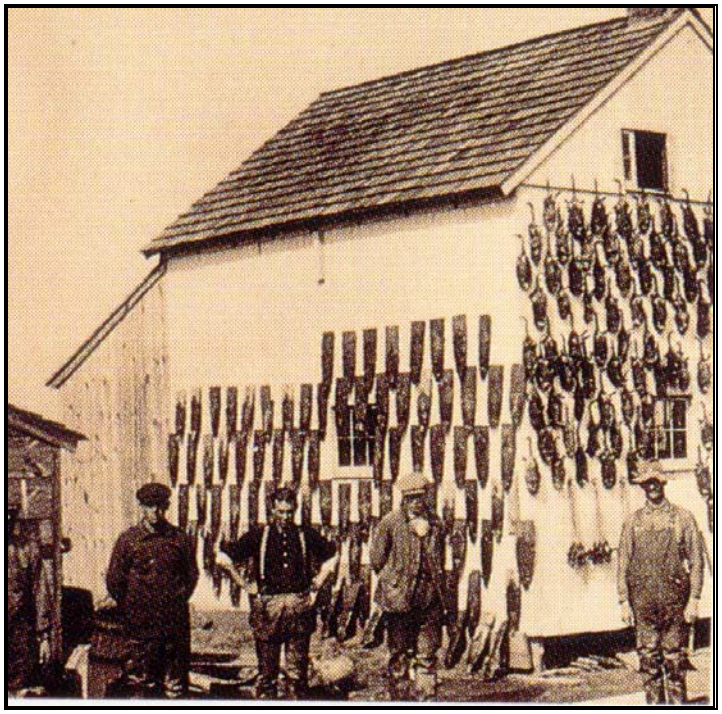
3.1 Muskrat

The muskrat is the most heavily trapped species in modern Delaware, and the state was historically associated with massive annual harvests of muskrats (Photographs I-8 and I-9). In historic and modern times, muskrats were a source of both meat for the table and fur. The meat is served seasonally under monikers including marsh hare and Chesapeake terrapin (Wild America 2004).

Members of the Oak Orchard Nanticoke community trapped muskrat for fur in the past, but most of their twentieth century trapping was rabbits for the table. Charlie Davis (personal communication, 2004) reports "A few people trapped for the fur trade, muskrat. If they got anything else it was unusual." Charlie Davis (personal communication, 2004) spoke of a schoolmate in the 1930s who trapped muskrat:

> Now I seen Sylvester Harmon, when was going to school together, he trapped every morning. Uncle Willy owned that island out on the other side of the Indian River, not the one we used to swim out to, the one all the way out on the other side of the river. That's 25, 26 acres over there. And Sylvester used to take his boat and go over there every morning, and walk the trapline for muskrats before he came to school. Two, three times a week he'd have some muskrats that he skinned and saved the furs for.

Photograph I-8. Delaware muskrat trapper, ca. 1930, with daily catch of approximately 20 muskrats (from DNREC 1993).



Photograph I-9. Delaware muskrat shed with stretched skins (left) and unskinned muskrats (right) (from DNREC n.d.).

Tran Norwood (personal communication 2004) noted that "most of what used to be good muskrat ground in this area, is now bordered by development on so many sides that you can't get to the marsh."

In contrast, members of the Cheswold Community relied heavily on muskrat trapping, both for fur to sell and for meat for market or table. Anna Coker (personal communication, 2005) stated "I mean that's the way you had of making a living in the winter" and "It was something that was always done in the winter because once your stalks and everything were up from the corn, trapping season began." Curtis Coker (personal communication, 2005) discussed the fur pricing system:

> Your muskrat, your hides around here was priced based on what the mink was. If the mink was really high, your hides wasn't worth nothing. No. . . If the mink was high, your hides was worth more. If the mink was low, you wouldn't get nothing for your hides; they'd just buy the mink. Back when I was doing it, that is how they graded it, anyway. You'd always look at the prices to see if mink were high or low. They wanted those muskrats for inside of gloves, inside of hats.

In addition to selling the fur, the Cheswold Community ate muskrat during the winter. Ann Coker (personal communication 2005) commented "You see, we ate . . . Mom cooked muskrat regular." Dennis Coker (personal communication, 2005) addressed the locational basis for muskrat trapping in the Cheswold Community:

> I wonder how much muskrat trapping, fur-bearing trapping that was done was because we ended up living in those low-lying areas. Some are right there with them (right against the marsh). As opposed to having high ground, where you wouldn't have those marshy areas.

Muskrats generally weigh slightly more than 2 lbs when mature (Doutt *et al.* 1977). They are predominately vegetarians that thrive on aquatic marsh/swamp plants, although they will eat an occasional mussel or clam. Muskrats are excellent swimmers and their fine fur evolved to protect the creature during its lengthy forays in the water. Muskrats are most active in the evening and early morning. The species lives either in domed lodges built of reeds and other plant matter or in burrows excavated into the banks of creeks, rivers, or lakes.

In terms of reproductive prowess, muskrats are the rabbits of the marsh. According to a display in the Port Penn Interpretive Center "one pair of muskrats and their successive generations can produce 3 million offspring over a period of seven years."

Muskrats generally do not wander far in their daily rounds. They remain active year-round, and paths, canals, and feeding platforms become well-established. Muskrats have two to three litters per year (Wild America 2004). It is typically easy to determine if muskrats are active in an area.

With their sleek bodies and slender shoulders, muskrats are not easily snared. The Seneca, Northern Athapaskans, and Northern Algonquians did not use snares for muskrats, relying instead on dead-falls and, later, steel traps (Cooper 1938). Weslager (1943:180-181) reports that the Cheswold community used figure-4 deadfalls for muskrats, and Speck *et al.* (1946) likewise recorded the use of the figure-4 deadfall for muskrat among the Rappahannock.

3.2 Beaver

Beaver favor freshwater settings. Although they can occasionally be found along brackish streams, they much prefer access to fresh water. The beaver depends on hardwood trees for subsistence and as raw material for their dams and lodges. They are among the most conspicuous of furbearers, building large dams and lodges, creating ponds, leaving numerous gnawed tree stumps, and tail-slapping the water when startled.

Adult beaver usually weigh 40 to 60 lbs. As with most furbearers, their coats are thickest (i.e., are “prime” in trapping lingo) in the middle of Winter.

In Delaware, the role of water salinity on beaver distribution can be seen in the contrast of the Blackbird Creek Component and the St. Jones River Component of the Delaware National Estuarine Research Reserve. The Blackbird Creek Component is predominately freshwater, containing “freshwater tidal and non-tidal wetlands and brackish water marshes” (DNERR 2004a). The component supports “large numbers of muskrat” and “beaver and river otter in lesser numbers” (DNERR 2004a). At the St. Jones River Component, the major features are tidal brackish-water and salt marshes. The St. Jones Component supports muskrat, mink, and otter, but no beaver (DNERR 2004b).

It is unknown what type of trap the Seneca traditionally used for beaver, but beaver deadfalls were used by the Northern Athapaskans and Northern Algonquians (Cooper 1938). Weslager (1943:180-181) reports that the Cheswold community used figure-4 deadfalls for beaver. Strachey (1612) observed the use of “gins and snares” for beaver in eastern Virginia in 1610-1611. Wire snares are used in underwater sets for beaver, but this appears to be a modern development.

Beaver were historically present in the Oak Orchard vicinity, but they were not targeted by trappers. Tran Norwood (personal communication, 2004) reports "they've reintroduced them from time to time."

3.3 Racoon

The raccoon is among the most adaptable of the furbearers. Raccoons are equally at home on small islands in the saltwater marsh or along freshwater creeks of the Piedmont. Because the raccoon is a nocturnal creature, trapping is better suited than hunting for capturing raccoon. Mature raccoons weigh 12-26 lbs and sport excellent furs and striking tails. The species eats a wide variety of plant and animal foods, including nuts, corn, fish, frogs, eggs, reptiles, small mammals, and shellfish (Doutt *et al.* 1977). On the edge of almost any small stream, marsh, or wetland in the state, one can find the tracks of a raccoon. Raccoons may den in hardwood trees in the uplands, but they normally feed near water.

Raccoon can be captured in blind sets along established travel routes or with baited sets. In addition, the species is mesmerized by shiny objects and sets can be made with dangling or immersed items to draw the raccoon to the trap. The Seneca use deadfalls for raccoons, but snares were not used for this species (Cooper 1938). Among the Rappahannock, spring-pole baited snares and figure-4 deadfalls were used for raccoon (Speck *et al.* 1946).

Tran Norwood (personal communication, 2004) commented on the current state of raccoon trapping in the Oak Orchard area:

> Its not feasible for these fellows to even make a living. And that's a big thing on the raccoon. It used to be that you did make something on the raccoon. You talk now, every other week is a rabies scare, and you don't find the guys that even coon hunt like they used to. You've got the overabundance of raccoons plus the developments. You'd be surprised. You could go right across the road into Summer Village and find somebody in there that's feeding [raccoon], or even the groundhogs.

Similarly, Curtis Coker (personal communication, 2005) of the Cheswold Community reminisced about raccoon trapping years ago:

> And a raccoon was $30. I was skipping school. You know. You catch 12 raccoons a day, for 25 or 30 bucks, you were doing something, buddy. . .Let the furs (prices) come back, and I'll show you a trapper.

3.4 Opossum

The opossum is given little respect as a source of fur or as table fare, but the density of the species in all areas of the state mean that it was probably trapped in pre-contact times. The opossum grows to a mature weight of about 6-10 lbs. It is distinctive among Delaware mammals because it is a marsupial, has a prehensile tail, has more teeth (50) than any other local mammal, and plays dead when threatened. Doutt *et al.* (1977:27) comment:

> The needs of the opossum are really very simple. Almost anything to eat and almost any place to live!. . .So, we have a mammal equally at home from sea-level to mountain-top.

Opossums utilize a variety of dens, including abandoned fox and skunk burrows and hollow hardwoods. They wander both uplands and the stream side settings, and do not generally create notable paths. Their distinctive "thumbs-out" tracks can be found along streams in areas also used by raccoons. Opossums are most frequently captured in baited sets or in blind sets targeting other species. Snares may be useful at active dens, but baited deadfalls are generally most effective. Speck (1915:21) reports that gum-log box-traps were used by the Nanticoke for trapping opossums.

Opossums may also have been captured by light and noise. A screaming person with a torch will generally cause a possum to "play possum." At certain times of year, such as when the persimmons are ripe on the tree, it is relatively simple to predict where local opossums will be found. A night-time raid on a persimmon tree may yield several opossums gorging themselves on this late autumn fruit. Persimmons were also eaten by Indians (commonly after the first frost), and this shared resource may have brought opossums and Native Americans into contact and competition for a week or two each year.

Opossum were captured in rabbit gums by the Nanticoke (Speck 1915), the Rappahannock (Speck *et al.* 1946), and the Catawba (Speck 1946a). The Rappahannock also used the figure-4 deadfall and the baited spring-pole snare for the opossum (Speck *et al.* 1946).

Among the twentieth century Nanticoke, opossum caught in rabbit gums were kept alive in a barrel for a month, being fed on sweet potatoes. This served to clean their systems, and also kept a ready meal on hand. Snapping turtles were likewise barrel-kept before being eaten (Tee Norwood and Charlie Davis, personal communications 2004).

3.5 Rabbit

The cottontail rabbit is common throughout the northeastern United States. The typical adult rabbit generally weighs 2-3 lbs (Doutt *et al.* 1977). Rabbits rely on camouflage, brush cover, and escape speed to avoid predators. Rabbits generally are found in high density clusters, where they establish a network of well-worn trails through brambles and tree falls. Their environmental preferences for dense brush make rabbits hard to hunt, even for modern hunters (unless dogs are used). Rabbits remain active throughout the year, and snow renders their active trails highly visible. Rabbits are known for their reproductive prowess, and Doutt *et al.* (1977:91) report "trapping studies show that really good rabbit habitat cannot be hunted out." Thomas *et al.* (1975:47) report that in Delaware "very good habitats [for rabbits] occur on overgrown lands."

The habitual use of established trails make rabbits easily captured by snaring. Rabbit snares were used by the Cheswold community (Weslager 1943), the Nanticoke (Speck 1915), the Seneca, the Northern Athapaskans, and the Northern Algonquians (Cooper 1938). The trapper needs to make only minor modifications to assure that any rabbit using a trail will pass through his snare. Because snaring is so effective, it was probably unusual for native trappers to build deadfalls for rabbits. Neither the Seneca, Northern Athapaskans, nor Northern Algonquians are known to have used deadfalls for rabbits (Cooper 1938).

It is not clear if the rabbit gum – a specialized trap type used mostly for rabbits – was used by pre-contact trappers, or represents an Old World introduction. Speck (1915:21) and Hassrick (1943:8) indicate that rabbit gums were used by the Nanticoke. The Nanticoke also procured rabbits with a throwing stick, and they were clearly very familiar with the habits of the species (Speck 1946b). The Rappahannock (Speck *et al.* 1946) and the Catawba (Speck 1946a) also used the rabbit gum.

Interviews in the Oak Orchard Nanticoke community revealed that most trapping in the twentieth century consisted of box trapping (trapping with a rabbit gum) of rabbits for the table. As Charlie Davis (personal communication, 2004) reported, "we just threw the fur away." Beginning in the 1920s or 1930s, hunting rabbits with dogs grew in importance among the Nanticoke, and box trapping decreased. Interestingly, some of the Nanticoke rabbit trapping was aimed at game management, as revealed in this exchange between Tran Norwood and Charlie Davis (personal communications 2004):

> Tran: We do a little just for fun. And its basically to restock rabbits. Trap them and move them where you want them.
>
> Charlie: Charlie Noah did that, when he was a manager down there. He would set traps for them down there and bring them home and put them in briar patches at everybody's house.

3.6 Fox

There is some question regarding the pre-contact distribution of foxes in Delaware and Pennsylvania. There is general agreement that gray fox was present throughout both states, but there is very little evidence of red fox before widespread clearing of agricultural lands (Doutt *et al.* 1977). The red fox thrives in field edges, brambles, and old clearings rather than mature forest. Certain researchers argue that red foxes were European introductions. For example, McDougall (1997:130) reports:

> Unique among canines, North America's gray fox can and usually does climb trees to escape pursuit, which made for a short chase in untamed wilderness. Such impudence from a fox was intolerable, and in the mid-1700s red foxes were shipped over from England to remedy the situation. These immigrants found the New World to their liking and promptly escaped into the wild, where they have been thriving ever since.

The gray fox generally weighs 8-10 lbs. The species prefers unbroken forest. The gray fox ranges over a territory of 0.5-2.0 square miles, and eats a mixture of small mammals, insects, fruits, and vegetable matter (Doutt *et al.* 1977).

Modern trappers use wire snares for foxes, but fox snaring was not recorded among the Seneca. Foxes were captured with either deadfalls or snares by the Northern Athapaskan and Northern Algonquian (Cooper 1938). The Rappahannock used figure-4 deadfalls for fox (Speck *et al.* 1946).

Fox hunting with hounds is popular among the Oak Orchard Nanticoke today, and fox trapping is illegal in the state. However, in a discussion on feral cats, it became clear that some fox trapping continued. Charlie Davis (personal communication, 2004) reported:

> [name withheld] ,I know he doesn't talk about it too much, he has traps up and down Vance and to the fire hall. One day he was out talking – I was out hunting – and he says he caught six gray foxes that year. Well, if he caught six gray foxes, he'd caught a dozen [feral] cats.

3.7 Bobcat

At 15-25 lbs (typical adult weight), the bobcat is among the largest of predators in the state. Doutt *et al.* (1977:226) report that "cottontail rabbits, grouse, turkeys, small birds and eggs, rodents, fish, frogs, and occasionally fox and deer are all grist to their dietary mill." The nocturnal hunter may range widely in pursuit of game, and, like its big cat relatives the lions and tigers, does not need to eat every day.

There is no record of what types of traditional traps the Seneca used for bobcat or lynx. The Northern Athapaskans and Northern Algonquians used both snares and deadfalls for lynx, a larger relative of the bobcat (Cooper 1938).

3.8 Mink

The mink is a semi-aquatic weasel and a predator known for its fine fur. Minks generally weigh approximately 1-2 lbs, but are ferocious hunters. They eat muskrats, rabbits, ducks, mice, fish, frogs, crayfish, insects, and chickens. Mink prefer forested areas near water, whether salt, brackish, or fresh. Mink are not common and cover rather large hunting territories. Doutt *et al.* (1977:210) report that "Pennsylvania trappers average one mink for every 45 muskrats." The recent data (1995-2000 seasons) for Delaware suggest even a lower relative capture rate, with a ratio of 4,760 trapped muskrats to each trapped mink; only 36 minks were trapped over the five year period (Delaware Department of Natural Resources and Environmental Control 2004).

The appetite of the mink and its keen sense of smell make the mink a prime target for baited traps. Harding (1951:21) reports that "fish, birds, chickens, rabbits, and squirrel are used for bait; but nothing equals muskrat." The Seneca, Northern Athapaskans, and Northern Algonquians used deadfalls to capture mink, and the Seneca also used snares and pit traps (Cooper 1938). The Rappahannock used figure-4 deadfalls and baited spring-pole snares for mink (Speck *et al.* 1946).

3.9 Spotted and Striped Skunks

Both species of skunks are sought for their striking black and white furs, but avoided due to their ability to spray when provoked. Proper trapping, even with traditional methods, removes the risk of having either the trapper or the trap sprayed.

In addition to differences in markings, Spotted Skunks average 1.5-2.0 lbs adult weight and Striped Skunks average 4.0 lbs adult weight. The Spotted Skunk prefers mountainous terrain and is not common in Delaware, but the Striped Skunk is found in all areas of the eastern United States (Doutt *et al.* 1977).

Doutt *et al.* (1977) note that in some trapping seasons in the past, more than 10,000 skunks were trapped in Pennsylvania. Doutt *et al.* (1977:218) note that "although 10,000 skunks sounds like a good many animals, such a harvest apparently leaves the breeding potential unimpaired."

Skunks generally do not spray as a panic reaction, but rather reserve the tactic for use against living threats. This means that skunks generally do not spray the moment they are trapped, and a careful trapper can dispatch live skunks without being sprayed. Marion Deppen (2004:36), who trapped near Harrisburg, Pennsylvania in the 1940s, provides the following account:

> My system to dispatch a skunk was to raise the barrel of my .22 rifle to its nose. When the skunk inquisitively sniffed the end of the barrel, I would quickly raise it an inch and fire a .22 short into its brain. The dispatch was quick and without any odiferous results. Except this time.

A native trapper without fire arms would have to either club the skunk or drown it, if a creek was nearby. Skunks can only spray when they are standing on the ground. A badly snared skunk or one captured in a leg-hold trap can be lifted with a long-pole (the proverbial 10 ft pole) and taken to a creek or lake for drowning. The Seneca, Northern Athapaskans, and Northern Algonquians used snares for skunks, and the latter two groups also used deadfalls for this species. The Rappahannock used a figure-4 deadfall for skunk (Speck *et al.* 1946).

3.10 Fisher and Pine Marten

These two members of the marten family (sometimes referred to collectively as sable) were probably formerly present in at least the Piedmont of Delaware. This is based on the killing of the last known fisher in Pennsylvania in Lancaster County, only 20.0 mi from the Delaware Piedmont (Doutt *et al.* 1977).

The fisher and the pine marten both had highly desirable fur and were easily trapped. This led to a rapid decline in their numbers. Both species were susceptible to trapping with a baited, trip-stick deadfall. The Northern Athapaskans and Northern Algonquians used deadfalls

for marten and fisher. A classic set for these animals was to build the trap on an inclined log, such that the fisher or pine marten had to climb past the trigger stick to get to the bait.

3.11 Otter

Adult otters can weigh up to 20 lbs (Doutt *et al.* 1977). Otters may roam a large territory in search of fish, crayfish, frogs, and snakes, and are found in freshwater, brackish water, and saltwater zones. Otters typically live in streambank dens, but may also use hollow trees if suitable soils are not present. In his 1612 account of the Virginia colony, Captain John Smith reported that the Indians "have many Otters, which, as the Beavers, they take with snares, and esteeme the skinnes great ornaments; and of all those beasts they use to feede, when they catch them" (Arber 1910). Likewise, Strachey (1612) observed the use of "gins and snares" for otter and beaver in eastern Virginia in 1610-1611.

Otters are perhaps best known for their slides, a basic recreational facility. They also create well-worn trails, especially where overland travel reduces the effort, such as across the narrow peninsula inside a horse-shoe curve in the creek.

Otters were captured by deadfalls of the Northern Athapaskan and Northern Algonquians. Weslager (1943:180-181) reports that the Cheswold community used figure-4 deadfalls for otters. The Rappahannock also used a four-log, figure-4 deadfall for otter (Speck *et al.* 1946). Harding (1951:45-46) likewise notes that "the Indians of Canada sometimes use the trip-stick deadfall for otters by building the trap on an otter trail, and beavers are trapped the same way."

Otters occur in the vicinity of the Oak Orchard Nanticoke. Today, nobody sets traps for otters, but they are occasionally caught in steel traps set for muskrat (Tran Norwood, personal communication, 2004).

Likewise, otters were occasionally captured in muskrat traps in the Cheswold Community. However, otter trapping was a risky business, according to Curtis Coker (personal communication, 2005):

> Otters were hardly worth it. You found an otter slick, it took you so long to catch try and catch it. By the time you caught it, and the tide went down, and you had other people going up and down the same crick. They'd see him right there, and by time you got back, the trap would be set off and he was gone.

Curtis Coker (personal communication, 2005) described a typical set using a 220 Conibear trap, a two-spring body grip device:

> We used a 220. You go up and down the marsh in the winter time, and you're always watching the banks. The marsh edge, that's where the otter plays. He'll go up and down, back and forth, and they call it an otter slick. What you do, is break some sticks off, good size, and you stick them in on either side of the slick, on an angle to make sure he come through there (make a fence on either side). Put your sticks up on each side, then take your 220 and put it with a stick up there. And then he comes riding down the hill and right into the 220.

3.12 Bear

Black bears are not presently known in Delaware, but biologists feel that the species was once present throughout much of the state (Heckster 1999). Black bears in the eastern United States yield much edible meat, a heavy fur, teeth and claws for ritual use, and bear oil for use as a condiment or cooking oil. Black bears are or were formerly found in Coastal Plain swamps, the Piedmont, and the mountainous areas of the eastern United States (Brown 1993).

The black bear is active in both daylight and night. It feeds on a wide range of animals, fruits, and plants. As many modern campers recognize, the bear has a strong sense of smell and will be attracted to many types of human foods. Their attraction to bait and their relative clumsiness make the black bear an appropriate target for trapping with deadfalls. Even after leg-hold bear traps were available, the preferred trap remained the deadfall. No trapper looked forward to having to dispatch an enraged bear in a leg-hold trap. Bear deadfalls were used by the Seneca, Northern Athapaskans, and Northern Algonquians. The construction of a deadfall suitable for capturing a bear requires much effort and planning. Deadfalls for bears were probably most frequently built in areas repeatedly trapped year after year.

The Northern Athapaskans and Northern Algonquians also used a snare for bears (Cooper 1938). Harding (1951:38-39) reports:

> To speak of snaring bears sounds like a joke; but the truth is that the spring-pole snare is one of the most effective bear traps that can be employed. Many black bears are caught in snares by the Canadian Indians; but I have never heard of any other species of bear being caught this way. . . When a bear feels the noose tightening he commences to struggle, and the first lunge unties the jam knot by which the lifting pole is held down. The rising pole lifts the bear off his front feet and draws his neck up against the two poles where he is quickly strangled in spite of his desperate struggling.

In the twentieth century, bear were not present in the Oak Orchard vicinity. To find bear, "you have to get over in Maryland" (Charlie Davis, personal communication, 2004).

3.13 Deer

The white-tailed deer represented to the Native Americans a significant package of meat, a large pelt, and other raw materials (antler, bone, sinew). White-tailed deer are predominately nocturnal, and a single animal may travel more than a mile in a single night. In the 2001-2002 hunting season, 12,133 deer were taken in Delaware. Thomas *et al.* (1975:48) report an average deer carrying capacity of one deer per 30 acres.

Weslager (1996:60, emphasis added) reports that among the Delaware "deer was taken by stalking the individual animal with bow and arrow, **by snares set in the woods** where the does browsed for food, or by driving herds into a natural or artificial enclosure." Likewise, Colonel Norwood recorded eastern shore Indians snaring deer in 1649 (Norwood and Force 1963). The ideal snare set is where two trees or other obstacles restrict the trail.

Deer may have been trapped in any season. Deer hides were used in both furred and scraped forms, and deer fur did not have to be in prime for the skins to be useful. In addition, deer mobility was directly related to efficiency of trapping. At times of the year when deer increase their normal movement patterns (e.g., during rut), they are much more easily caught on trails.

Deer and Indians both relied on mast (acorns, hickory nuts, other edible nuts) crops in the autumn. Once the nuts began to fall, it was important to reach the downed nuts before squirrels, chipmunks, and insects set to work on them. If Indians were gathering nuts in upland hardwood groves, it may have been natural for them to set traps for the deer also targeting the groves.

The effectiveness of snaring deer and their general inattention to bait combine to make deadfall traps for deer relatively ineffective. Among the Seneca, Northern Athapaskans, and Northern Algonquians, there is no record of deadfall trapping of deer. The Catawba (Speck 1946a), Seneca (Cooper 1938), Kickotank (Feest 1978), and Delaware (Weslager 1996) are known to have used snares for deer.

It is difficult to know the historical range of white-tailed deer. The Nanticoke at Oak Orchard report that deer were not present in their area before the 1950s "and then they were scarce. It was special to see a deer" (Tee Norwood, personal communication, 2004).

3.14 Groundhog

Groundhogs (or woodchucks) typically weigh 6-10 lbs, and their weights peak yearly just before hibernation in early winter (Doutt *et al.* 1977:110). The range of the groundhog in Delaware was probably limited by the suitability of soils to extensive burrowing. McDougall (1997:251) reports "when scouting possible woodchuck habitats, bear in mind that animals require at least 3 feet of high-and-dry ground to live, so open swamps and bottomlands with a high water table are not good places to look." Groundhogs are generally tied year-round to their burrows, and such burrows typically are the center of a series of obvious paths. The burrows are highly visible in the spring, when housekeeping results in freshly dug dirt being deposited around the mouth of active entrances.

Being low to the earth, the groundhog is highly susceptible to trip-stick deadfalls. Their body shape – relatively small head, narrow neck, and broad shoulders – and well developed trail networks made them susceptible to snaring. They were snared by the Seneca, Northern Athapaskan, and Northern Algonquian, and occasionally captured in deadfalls by the latter two groups (Cooper 1938).

The Nanticoke at Oak Orchard report that groundhogs are relatively recent arrivals. They are commonly shot, never trapped, and "we don't eat them, although some people say the young ones are good" (Charlie Davis, personal communication, 2004). Tran Norwood (personal communication, 2004) discussed their arrival:

> Now this is a migration thing. If you're familiar with Route 1, as you leave five points at Lewes and head north toward Dover. There's the area of Clark Hill. In the 70s, that was as far south as they came. In the 80s they weren't even in this area, that popular, but now I am not sure but they may even be across the river. That's a migration thing. When you think groundhog years ago, you would talk Delaware City.

The only documented use of traps similar to rabbit gums in the Cheswold Community was for the capture of groundhogs. According to Curtis Coker (personal communication, 2005):

> We had them (box-like traps), we made them in the summertime to catch groundhogs, we sold to the college down here for research. Charles, Charles was selling them. That's where he took the groundhogs.

3.15 Turkey

A wild turkey represents good eating and desirable feathers. At the time of initial European settlement on the eastern seaboard, there were reports of turkey flocks containing up 500 individuals (Schorger 1966). Where turkeys are common, their flock feeding areas are easily recognized. In these areas, turkeys churn-up the leaves and moss in search of mast (acorns and other nuts).

The Northern Iroquois captured turkey with twitch-up snares. The Catawba captured turkeys live in a pen-fall trap utilizing a figure-4 trigger (Speck 1946a), and the Rappahannock live-captured turkeys with a pen or scratch trap (Speck *et al.* 1946).

As with deer, it is hard to estimate the historic range of turkey. Charlie Davis (personal communication, 2004) of the Oak Orchard Nanticoke notes “we’ve introduced a few turkey, but they don’t last, do they?”

3.16 Junco

The Junco is a cold weather visitor to the Middle Atlantic region. Also known as snow birds, juncos travel and feed in flocks. Juncos are often found around human settlements, and they apparently represented an easily trapped, albeit small, meat package.

The Rappahannock captured juncos in pen-fall traps and board deadfalls (Speck *et al.* 1946). The latter trap required an observer, often a child, to pull a trigger string when the bird(s) were under the deadfall. The Catawba similarly used spring-pull deadfalls and figure-4 pen-fall traps for juncos (Speck 1946a). Although a single junco would not have been a meal for anybody, the flocking of juncos allowed many to be captured, often in the barnyard.

3.17 Incidental Captures

It is rare that a native or modern trapper could ever assure that only one species would be captured in a set. The author once captured a squirrel a day for three days in a trap set for mink in an abandoned muskrat burrow. A log set for marten or fisher might also yield a curious red or fox squirrel, a weasel, or a porcupine. A stream-side snare set for raccoon may entangle a duck, goose, or wading bird. A baited deadfall may be visited by mice or voles, and crows and jays may likewise be attracted to bait. Although it is unlikely that native trappers would

have expended great effort in trapping any of these minor species, the trappers nonetheless would have made use of the incidentally captured.

Very little is known about ritual trapping in the eastern United States. In the western United States, certain native groups captured eagles and falcons to harvest their feathers. In the Southeast, roseate spoonbills and swans may have been trapped or hunted as ceremonial items (Hudson 1976).

4.0 THE TRAP LINE

Native trappers generally did not rely on a single trap to harvest furbearers. The effectiveness of trapping is increased because with minimal investment, a trapper can cover many good encounter locations by setting a number of traps at the same time. Once the traps are set, they can be left for a number of days without losing efficiency. One of the arts of trapping is to create an effective trap line, a loop of travel that can be covered in a day and which allows all traps to be checked on a regular basis. Ideally, the trapper can check each trap without fouling the actual set. If a trap is unsprung, he simply moves to the next set. If baits or lures are being used, the trapper can freshen these as he makes his rounds. As discussed in the species descriptions, a single location can catch several animals, and successful traps are often reset in the exact same location.

It must be remembered that the actual manufacture, setting, and checking of traps is most efficiently completed alone. Generally, there is no heavy lifting involved, and the distances of trap lines make it inefficient for two or more trappers to create and/or check the same line.

With regard to the length of the trap line, time required to set each trap is important. Cooper (1938:37) states “Incidentally it may be added that good trappers can set a great many rabbit snares in a day; some, I am told, can set as many as fifty or a hundred, and even fifty or sixty of the spring pole type.” A trap line can be increased incrementally. If checking the line takes only a few hours, the rest of the daylight can be used to set additional traps. The trapper generally recognizes when the trap line becomes too long; if the trapper does not have time to visit/empty/reset traps and preliminarily process the catch, he pares back the length of his line. Newhouse (1874:134) presents an interview with an experienced trapper:

> “How many traps can one man tend?”
> “That depends, of course, upon circumstances. Where game is plenty, fifty traps will keep you skinning and stretching; but in other places, you might tend one hundred and fifty or even two hundred traps.”

It must be noted that this conversation was presented in a publication aimed at getting trappers to buy a lot of traps, and the numbers may be somewhat inflated.

The length of a trap line varies with the mode of transportation, but trappers on foot usually limit their trap lines to 2.0-4.0 mi in length. Depending on the resource base, a trap line might be completely moved after one week of trapping, or alternately, new sets can be established along the same line.

Opportunistic trapping was probably also undertaken in pre-contact times. If a hunter was going to stop for the night in an area with well established rabbit trails, he might quickly set out a few snares. The next morning, before moving on, he could check and pull the snares. In another scenario, if his dog's behavior suggests that a raccoon is residing in a hollow oak tree, the hunter could build a baited deadfall nearby and return the next morning to claim his catch. Among the Catawba of the early twentieth century (indeed throughout much of the South), rabbits were trapped year-round, with rabbit gums placed near frequently traveled paths, roads, or agricultural fields, where they could be checked as part of the daily routine.

5.0 DEVELOPMENT OF MODERN TRAPPING

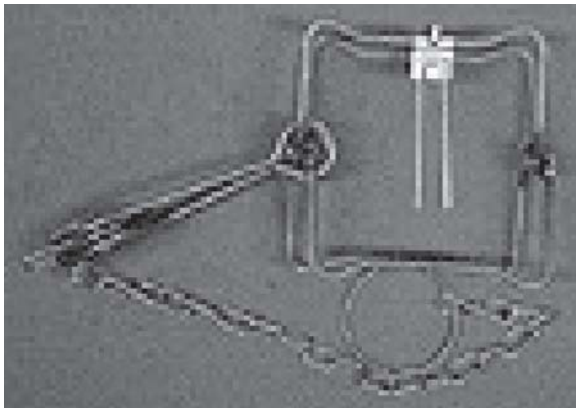
Before attempting to address the efficiency of pre-contact trapping, it is important to revisit the time-line of trapping innovation. There was no metal involved in traditional trapping. Pre-contact groups used snares and deadfalls produced of wood, fiber, and leather.

With the arrival of Europeans, snare wire eventually became available. The record is unclear when snare wire became a key trade item. Indeed, certain references suggest that Indians chose to continue using fiber snares even after snare wire was available. For example, the Seneca trappers of the twentieth century continued to use hemp and basswood snares despite the availability of snare wire (Cooper 1938). Because it was difficult to impossible for most species to chew through a snare wire, the necessity decreased for complex sets such as the spring pole or the lift pole. The time necessary to make a snare set decreased, but its ability to catch prey probably did not change significantly. Put another way, if Indians were losing much game to failed snares, the Indians would not have continued using snares. A perspective on the relative efficiency of snares and steel traps is presented by Thompson (1946:14):

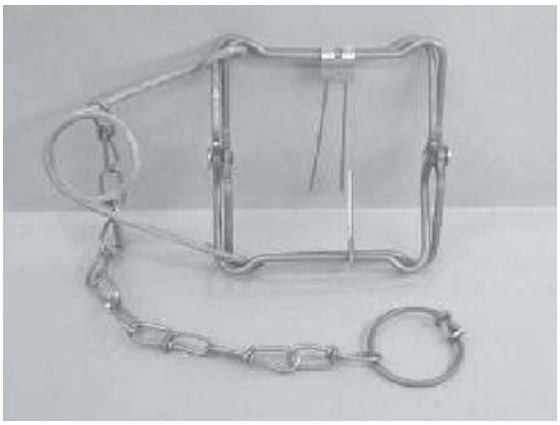
> To the skeptic who believes it is impossible to snare such animals as foxes, coyotes, wolves, and other furbearers that are difficult to trap, I wish to make this challenging statement: WHY should it be harder to capture any animal in a noose ranging from six to sixteen inches in diameter (depending on the size of the animal you wish to snare) than to catch the same animal in a steel trap whose trigger is controlled by a very small circle, namely a two-inch pan? If you ask yourself that question, you will certainly agree that snaring is sound in principle.

The leg-hold, steel trap appeared in great numbers in North America in the mid- to late 1800s. Hand-made steel traps had been imported from Europe or produced by American blacksmiths since the seventeenth century, but most of these were used by Euro-American trappers (Russell 1967). The leg-hold trap worked by grasping the foot and leg of the prey animal when the animal stepped on the trap (Figure I-12). The Minnesota Trappers Association (2004) provides an overview:

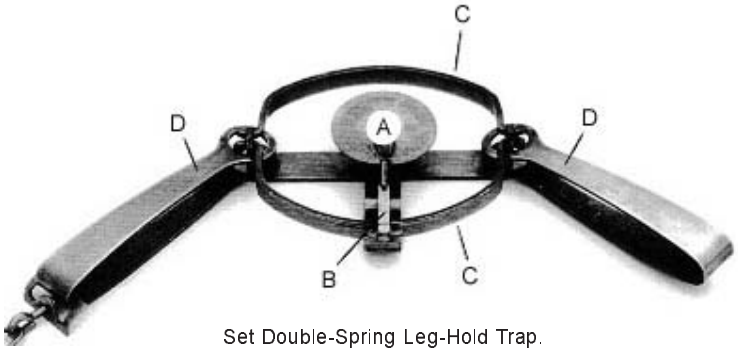
> Steel traps had been invented in 15th or 16th century Europe, and were used in 17th and 18th century North American fur trade. But these traps were expensive and in limited supply. The early trappers and the Indians used any means at their disposal to capture beaver and other furbearers. These included shooting, netting, spearing, snaring, deadfalls, using dogs and even draining of ponds and the destruction of dens and lodges. It was not until 1823, near the end of the fur



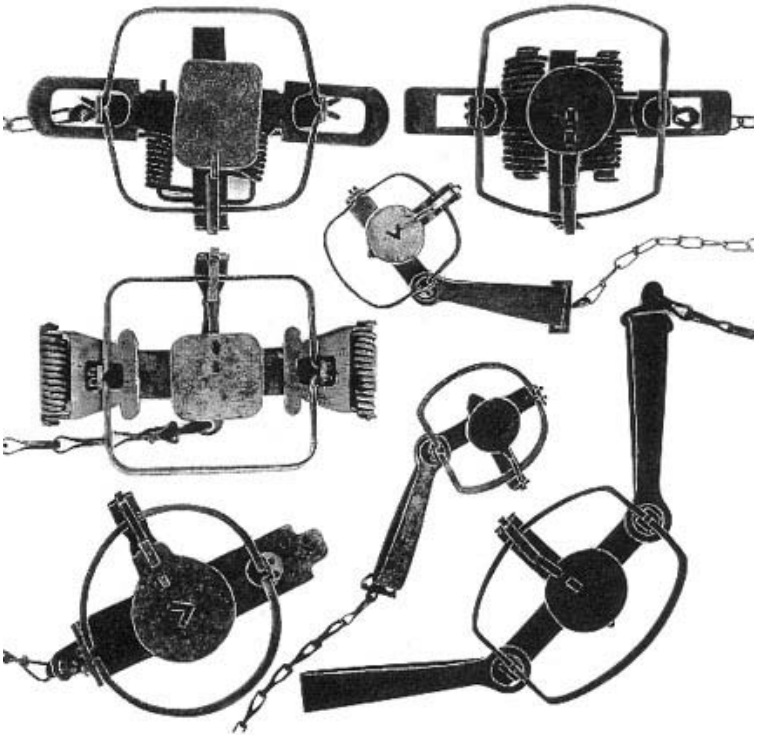
Set Conibear-style Trap.



Sprung Conibear-style Trap.



Set Double-Spring Leg-Hold Trap.



Various Styles of Set Leg-Hold Traps.

DELAWARE DEPARTMENT OF TRANSPORTATION

BLUE BALL AREA TRANSPORTATION IMPROVEMENTS
PHASE III
RONALD MCDONALD HOUSE SITE (7NC-B-54)
BRANDYWINE HUNDRED NEW CASTLE COUNTY

LEG-HOLD AND CONIBEAR®-STYLE TRAPS

FIGURE I-12

SKELLY and LOY Inc.
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> trade era, that Samuel Newhouse perfected the making of steel traps with interchangeable parts – thus making mass manufacture possible.

Russell (1967:141) provides additional data on Newhouse:

> Among the trapmakers of the early decades of the nineteenth century only one established himself so firmly in the minds of his contemporaries as to perpetuate his name in the modern trade. Sewell Newhouse, as a boy in New York State in 1823, made traps for his personal use and for sale to his Indian friends, some of whom were moved by the government to Wisconsin. These traps went with them. During the next twenty years, Newhouse expanded his industry until his output was two thousand traps per year, and the fame of the quality of his hand-forged product spread widely through the land. In 1848, the Newhouse family became members of the Oneida Community, which identified itself with the Newhouse trap. The industry was converted from the hand-work stage to the machine-enterprise with no change in the design of the trap which is still on the market.

The date of Newhouse's breakthrough is elsewhere argued to have been 1832 (Woodstream Canada 2004); regardless, mass-produced steel traps did not begin to appear until well into the nineteenth century.

Regarding the period of hand-made steel traps, Russell (1967:131) notes that "information regarding the Indians' use and purchase of these government-procured beaver traps is scanty indeed." Russell (1967:101) further notes that "even the advent of the steel trap did not relegate the snares, deadfalls, etc., to complete discard."

It is fairly easy to get an animal to spring a leg-hold trap, but then a problem arises. Most species of animals will chew off their foot rather than remain trapped. The trapper must create his set such that the trapped animal drowns (the first flee response among muskrats, mink, beaver, and otters is to dive into the nearest water), or such that the animal cannot pull strongly against the trap. The other disadvantages to the leg-hold trap are that they are heavy and they were expensive in the past. In addition, snowy and icy conditions can reduce the effectiveness of steel traps (Frye 2004).

In the late 1970s, a new type of trap – the Conibear® – became widely available (see Figure 12). This trap was created partly in reaction to the anti-trapping lobby that decried the cruelty of leg-hold traps. The Conibear® is a metal, heavily-sprung trap that snaps the back of any animal that tries to pass through the trap. Immediate death is the most common result with the Conibear®, also known as a sure-kill trap. The design of the Conibear® makes it extremely well suited to burrow and trail sets, and it is significantly lighter than leg-hold traps. The trapper

does not need to be concerned with the animal struggling, and therefore the trapper can use much simplified sets. The modern trapper relies heavily upon the Conibear®, also known as the 110 bodygrip. Sullivan (1991) reports:

> With all these advantages, the #110 bodygrip trap has largely replaced the foothold trap on many muskrat lines. Some muskrat trappers use bodygrip traps exclusively. These traps are easy to use, but they are by no means foolproof.

A review of published trapping guides suggests that although leg-hold traps were widely available and reasonably affordable in the twentieth century, trappers continued to use deadfalls and snares. *Life in the Woods: A Practical Manual of Instruction in the Art of Hunting, Trapping and Fishing* (Anonymous 1921), *Camp Life in the Woods and the Tricks of Trapping and Trap Making* (Gibson 1881), *Trapping Tips for Rural Trappers: Practical Suggestions to the Part-Time Trapper Who Wishes to Make His Traps Pay Bigger Dividends* (Stephens 1934), *The Wilderness Trapper* (Thompson 1924), *Snares and Snaring* (Thompson 1946), and *The Trapper's Handbook* (Harding 1951) provide details on both leg-hold trapping and the use of deadfalls and snares. From the 1970s to today, trapping manuals do not offer instruction in the construction of deadfalls, and none of the dozen or so trappers interviewed at the 2004 Pennsylvania Trappers Rendezvous had ever used traditional trapping methods.

6.0 EFFICIENCY OF TRAPPING

6.1 The Problem of Efficiency

It is difficult to estimate the economic importance and efficiency of trapping in native cultures of the eastern United States. Most of the ethnohistoric analogies are based on colder regions and/or metal-based trapping. The arrival of wire suitable for snares might have had a significant impact on the efficiency of snares, especially for larger animals. With the eventual arrival of leg-hold traps, efficiency may have increased. However, it has been argued that these innovations did not necessarily change the yield, rather only made it easier to prepare the sets. Some authorities felt that the snare continued to be more effective for certain species. For example, Stephens (1934:19) argues "the steel snare is by far the best implement for the amateur to use when in quest of fox."

There are two elements of trapping efficiency: 1) how difficult and time-consuming it is to make and set a trap; and 2) how well that trap captures prey. The former is termed "set efficiency," and the latter is termed "catch efficiency" in the following discussion.

In crafting an evaluation of the efficiency and importance of traditional trapping, several lines of evidence must be considered. First, a consideration of historic and modern trapping in Delaware demonstrates the potential to procure significant meat and peltry through trapping.

6.2 Success of Modern Trapping in Delaware

The modern data on fur harvest can provide some indication on the sustainable furbearer populations in the state. The Delaware Department of Natural Resources and Environmental Control (2004) provides data on the state fur harvest, 1995-2000 (Table I-3). It is important to note the relatively small number of trappers (average of 190.3 per year), the large number of furbearers taken (average of 30,804 per year), and the limited trapping season (generally early December through mid-March). The average trapper caught 161.9 animals per season. In considering these data, it must be recalled that certain species are never or rarely trapped today. It is not legal to trap deer, but approximately 15,000 deer are shot each year in Delaware. Also, 20,000 rabbits and 1,500 raccoons are taken by hunters each year.

As mentioned above, the efficiency of modern traps – especially the Conibear® trap – does not allow us to draw a direct connection between pre-contact harvests and those of recent

years. However, it is instructive that despite the loss of habitat to development, the state's furbearer population can be sustained even while losing 30,804 individuals a year.

Table I-3.
Summary of Fur Harvest in Delaware, 1995-2000

	1995	1996	1997	1998	1999	2000
Licensed Trappers	175	216	234	199	150	168
Muskrat	22,560	49,271	40,476	16,800	19,314	22,956
Otter	42	51	51	61	39	17
Raccoon	2,147	3,014	2,365	1,386	378	497
Gray Fox	32	28	14	66	3	114
Opossum	372	412	350	235	170	178
Skunk	23	34	8	18	0	0
Beaver	10	71	309	443	303	134
Weasel	32	0	5	0	0	0
Mink	16	17	3	0	0	0
Total	**25,234**	**52,898**	**43,581**	**19,009**	**20,207**	**23,896**

Source: Delaware Department of Natural Resources and Environmental Control (2004).

A measure of the importance of the muskrat industry in Delaware is the fact that the only two muskrat skinning houses documented with the Historic American Building Survey (HABS) are Delaware examples. The Port Penn Muskrat Shed and the Ike Cleaver Muskrat Shed represent a once common structure on the rural landscape (Lanier and Herman 1997). In areas productive for muskrats, trappers constructed simple cabins or sheds to provide a dry, heated location for the skinning, stretching, and drying of pelts and the processing of muskrat meat. A map made by Ike Cleaver in the winter of 1938-1939 depicts 147 muskrat lodges in his trapping territory (the map has no scale, but appears to represent approximately 50 ac). Cleaver captured sufficient muskrats on his trap line to justify the dedication of a single building to skinning and stretching their pelts (HABS 1987), and apparently trapped the same territory year after year.

6.3 Judging Efficiency Relative to Steel Traps

One line of evidence on the efficiency of traditional traps is accounts from the period when both steel traps and traditional traps were available for use. There have been no head-to-head studies of traditional versus steel traps, and we must instead rely on firsthand judgements.

Referring to the 1960s Slave Indians, Tetso (1970:53) provides the following account:

> After getting into the wooded hills, we started setting traps for marten. Steel traps at first, till we ran out of them. Then we started to make traps on the spot, called deadfalls. They are made all of wood, except for the bait, which is meat or anything a marten will take and eat. Anyway, every night around the campfire, everyone would be busy making bait sticks for the next day. . . This kind of trap takes quite some time to make and set.

Tetso (1970) indicates a preference for steel traps (they were used first), but only because they were easier to set. He nowhere states that deadfalls are less effective than steel traps, once set.

A similar situation is reported for the Innu of Labrador-Quebec peninsula (Innu Nation 2005; see also Clément 1997):

> In the days before metal traps, the Innu used wooden deadfalls to trap furbearing animals. These traps were made of various sizes depending on the size of the animal to be trapped. Small *uanaikan* were used to trap mink and martin. Large ones were used to trap black bear. Even in recent times, Innu trappers used deadfalls, particularly at times when they ran out of metal traps.

Again, the catch efficiency of deadfalls is not questioned, but rather the ease of setting.

In October 2004, the Pennsylvania Game Commission gave preliminary approval of the use of wire snares for trapping fox and coyote (Frye 2004). The greater efficiency of snares in snowy conditions was one of the reasons for their decision. Frye (2004) states that "The Pennsylvania Trappers Association has been seeking their approval here because the snow and ice of late winter can render traditional foot-hold traps useless for capturing larger predators." This modern example again suggests that some forms of traditional traps (although wire in this case) are equally or more efficient than leg-hold traps.

Sharrock and Sharrock (1974) report that trading post records indicate difficulties in selling steel traps to the nineteenth century Cree, because the Cree preferred to use traditional

methods of trapping. This source notes that the Cree were trading for a wide variety of other manufactured goods, but simply had little interest in the steel trap. This would suggest that snares and deadfalls were almost as efficient as steel traps.

Following a review of Ontario-region ethnography, Larcombe (1994:51) remarks on the importance of native skills and devices: “one of the key components in the success of European fur trade expansion into the continental interior was the adoption of Aboriginal technology.” Larcombe places the importance on Europeans using native ways rather than Native Americans adopting European traps.

Likewise, traps are not found among the extensive list of goods presented to Indians in early land sales in Delaware and Pennsylvania (Myers 1937). The absence of traps suggests that the Indians were not requesting steel traps in the seventeenth and early eighteenth centuries.

6.4 Direct Accounts of Efficiency of Traditional Traps

Hara (1980) discusses the snaring of snowshoe hares by the Hare Indians of northwestern Canada. Using traditional, non-metal snares, the Hare typically realize a success rate of 10 percent (good day) to 20 percent (outstanding day). This means that on any given day, one in every five to 10 snares was successful. Although the specific success rate will vary with species and environmental setting, the Hare Indian data indicate the capabilities of traditional snares.

Tome (1854) describes the efficiency of deadfall traps for Fisher/Marten (collectively called sable) in eastern Pennsylvania in 1814:

> That morning Morrison and Whitcomb set 40 sable traps, called deadfalls; they were so constructed that when a sable came to eat the bait a small log would fall and kill them. The receipts were 40 sable skins.

Likewise, Weslager (1943:183) discusses the efficiency of figure-4 pen-drop traps among the Cheswold community:

> The first cage trap did not require this attention, and a dozen or more traps might be placed throughout the woods in the morning and visited again in the evening to gather up a sizable catch of quail or partridge.

Two mid-nineteenth century sources are interesting in their contrary views of the efficiency of deadfalls. The guidebook by Thrasher (1868) targeted the avocational trapper, and the guidebook by Newhouse (1874) targeted the professional trapper. Importantly, the Newhouse (1874) guidebook also served as a catalog and advertisement for the steel traps produced by Newhouse. In discussing deadfalls for bears, Thrasher (1868:81) states "this [deadfall] is preferable to the steel trap, for there is no chance of catching men or cattle in it; and its cost is trifling." In contrast, Newhouse (1874:13) describes the deadfall as "a clumsy contrivance for killing animals." Further, Newhouse (1874:14, parentheses added) claims that "woodsmen who have been accustomed to good steel-traps, call it (the deadfall) a 'miserable toggle,' not worth baiting when they find one ready made in the woods." Newhouse's concerted effort to discredit the deadfall suggests that there may not have been any major difference in catch efficiency between steel traps and deadfalls.

In 1924, Thompson (1924:144) argued contrary to Newhouse's position:

> A large number of very successful trappers employ the use of the deadfall to a great extent in marten trapping. A deadfall has some advantages that a steel trap does not have – it is not bothered by squirrels and is less apt to freeze up.

Likewise, in 1881 Gibson (1881:17) wrote of trapping furbearers:

> Although commonly taken in steel traps, as described respectively in a later portion of this work, these animals are nevertheless often captured by Deadfalls and other devices, which are well known to the professional Trapper, and which serve excellently in cases of emergency, or in the scarcity of steel traps.

Gibson (1881:107) also stated that the Poacher's snare (a baited spring-pole snare) "represents one of the oldest and best snares in existence, – simple in construction and almost infallible in its operation." Gibson (1881:137) further stated that "the author has known trappers who have plied their vocation largely by the aid of various hand made traps, described in earlier pages of this book, and with good success."

6.5 Efficiency as Seen in the Humane Trapping Movement

The efficiency of traditional traps has also been discussed recently in light of efforts by governments to legislate more humane trapping. In 1997, Canada, the European Union, and Russia signed the *Agreement on International Humane Trapping Standards*. The standards

called for the outlawing of steel traps on land by 2001, due to problems of lengthy animal suffering. However, the standards allowed the continued use of snares (with minor modifications) and "traditional wooden deadfall traps" (Fur Institute of Canada 2004a). The acceptable humane traps illustrated include an underwater snare for beaver, a trail snare (apparently a spring-pole), and a spindle-stick deadfall (Fur Institute of Canada 2004b). The inclusion of these traditional traps indicates that such devices do not result in a high frequency of escaped or injured animals (i.e., these traps are efficient). Pierre Canac-Marquis (personal communication 2004), the Coodonnateur Piégeage Faune et Parcs Québec, notes that deadfalls are still legal and widely used in France, again indicating the efficiency of traditional traps.

6.6 Efficiency Measured by Historic Productivity

The Beaver Wars provide some indication of the efficiency of trapping. In a relatively short period, a relatively small number of native and European trappers were able to trap-out significant areas of the eastern United States. Once the demand for furbearers changed from meat and fur for Indian consumption to an economic trade item, the intensity of native trapping increased significantly. For example, Weslager (1996:121) discusses the situation faced by Johan Printz, when Printz became governor of New Sweden in 1643:

> By the end of his first year of administration, during which time he had ample opportunity to familiarize himself with all facets of the commercial situation on the Delaware, Printz came to two important conclusions. First, the ruthless slaying of beavers along the Delaware and its tributaries during the twenty-five years the Indians had been accommodating European traders had almost destroyed the beaver population in this immediate area. . . Printz's second conclusion was that there still remained an excellent source of beaver and otter pelts in the deep waters and hills of the Minquas country, especially along the tributaries of the Susquehanna.

This is important in gauging both the intensity and efficiency of primitive trapping. Prior to the fur trade, native trapping was carried out non-intensively, allowing a healthy population of fur-bearers to maintain and renew itself. This population was such that it took 25 years of focused, extremely intensive trapping (most of it using traditional traps) to decimate the furbearers.

Weslager (1983:58) presents data on the furs shipped in 1695 from the Eastern Shore of Maryland. These included 2,868 muskrat, 2,085 racoon, 893 mink, 445 fox, 70 otter, 42 beaver, 20 wildcat, and nine bear. To Weslager (1983:58), "these figures indicate that the beaver

population on the Eastern Shore was drastically reduced by 1695 and that the wild cat and bear had also become scarce." Much of the trapping during this period was done with traditional traps.

Even after the beaver population declined, Delaware remained a major producer of furbearers. The state was known for its muskrat harvests, and the Delaware city of Leipsic was named in 1814 for the center of the European fur market, Leipzig, Germany.

6.7 Summary of Efficiency Evidence

Since the general establishment of the modern environmental regime in Delaware, there has been a rich furbearer biomass in the state. Modern harvest data indicate that many individuals can be captured through trapping each year, without any negative impact on the viability of the species.

The various lines of evidence suggest that the catch efficiency of traditional traps was comparable to that of steel traps. In certain circumstances, deadfalls and snares are considered more efficient than steel traps. In the early historic period, native trappers did not embrace the steel trap, and many chose to continue using traditional traps.

As discussed in the introduction to this chapter, set efficiency was typically lower for traditional traps than for steel traps. It took longer to make and set a traditional trap than a steel trap. This explains the several accounts in which the trappers set steel traps until they ran out, and then began using traditional traps. The low set efficiency of traditional traps was a trade-off made when steel traps were not available. The continued discussion of deadfalls and snares in trapping guides well into the twentieth century suggests that many trappers chose to use traditional traps even after steel traps were widely available.

It is unusual to think of a snare or deadfall as a humane trap, but their inclusion in this category by modern policy-makers also reflects the catch efficiency of traditional traps. There is a lower incidence of escaped, injured, or unduly suffering catches in traditional traps than in steel traps on land.

The overall argument appears sound. The environment of Delaware has the potential to yield much fur and meat through modern trapping. Traditional trapping has been shown to be as efficient as modern trapping, except that the former requires longer setting times. Therefore, traditional trapping must be considered an effective means of harvesting a variety of wild fauna.

7.0 TYPES OF TRAPPING SITES

Lacking complete models of pre-contact settlement, it is difficult to know how trapping loci integrated with other site types. However, there are some basic site types that can be expected, regardless of whether the trapping was pursued in a logistically oriented settlement system or in an expediently organized system. Familiarity with a trapping territory greatly increased efficiency, and re-utilizing the same area year after year provided good return from the time investments of creating deadfalls. Holliday (1998) suggests that at least semi-sedentary settlement is necessary before cultures intensify trapping. Establishment of a single-family house for a few months at the center of a series of trap lines would qualify as semi-sedentary settlement. The modern trapping data suggest that traditional trapping was probably unable to "trap out" an area, and it is likely that trapping was pursued in the same area by the same pre-contact trappers year after year.

How many trapping-related sites might there be in the archaeological record of Delaware? Taking a very conservative estimate of 25 men trapping each year in pre-contact Delaware, an equally conservative estimate of 4,500 years of trapping (Woodland I through Contact periods), and a third conservative estimate of only 20 trap sets per year per trapper, there would have been more than two million trap-setting sites. As discussed below, there would also have been other trapping-related sites.

7.1 Anticipatory Trap Manufacture Locations

These activity areas could have occurred in any permanent or semi-permanent occupation areas. The sites would involve the manufacture of trigger sticks, cordage snares, and similar trap elements. These were probably often prepared in advance, especially since many trapping treatises advise allowing trap parts to weather before they are used.

These loci will be difficult to distinguish from other basic domestic maintenance areas. Wood was carved into a variety of non-trapping artifacts, and cordage was widely used for many non-trapping purposes. These small loci may become part of generic "domestic" smears at seasonal encampments. Wear indicative of both cross-grain cutting (sawing of notches) and with-grain whittling should be present on trap-carving tools. Additionally, spokeshave-like tools showing wear around the perimeter of a notch might also be expected. Tools with highly polished small notches might also be expected from the processing of sinew or textiles into snares. Blood residue should not be common in loci of anticipatory trap manufacture.

In the 1970s, the Pamunkey Project was a comprehensive program of living or experimental archaeology. It represents one of the few efforts by East Coast archaeologists to make and use pre-contact technology in a wilderness context (but see William Schindler's program at http://experimentalarchaeology.org for another example). Spring-pole snares were a crucial part of their infrastructure for supplying meat to the camp. Andrefsky (1976) experimented with the best stone tools for carving snare triggers from poplar, sweet gum, and hickory. Andrefsky (1976) found that whittling and sawing motions were necessary to make the snare triggers. Modified (edge retouched) flakes were better suited to sawing than were unmodified flakes, but the opposite was true for whittling. An edge angle of approximately 35 degrees was most effective overall. Total production time per snare trigger varied from 11 to 92 minutes.

7.2 On-Location Trap Setting

Trap construction may also have occurred on an impromptu basis, as a worthy set was recognized. The crafting of a deadfall or spring-pole snare most frequently occurred very near the set location; trappers did not want to carry killing logs or spring poles for great distances. In isolation, these sites would be recognized by the presence of wood-worn flakes, possibly broken formal cutting tools, and possibly (especially for deadfalls) the presence of axe or celt-sharpening or impact-fracture flakes (or broken and discarded axes/celts). Tools with soft tissue cutting or scraping wear should not be present. Natural cobbles may have been used for pounding in stakes, or, in rock-deficient areas, a cobble would be included in the trapper's kit bag. Split cobbles may occasionally be found at trap construction sites. These sites may be comprised of a very few artifacts, and there were probably huge numbers of these sites on the landscape.

It should also be noted that trappers are extremely careful to minimize human sign left near traps. It is likely that all obvious artifacts would be removed from near a trap, and either recycled for further use or disposed of away from the trap. Under such a scenario, a trapper might fling a handful of flakes into the woods or into a wetland.

Minor activity may also have been associated with fine-tuning and/or repairing traps. The capture of prey may have disrupted a set, or an unsuccessful triggering of a trap may require minor redesign. Fine-tuning and repair would probably yield only a very small number of artifacts, typically showing wear from wood carving. Artifacts left near loci of on-location trap construction should generally not have blood residues.

The on-location trap setting sites will vary spatially with the target species. Beaver and groundhog would not be pursued in highly saline marshes, muskrats would not be found in uplands lacking wetlands, and gray foxes would not be pursued in old Indian fields. Unfortunately, diverse furbearers are found in most areas of the state, and we cannot eliminate, for example, the Piedmont from our list of areas with likely trapping sites. At a finer level of resolution, we could reasonably expect much of the trapping in the Piedmont to have been focused on wetlands and rivers/streams. Likewise, if we suspect an area was impacted by major windstorms during the pre-contact period (e.g., the site has lots of tree-fall features), it might be reasonable to expect rabbit trapping in the aftermath.

7.3 Initial Prey Processing

Depending on the weather, prey may require immediate field processing. Minimally, this may have involved gutting (removing the viscera from) the animal. Internal organs begin to decay immediately upon death, and leaving a kill uncleaned will result in poorer quality meat.

In addition, it is much easier to skin a warm animal than a frozen one. Depending on the time available and distance from camp, the trapper may also skin the animal on the trail. It is preferable to skin an ungutted animal; the messiness of the internal organs will not contaminate the fur. Dressing and skinning the animal in the field also reduces hauling weights, as items of minimal dietary interest (e.g., muskrat skull, feet, viscera, and tail) can be discarded or used for bait.

The location of the initial prey processing, relative to the trap, will depend on a number of factors. First, if the trap is to be reset, the trapper will not want to leave signs of activity near the trap. Likewise, if the trap is to be reset, the trapper does not want to encourage crows and other scavengers to descend upon the trap location. Because the trapper knows that he needs to check a certain number of traps each day, he may clear and reset a portion of his traps before deciding if he has time to field process the catch. In this way, these sites may have seen the batch-processing of prey.

These sites will generally include formal tools and expedient, sharp flake tools (Photograph I-10). All of the tools should show evidence of soft-tissue cutting, and blood residues should be present. If hafted bifaces are used as skinning knives, their points may have wear indicative of piercing (as the skin is initially broken) and light cutting, as the animal is skinned. If unretouched flakes were used in the skinning, they should show evidence of soft-tissue cutting (assuming such limited use-wear is detectable on the raw materials in question).

Photograph I-10. Skinning a muskrat using stone tools.

There should not have been any scraping or hide preparation at such sites. Modern skinning typically begins with the hatchet removal of paws and possibly (depending on species) the tail (see HABS 1987 for a 1930s Delaware example of a muskrat hatchet); evidence for similar chopping may be expected from traditional trappers, and axes, celts, or simple cobble choppers may have been used. Fire would probably have been avoided at such sites, all of which would have been fairly close to the trap line. The artifact count at such sites would be dependent on the number of prey packages being processed, but most artifacts should show blood residue (assuming conducive preservation conditions and sufficiently sensitive methods of presumptive testing; see Blood Residue appendix for further discussion of this issue).

The primary butchering of the prey may also have occurred at such sites. Carcass elements of limited nutritional interest would probably have been discarded at the site. For example, if preservation conditions are good, muskrat skulls, paws, tails, and torsos (there is very little meat on the ribs and spine of a muskrat) might be expected (see Klein 1973 for a discussion of sites with only paws and other sites with pawless carcasses in the Ukraine Paleolithic). In this example, the pelt would be saved, and forequarters and hindquarters would be used either as a meat source or for bait. If blood residue identification studies are pursued, the species may include nocturnal or aquatic species that were generally not easily procured by hunting, providing a distinction between hunting and trapping sites.

Primary butchering would also have included the removal of body parts of high ritual value. For example, among natives of the Delmarva peninsula, beaver incisors apparently had special significance. In such a case, the smashed mandible and maxilla might be expected to enter the archaeological record at the location of the primary butchering.

7.4 Initial Hide Processing

As mentioned above, some of the skinning may have occurred at small sites spread along the trap line. However, the majority of skinning probably occurred where the trapper spent the night. At these sites, the animals would have been skinned, and the hides stretched and preliminarily de-fleshed.

The initial hide processing would probably have occurred where meat processing also took place. Unless the temperatures were consistently below freezing, a carcass would need to be preserved through cooking, smoking, or drying, or would need to be prepared for immediate consumption.

Because initial hide processing probably occurred most often in wintertime, a fire was probably made. Modern experience suggests that a warm fire was appreciated after stomping through the snow and wading almost-frozen streams, and after immersing hands in cold water, blood, and animal fat. In historic and modern times, the muskrat shed served this function (see HABS 1987).

In modern trapping, there are two basic ways of skinning furbearers and stretching pelts (Figure I-13). The case method uses a cut from rear paw to rear paw, and removes a hide somewhat resembling a sock. The case method is the least wasteful and is preferred by modern furriers for almost all species. Pelts removed by the case method are stretched inside out over wooden or metal frames. The pelts undergo preliminary fleshing – the removal of any flesh adhering to the skin – while stretched. Upon air drying, the hides are relatively stable and odor-free until secondary processing is desired. Illustrations of eastern Native Americans feature examples of full-skin bags, suggesting that case skinning was pre-contact in origin.

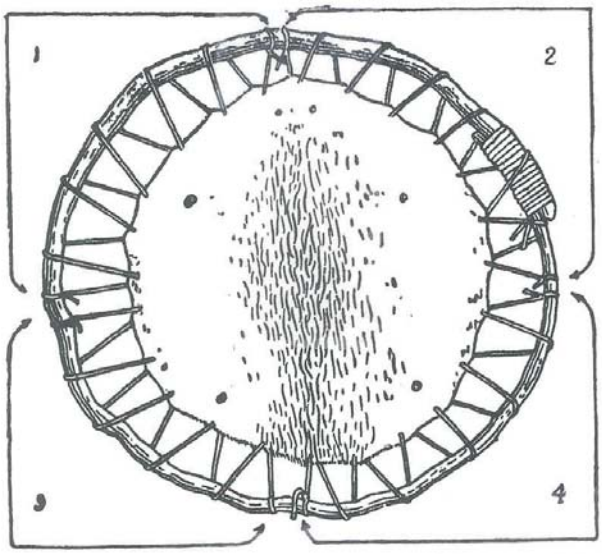
The second means of skinning and stretching is the open method. A cut is made down the underside of the animal from the chin to the base of the tail. Four additional cuts branch up each leg. The open skinning method does not result in a sock-like skin, and it is not possible to stretch and dry such skins over boards. Instead, the traditional solution for animals skinned in such a manner – commonly deer, bear, bobcat, and beaver – is to stretch the skin with a round hoop (beaver) or rectangular frame (Figure 13). Holes are punched around the perimeter of the pelt (resulting in pointed flake tools or projectile points with penetration wear), and the pelt is lashed to the frame. The open method skinning would have resulted in a more intensive site signature, with extensive woodworking debris and awls, in addition to the skin cutting and fleshing tools expected for either stretching method. The open method was used in the pre-contact period, and was later encouraged by European traders because it facilitated the shipping and processing of beaver and deer hides.

The preliminary de-fleshing entails the removal of any large pieces of flesh or ligament hanging on the hide. This is best done with a very sharp flake used in a cutting motion. True scraping did not occur at this stage of the hide processing.

7.5 Secondary Hide Processing

By the time of secondary hide processing, the Indians might be dealing with hides from either hunting or trapping. Secondary hide working was a time-consuming process, and ethnographically it generally occurred at longer-term residential sites. As mentioned above,

HOW THE MUSKRAT IS SKINNED; DOTTED LINES INDICATE WHERE THE SKIN IS CUT



DRYING A BEAVER SKIN IN A HOOP, FASTENED WITH FOUR STRINGS, AS SHOWN BY 1, 2, 3, 4

SOURCE: HARDING 1951

DELAWARE DEPARTMENT OF TRANSPORTATION

BLUE BALL AREA TRANSPORTATION IMPROVEMENTS
PHASE III
RONALD MCDONALD HOUSE SITE (7NC-B-54)
BRANDYWINE HUNDRED NEW CASTLE COUNTY

SKINNING / DRYING METHODS

FIGURE I-13

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once the pelts were stretched and dried, there was no rush to conduct secondary processing. Indeed, ethnographic accounts and modern experimentation suggests that curing for several months and/or repeated freezing/thawing of hides increased the efficiency of brain tanning (Richards 2003). Rountree (1992:44) reviewed the ethnographic data for coastal Virginia and concluded that "tanning was women's work."

The secondary hide processing commonly utilized washes of alkaline material (e.g., hardwood ash in water, animal brains), stretching and scraping, and smudging. Depending on the intended use of the pelts, dehairing may also have been undertaken. A source of running, fresh water was desirable for the repeated washes needed during the tanning process. Beamers (commonly produced from deer cannon bones), hafted stone scrapers (especially end scrapers), and bone or stone awls might be expected at such sites (Photograph I-11). Small retouched flakes from the worn edges of steep-angled scrapers might also be expected, as extensive scraping would require repeated episodes of edge resharpening. Compared with locations of skinning, butchering, and food preparation, sites of secondary hide working should have less contact of tools with blood, which should be reflected in blood residue results. The scrapers should show wear indicative of soft material scraping.

Deposits of charcoal and/or pitch from highly controlled, reduced-atmosphere fires are expected from smudging. Smudging is a system of exposing the hide to smoke, in order to color (literally tan) and seal the skin (Richards 2003). Smudge pits may have utilized corn cobs, pine cones, or bark. Smudging relied on a reduction burn, rather than an open fire quickly consuming the fuel. Such features were generally contained in pits rather than being surface hearths, to protect from breezes that might over-oxidize the burn. Post features from tanning/smudging racks should also be expected.

Deer hide was often dehaired in preparing leather. Dehairing also requires washes with caustic fluids. As late as the twentieth century, the Lenape of New Jersey used a combination of tannic acid and wood ash in dehairing deer hides (Brown 1982).

If many hides are processed in the same location, the alkaline nature of the tanning solution may be sufficient to alter soil chemistry in a focused portion of the site. Careful intra-site soil sampling and pH testing may help confirm secondary hide preparation.

An archaeological example of a secondary hide processing station was excavated at the Losey 3 site, Tioga County, Pennsylvania. This locus included 45 smudge pit features endscrapers with wear consistent with that on replicas used for hide scraping, and projectile, points with cutting wear. The smudge pits contained intact deposits of reduced bark, including some identified as oak. Ethnographic research by Binford (1967:8) suggests that secondary

Photograph I-11. Ojibwa woman with stretched deer hide (from Irwin 1984b).

hide processing most commonly was a female task undertaken in the Spring and Summer at a base camp.

7.6 Timely Meat Processing

Successful trapping may also require timely meat processing. For small meat packages (e.g., muskrat quarters), this processing may only amount to baking or broiling the meat at the evening fire (tools with butchering and soft tissue cutting wear will be produced). For taboo animals, the carcass would be buried, fed to the dogs, discarded, or used for bait.

However, the capture of a large bear or multiple deer may require more substantial action. Especially when far from the help and facilities of a residential base camp, it may have been necessary to bulk-process large meat packages. As an example, the simultaneous construction and use of two large roasting pits at the Mountain View 1 site (46BO296) led to the interpretation of the features as meat-baking pits. Espenshade *et al.* (2001; see also Espenshade 1999) argued that the only reason for constructing two pits – rather than using the same pit twice – was to prevent the spoilage of a large amount of meat. Espenshade *et al.* (2001) posited that multiple deer or one or more bears had been captured by a small task group well removed from their residential base camp. Other than the more than 800.0 kg of fire-altered rock, the assemblage included only 84 flakes, three projectile points, three bifaces, and 25 small sherds from 20 1.0 x 1.0 m units.

Tools with evidence of piercing, butcher twisting/prying, heavy cutting of soft tissue, and light cutting of soft tissue would be expected. All of the tools would have been used in contact with blood, and blood screening results should be overwhelmingly positive. Standard hearths and/or roasting pits should be expected.

7.7 Summary

For all the trapping-related site types, the signatures are not unique. Trapping required woodworking, but woodworking unrelated to trapping also occurred in the woods and in residential bases. Hunters, rather than trappers, may have processed game in the woods. Hides from either hunting or trapping may have been processed in residential bases. A modern trap line site might be recognized by scraps of snare wire, but the perishable nature of traditional traps means that we will lack a similar signature for pre-contact sites.

Coming into this study, there was no expectation that we could define distinctive signatures of trapping-related sites. Instead, it was hoped that trapping would at least be considered when signatures similar to those defined above are found, rather than simply ruling such sites hunting-related or, more vaguely, extractive stations. It was also hoped that uninformative functional lumping (e.g., a hunting/processing station) might be avoided when addressing the variety of sites created by trapping.

It must also be recalled that trapping was not a monolithic activity. If the trapper chanced upon a deer, he would shoot it. If the trapper was hungry and passed near a stand of cattails, he may harvest a quick snack of roots. The common theme among the many activities pursued by a trapper was that they were extremely short-term, most were undertaken by a single actor, and most left only a marginal signature on the landscape.

8.0 SUMMARY OF PRE-CONTACT TRAPPING IN DELAWARE

It is doubtful that archaeologists will ever determine precisely the extent and importance of pre-contact trapping in Delaware. It is difficult to evaluate the qualitative descriptions of trapping efficiency, such as Goodchild's (1984:85) contention that traditional "trapping was sometimes more effective than hunting as a means of killing animals." It is clear from the ethnohistoric and ethnographic accounts that native groups had the technology necessary to efficiently capture many furbearing species. Indeed, the Nanticoke in particular were noted for the importance they placed on trapping. Even in the twentieth century, many Nanticoke relied heavily on wild resources. Charlie Davis (personal communication, 2004) of the Oak Orchard Nanticoke reported:

> Now Uncle Walt he never had money. He had enough to do what he wanted, but he lived basically off the land. When they lived down to Poplar Thicket, why he thought it was heaven down there, to tell the truth. There was ducks, geese, and rabbits, and everything you could want. And all he wanted was a little patch of corn for his mule, so he could have his garden, and clams and oysters, and he just ate on the water all the time. Now this is my father's sister's husband. And all she knew was to live in the style Uncle Walt had provided for her.

Relatively basic traps made of wood and cordage were capable of capturing everything from weasels to black bears, and from juncos to turkeys. Although many museums depict Indians <u>hunting</u> white-tailed deer, a significant number of deer were probably actually captured through trapping.

The importance of trapping relative to hunting or fishing is rarely directly referenced in the historic and ethnohistoric record. However, Speck (1946:14, emphasis added) discusses the situation among the Catawba:

> The serious use of traps and snares has not formed a part of the economy of food providing in the tribe for over a generation. **But it did formerly**, when wild turkeys and game birds and larger animals abounded in the valley of the Catawba.

Likewise, Weslager (1943:180) offers a similar assessment of trapping among Delaware Indian communities, stating "needless to say, trapping was important to the Indians because of the limitations in the use of the bow and arrow and other primitive weapons."

An indirect measure of the importance of trapping among the Powhatan groups is the recorded vocabulary. William Strachey (1612) recorded approximately 430 words, including five terms for furbearers (otter; fox; muskcat [skunk]; wolf; and beast like a fox) and four terms referring specifically to furs or pelts (a black fox skin or an overgrown sable's; raccoon fur; skin or fur of a hare; and a fur like a sable's). Based on the frequency of words related to hunting, fishing, shellfish, and horticulture, it appears that trapping was at least seasonally significant to the Powhatan.

Indications have been provided that traditional traps were not significantly less effective than modern traps. Although traditional traps took longer to create and set, their efficiency once set was equal to that of leg-hold traps. It does a major disservice when archaeologists, out of ignorance, argue that trapping was never a major pursuit because Indian technology was too "primitive."

It has also been demonstrated that Delaware formerly had a large population of furbearers, and that even modern hunting and trapping are not sufficiently effective to adversely impact populations. The historical muskrat industry in the state attests to the wealth of furbearers. The modern harvest data show that the state's furbearers are still doing well, even in the face of modern trapping, suburban expansion, and loss of habitat. It is likely that pre-contact trappers could readily capture peltry and meat, especially in the furbearer-rich freshwater, brackish, and saltwater marshes of Delaware.

Therefore, we can infer that native trappers had the means (i.e., the technology) and the opportunity (i.e., a large biomass of furbearers) to derive much meat and many pelts through trapping. The motive was partly nutritional, but also rested in the importance of furs to pre-contact groups. Trapped animals also provided sinew, antler, bone, and teeth for the manufacture of tools and other items. The significantly higher efficiency of trapping relative to hunting means that the easiest way for natives to obtain their required protein and pelts was through trapping.

Unfortunately, we have not identified a stone "trapper's tool" that was used only in the manufacture of traps or the skinning of trapped animals; there is no known pre-contact equivalent of the Buck®, two-blade, folding, trapper's knife. Likewise, there is no indicator to distinguish the bones of a hunted deer from those of a snared deer. We are left with a circumstantial case, but a strong case nonetheless. Trapping was probably an important element of the settlement-subsistence activities in pre-contact Delaware, at least on a seasonal basis. Archaeologists have done a significant disservice to our discipline (and have insulted native trappers) by ignoring trapping as a major source of meat and pelt.

It is hoped that this overview will broaden the knowledge of pre-contact trapping, and that trapping will soon become discussed in regional overviews. It is further hoped that, when interpreting the remains from limited activity sites, archaeologists will consider the possibility of the sites being trapping-related.

9.0 REFERENCES

9.1 References Cited

Andrefsky, B.
1976 Experimentation and Analyzation of Unmodified and Unifacially Modified Flakes Associated with Trapping in a Subsistence Based Situation. In *The Pamunkey Project Phases I and II,* compiled by E. Callahan, pp. 304-313. Department of Sociology and Anthropology, Virginia Commonwealth University, Richmond.

Anonymous
1921 *Life in the Woods: A Practical Manual of Instruction in the Art of Hunting, Trapping and Fishing.* Max Stein Publishing House, Chicago.

Arber, E. (editor)
1910 *A Map of Virginia. With a Description of the Country, the Commodities, People, Government and Religion. Travels and Works of Captain John Smith, President of Virginia, and Admiral of New England, 1580-1631.* John Grant, Edinburgh.

Bassano, B., A. Perrone, M. Tarantola, E. Macchi, and G. Eri
1993 Methods of Capturing and Marking Alpine Marmots. *Journal of Mediterranean Ecology* 1:11-13.

Binford, L.R.
1967 Smudge Pits and Hide Smoking: The Use of Analogy in Archaeological Reasoning. *American Antiquity* 32(1):1-12.

Brown, G.
1933 *The Great Bear Almanac*. Lyons & Burford, New York.

Brown, T., Jr.
1982 Dehairing Deer Hides. *The Tracker Magazine* 1(3). Republished on website at http://www.trackertrail.com/thetrackermagazine/v1-3/thetrackerv1-3pg03.html. Accessed February 21, 2005.

Clément, D.
1997 Technology and Culture Among the Montagnais of Mingan: Trap Nomenclature. *Recherches Amérindiennes au Québec* 27(1):77-91.

Cooper, J.M.
1938 Snares, Deadfalls, and Other Traps of the Northern Algonquians and Northern Athapaskans. *The Catholic University of America Anthropological Series* No. 5. Washington, D.C.

Custer, J.F.
1984 *Delaware Prehistoric Archaeology: An Ecological Approach.* University of Delaware Press, Newark.

Custer, J.F., and D.C. Bachman
1984 *Phase III Data Recovery of the Prehistoric Components from the Hawthorn Site 7NC-E-46, New Churchman's Road, Christiana, New Castle County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., W.P. Catts, J. Hodny, and C. DeSantis Leithren
1990 *Final Archaeological Investigations at the Lewden Green Site (7NC-E-9), Christiana, New Castle County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., and J. Hodny
1989 *Final Archaeological Investigations at the Hockessin Valley Site (7NC-A-17), New Castle County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., A. Hoseth, B.H. Sisler, D.J. Gretner, and G. Mellin
1997 *Final Archaeological Investigations at the Pollack Prehistoric Site (7K-C-203), State Route 1 Corridor, Kent County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., D. Kellogg, B.H. Silber, and R. Varisco
1995 *Final Archaeological Investigations at the Wrangle Hill Prehistoric Site (7NC-G-105), State Route 1 Corridor, Chesapeake and Delaware Canal Section, New Castle County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., L. Riley, and G. Mellin
1996 *Final Archaeological Excavations at the Leipsic Site (7K-C-194A), State Route 1 Corridor, Kent County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., S.C. Watson, A. Hoseth, and E.C. Coleman
1988 *Final Archaeological Investigations at the Dairy Queen Site (7NC-D-129), New Castle County, Delaware*. University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Custer, J.F., S.C. Watson, and B.H. Silber
1996 *Final Archaeological Investigations at the Carey Farm (7K-D-3) and Island Farm (7K-C-13) Sites*, *State Route 1 Corridor, Kent County, Delaware (Draft Report).* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Day, G.M.
1978 Western Abanaki. In *Handbook of North American Indians, Volume 15: Northeast*, edited by B.G. Trigger, pp. 148-159. Smithsonian Institution Press, Washington, D.C.

Delaware Department of Natural Resources and Environmental Control (DNREC)
1993 *The Wetlands of Port Penn Interpretive Trail, Port Penn, Delaware.* Delaware Department of Natural Resources and Environmental Control, Dover.

2004 *Delaware Fur Harvest Summary.* Delaware Department of Natural Resources. Website at www.dnrec.state.de.us/fw/furbearer.pdf. Accessed January 21, 2005.

n.d. *Delaware Folklife: Tradition, Heritage, People.* Delaware Department of Natural Resources and Environmental Control, Dover.

Delaware National Estuarine Research Reserve (DNERR)
2004a *Delaware NERR – Blackbird Creek Component (Site Description).* Website at http://inlet.geol.sc.edu/DEL/blackbird-creek.html. Accessed November 15, 2004.

2004b *Delaware NERR – St. Jones River Component (Site Description).* Website at http://inlet.geol.sc.edu/DEL/st-jones-river.html. Accessed November 15, 2004.

Dent, R.J., Jr.
1995 *Chesapeake Prehistory: Old Traditions, New Directions.* Plenum Press, New York.

Deppen, M.R.
2004 Pennsylvania Memories: #1 Extra Large Black. *Pennsylvania Heritage* XXX(2):36-37.

Doutt, J.K., C.A. Heppenstall, and J.E. Guilday
1977 *Mammals of Pennsylvania.* Pennsylvania Game Commission, Harrisburg.

East, T.C. (compiler)
2006 *Tioga County, Pennsylvania: S.R. 6015 Improvements Project: Phase I/II/III Archaeology*. Skelly and Loy, Inc., Monroeville, Pennsylvania. Submitted to the Pennsylvania Department of Transportation Engineering District 3-0, Montoursville.

Espenshade, C.T.
1999 The Trouble with Roasting Pits. *West Virginia Archeologist* 51(1-2):11-30.

Espenshade, C.T., G.M. Kuncio, D.R. Langer, A.T. Vish, L.K. Espenshade, and M.G. Sams
2001 *Boone and Kanawha Counties, West Virginia: Orgas to Chelyan Connector Improvement Project: Phase I/II Archaeology.* Skelly and Loy, Inc., Monroeville, Pennsylvania. Submitted to the West Virginia Department of Transportation, Division of Highways, Charleston.

Feest, C.F.
1978 Nanticoke and Neighboring Tribes. In *Handbook of North American Indians, Volume 15: Northeast*, edited by B.G. Trigger, pp. 240-252. Smithsonian Institution Press, Washington, D.C.

Fenton, W.N.
1978 Northern Iroquois Culture Patterns. In *Handbook of North American Indians, Volume 15: Northeast*, edited by B.G. Trigger, pp. 296-321. Smithsonian Institution Press, Washington, D.C.

Frye, B.
2004 Commission Gives Tentative OK to Use of Cable Restraints. *Pittsburgh Tribune-Review*, edition of October 10, 2004. Pittsburgh, Pennsylvania.

Funk, R.E., and R.D. Kuhn
2003 *Three Sixteenth-Century Mohawk Iroquois Village Sites.* New York State Museum Bulletin 503. Albany.

Fur Institute of Canada
2004a *Agreement on International Humane Trapping Standards.* Fur Institute of Canada. Website at www.fur.ca/research/ABO-e.asp. Accessed January 21, 2005.

2004b *North American Traps Meeting International Humane Trapping Standards.* Fur Institute of Canada. Website at www.fur.ca/research/ABO-e.asp. Accessed January 21, 2005.

Gibson, W.H.
1881 *Camp Life in the Woods and the Tricks of Trapping and Trap Making.* Reprinted in 2002. Lyons Press, Guilford, Connecticut.

Goodchild, P.
1984 *Survival Skills of the North American Indians*. Chicago Review Press, Chicago.

Guilday, J.E.
1971 Biological and Archaeological Analysis of Bones from a 17th Century Indian Village. *West Virginia Geological and Economic Survey, Report of Archaeological Investigations* 4.

Hara, H.S.
1980 *The Hare Indians and Their World.* Canadian Ethnology Service Paper No. 63. National Museums of Canada, Ottawa.

Harding, A.H.
1951 *The Trapper's Handbook.* A.R. Harding, Columbus, Ohio.

Hassrick, R.B.
1943 A Visit with the Nanticoke. *Bulletin of the Archaeological Society of Delaware* 4(1):7-8.

Heckewelder, J.
1971 *History, Manners, and Customs of the Indian Nations Who Once Occupied Pennsylvania and the Neighboring States.* Reprint of 1876 edition. Arno Press, New York.

Heckster, C.M.
1999 *Delaware's Rare Animal Species of Conservation Concern.* Delaware Natural Heritage Program. Website at www.dnrec.state.de.us/fw/animal.htm#mammals. Accessed November 15, 2004.

Heite, E.F., and C.L. Blume
1998 *Mitsawokett to Bloomsbury: Archaeology and History of an Unrecognized Indigenous Community in Central Delaware*. Heite Consulting, Camden, Delaware. Delaware Department of Transportation Archaeology Series No. 154.

Historic American Building Survey (HABS)
1987 Ike Cleaver Muskrat Shed, Thomas Center Road near Appoquinimink Creek, Odessa Vicinity, New Castle County, Delaware. National Park Service, Washington, D.C. Documentation on file, Library of Congress, Washington, D.C.

Holliday, T.W.
1998 The Ecological Context of Trapping Among Recent Hunter-Gatherers: Implications for Subsistence in Terminal Pleistocene Europe. *Current Anthropology* 39(5):711-719.

Hudson, C.
1976 *The Southeastern Indians*. The University of Tennessee Press, Knoxville.

Innu Nation
2005 *Uanaikan – the Innu Deadfall Trap*. Innu Nation. Website at www.innu.ca/uanaikan.html. Accessed January 21, 2005.

Irwin, R.S.
1984a *The Providers: Hunting and Fishing Methods of the North American Natives.* Hancock House, Surrey, British Columbia.

1984b *Hunters of the Eastern Forest.* Hancock House, Surrey, British Columbia.

Jacoby, R.M., C.H. LeeDecker, R.J. Dent, and J.C. Bedell
1997 *Excavation of the Whitby Branch Site (7NC-G-151), State Route 1 Corridor, Odessa Segment, New Castle County, Delaware.* Louis Berger & Associates, East Orange, New Jersey. Submitted to the Delaware Department of Transportation, Dover.

Klein, R.G.
1973 *Ice-Age Hunters of the Ukraine.* University of Chicago Press, Chicago.

Lanier, G.M., and B.L. Herman
1997 *Everyday Architecture of the Mid-Atlantic: Looking at Buildings and Landscapes.* The Johns Hopkins University Press, Baltimore.

Larcombe, L.
1994 *Cultural Heritage Resource Predictive Modeling Project: Volume 2, Boreal Forest Aboriginal Land Use Patterns: An Evaluation of the Ethnographic Literature.* Centre for Archaeological Resource Prediction, Lakehead University, Thunder Bay, Ontario. Submitted to the Ontario Ministry of Natural History, Toronto.

LeeDecker, C.H., J. Bedell, and R. Jacoby
2001 *Archaeology of the Puncheon Run Site.* Louis Berger & Associates, East Orange, New Jersey. Submitted to the Delaware Department of Transportation, Dover.

LeeDecker, C.H., B. Koldehoff, and C.A. Holt
1996 *Excavation of the Two Guys Site (7S-F-68), Sussex County, Delaware.* Louis Berger & Associates, East Orange, New Jersey. Submitted to the Delaware Department of Transportation, Dover.

McDougall, L.
1997 *The Complete Tracker: Tracks, Signs, and Habits of North American Wildlife.* The Lyons Press, New York.

McPherson, J., and G. McPherson
1994 *Naked into the Wilderness: Primitive Wilderness Living and Survival Skills.* Prairie Wolf, Randolph, Kansas.

Minnesota Trappers Association
2004 *History of Trapping and the Fur Trade in Minnesota*. Minnesota Trapper Education Manual. Website at www.mntrappers.com/educationmanual.html. Accessed January 21, 2005.

Morgan, L.H.
1851 *League of the Iroquois.* Reprinted in 1962. Albany. Corinth Books, New York.

1852 Report on the Fabrics, Inventions, Implements and Utensils of the Iroquois, Made to the Regents of the University, Jan. 22, 1851. *Cabinet of Antiquities Annual Report* 5:66-117. Fifth Regents Report. Charles van Bethuysen, Albany, New York.

Myers, A.C.
1937 William Penn: His Own Account of the Lenni Lenape or Delaware Indians. Albert Cook Myers, Moylon, Pennsylvania.

Newhouse, S.
1874 *The Trapper's Guide: A Manual of Instructions for Capturing All Kinds of Fur-Bearing Animals and Curing Their Skins.* Mason, Baker & Pratt, New York.

New York State Museum
2004 *The Lewis Henry Morgan Collection: The NYSM Collection Today. T*he New York State Museum. Website at www.mapserver.nysed.gov/morgan/display.cfm?catno=36682. Accessed June 25, 2004.

Norwood, C., and P. Force
1963 *Tracts and Other Papers Relating Principally to the Origin, Settlement, and Progress of the Colonies in North America From the Discovery of the Country to the Year 1776* : *A Voyage to Virginia.* Vol. III., No. 10. Peter Smith, Gloucester, Massachusetts.

Petraglia, M., D. Knepper, J. Rutherford, P. LaPorta, K. Puseman, J. Schuldenrein, and N. Tuross
1998 *The Prehistory of Lums Pond: The Formation of an Archaeological Site in Delaware.* Parsons Engineering Science, Cultural Resources Department, Fairfax, Virginia. Submitted to the Delaware Department of Transportation, Dover.

Richards, M.
2003 *Brains, Bones & Hotsprings: Native American Deerskin Dressing at the Time of Contact.* Abotech. Website at www.abotech.com/Articles/Richards01.htm. Accessed January 21, 2005.

Riley, L., J.F. Custer, A. Hoseth, and E. Coleman
1994 *Final Archaeological Investigations at the Paradise Lane Site (7NC-D-125), Ogletown Interchange Improvements Project Area, New Castle County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Riley, L., S.C. Watson, and J.F. Custer
1994 *Final Archaeological Investigations at Prehistoric Site 7K-C-360 and Dover Downs (7K-C-365A and B), State Route 1 Corridor, Kent County, Delaware.* University of Delaware, Department of Anthropology, Center for Archaeological Research, Newark. Submitted to the Delaware Department of Transportation, Dover.

Ritchie, W.A., and R.E. Funk
1973 *Aboriginal Settlement Patterns in the Northeast.* New York State Museum and Science Service Memoir 20. The University of the State of New York, Albany.

Rountree, H.C.
1992 *The Powhatan Indians of Virginia: Their Traditional Culture.* University of Oklahoma Press, Norman, Oklahoma.

Russell, C.P.
1967 *Firearms, Traps, & Tools of the Mountain Men.* Alfred A. Knopf, New York.

Schorger, A.W.
1996 *The Wild Turkey: Its History and Domestication.* University of Oklahoma Press, Norman, Oklahoma.

Shaffer, B.S., K.M. Gardner, and B.W. Baker
1996 Prehistoric Small Game Snare Trap Technology, Deployment Strategy, and Trapper Gender Depicted in Mimbres Pottery. *Journal of Ethnobiology* 16(2):145-155.

Sharrock, F.W., and S.R. Sharrock
1974 A History of the Plains Cree Indian Territorial Expansion From the Hudson Bay Area to the Interior Saskatchewan and Missouri Plains, Volume VI: Chippewa Indians. Garland Publishing, New York.

Smith, J.
1623 The Generall History of Virginia, the Somer Iles, and New England, with the Names of the Adventurers, and Their Adventures. Reprinted in 1986, in *The Complete Works of Captain John Smith (1580-1631) in Three Volumes*, edited by P.L. Barbour. University of North Carolina Press, Chapel Hill.

Speck, F.G.
1915 *The Nanticoke Community of Delaware.* Contributions from the Museum of the American Indian Heye Foundation. Volume II, Part 4. New York.

1946a *Catawba Hunting, Trapping, and Fishing.* Joint Publications, Museum of the University of Pennsylvania and the Philadelphia Anthropological Society No. 2. Philadelphia.

1946b Cudgelling Rabbits: An Old Nanticoke Hunting Tradition and Its Significance. *Bulletin of the Archaeological Society of Delaware* 4(3):9-12.

Speck, F.G., R.B. Hassrick, and E.S. Carpenter
1946 *Rappahannock Taking Devices: Traps, Hunting, and Fishing.* Joint Publications, Museum of the University of Pennsylvania and the Philadelphia Anthropological Society No. 1. Philadelphia.

Stephens, G.
1934 *Trapping Tips for Rural Trappers: Practical Suggestions to the Part-Time Trapper Who Wishes to Make His Traps Pay Bigger Dividends.* F.P. Robinson, Curwensville, Pennsylvania.

Strachey, William
1612 *The Historie of Travaile into Virginia Brittania Espressing the Cosmographie and Comodities of the Country, Togither With the Manners and Customes of the People Gathered and Observed as Will by Those who Went First Thither as Collected by William Strachey, Gent., the First Secretary of the Colony,* edited by R.H. Major. Reprinted in 1957. British Museum, London.

Sullivan, H.
1991 110 Ways to Catch a Muskrat. *Fur-Fish-Game* March 1991.

Tetso, J.
1970 *Trapping is My Life.* Peter Martin Associates Limited, Toronto, Ontario.

Thrasher, H.
1868 *The Hunter and the Trapper.* Orange Judd and Company, New York.

Thomas, R., D.R. Griffith, C.L. Wise, and R.E. Artusy, Jr.
1975 Environmental Adaptation on Delaware's Coastal Plain. *Archaeology of Eastern North America* 3:35-89.

Thompson, R.
1924 *The Wilderness Trapper.* The Hunter-Trader-Trapper Company, Columbus, Ohio.

1946 *Snares and Snaring.* Fur Trade Journal of Canada, Toronto, Ontario.

Tome, P.
1854 *Pioneer Life: Or, Thirty Years as a Hunter*. Aurand Press, Harrisburg, Pennsylvania.

Ugan, A.
2005 Does Size Matter? Body Size, Mass Collecting, and Their Implications for Understanding Prehistoric Foraging Behavior. *American Antiquity* 70(1):75-89.

Van Der Donck, A.
1656 *A Description of the New Netherlands.* Reprinted in 1968. Edited by T. O'Donnell. Syracuse University Press, Syracuse, New York.

Wall, R.D., L. Santone, J.C. Bedell, and C.H. LeeDecker
1997 *The Drawer Creek Site (7NC-G-143) Excavations, State Route 1 Corridor, Odessa Segment, New Castle County, Delaware.* Louis Berger & Associates, East Orange, New Jersey. Submitted to the Delaware Department of Transportation, Dover.

Weslager, C.A.
1943 *Delaware's Forgotten Folk: The Story of the Moors and Nanticokes.* University of Pennsylvania Press, Philadelphia.

1956 *A Brief Account of the Indians of Delaware*. University of Delaware Press, Newark.

1983 *The Nanticoke Indians – Past and Present.* University of Delaware Press, Newark.

1996 *The Delaware Indians: A History*. Rutgers University Press, New Brunswick, New Jersey.

Wild America
2004 *Marty Stouffer's Wild America: Old Man Muskrat*. Website at www.waol.com/pages/s67.htm. Accessed January 21, 2005.

Wood, W.
1634 *Wood's New-England's Prospect.* Reprinted in 1967. Burt Franklin, New York.

Woodstream Canada
2004 Company History. Woodstream Canada. Website at www.victorpest.com/canada/history.asp. Accessed January 21, 2005.

9.2 References Examined

Carter, J.L.
1977 *The Down River People of the Lenni-Lenape Indians.* KNA, Kennett Square, Pennsylvania.

Harrington, M.R.
1938 *Dickon Among the Indians*. John C. Winston Company, Philadelphia.

Johnson, A.
1925 *Geographia Americae with an Account of the Delaware Indians Based on Surveys and Notes Made in 1654-1656 by Peter Lindeström.* The Swedish Colonial Society, Philadelphia.

Speck, F.G.
1943 The Frolic Among the Nanticoke of Indian River Hundred, Delaware. *Bulletin of the Archaeological Society of Delaware* 4(1):2-6.

1949 A Maker of Eel Pots Among the Nanticokes of Delaware. *Bulletin of the Archaeological Society of Delaware* 4(5):25-27.

Tetu, P.N.
1871 Rabbit Snaring. *Canadian Illustated News* III (12):189. The National Library of Canada. Images in the News: Canadian Illustrated News. Website at http://www.collectionscanada.ca/cin/h1-119.01-e.php?uid=54321&uidc=Negative1. Accessed January 27, 2005.

Weslager, C.A.
1942 Indian Tribes of the Delmarva Peninsula. *Bulletin of the Archaeological Society of Delaware* 3(5):25-36.

1948 *The Nanticoke Indians: A Refugee Tribal Group in Pennsylvania.* Pennsylvania Historical and Museum Commission, Harrisburg.

1950 *Indians of the Eastern Shore of Maryland and Virginia.* The Archaeological Society of Delaware, Wilmington.

1975 More About the Unalachtigo. *Pennsylvania Archaeologist* 45(3):40-43.

1976 *Red Men on the Brandywine.* Hambleton Company, Wilmington, Delaware.