Wildlife Impressions

By James Halfpenny

This article is adapted from A Field Guide to Mammal Tracking in Western America, *to be published in April by Johnson Books of Boulder, Colo. The author is a research associate at the Institute of Arctic and Alpine Research at the University of Colorado.*

Telling someone how to track is analogous to telling someone how to play a piano. I might tell you everything about how to play, but to become a concert pianist, you would have to sit down and practice. The same is true of tracking. I can provide the "how to," but you will have to get out and practice.

DEVELOPING A SEARCH IMAGE

The most important skill in tracking is learning to see. Although this may sound like a basic skill that all people have, it is not. Time and again, a skilled naturalist will be able to look at the ground and see things that others miss. The naturalist will be able to piece together a few visible parts into a whole story. Why? The naturalist has developed a *search image* in the mind and has also developed a "discriminating eye."

A search image is a mental image on which a person is able to cue. Have you ever sorted objects, say coins? As the sorting progressed, your speed increased. The increase was due to cuing in on different types of coins. The search image then may be a complex image, consisting of several basic track shapes and patterns.

Try to develop your search image and the skill of knowing what to look for by practicing on a small area. This should be an area where you know animals—even pets—have been, and should be about one square yard in size. Sit down and spend 15 minutes or more just looking at the ground for tracks and track patterns. Don't neglect bird tracks. It's important to be able to recognize these so you can tell them apart from mammal tracks. Sketch the block of ground and the patterns it contains.

When you can recognize tracks from different perspectives you will develop a "discriminating eye." As you look at your miniplot, move around from side to side. Look straight down and look from a low angle. Look into the sun and shade the area that you are looking at. Study parts of a single track so that you will recognize only portions of a print when you see them. When looking at a single track, look at the area two or three inches around it. Then step back and look at the whole picture: study the complete trail and identify the different gaits.

Positive reinforcement is a great aid to learning, and I recommend it whenever possible for trackers. When a mammal, even a pet, is observed, carefully go over the area where it was. Look for tracks, scat and sign. Compare these clues to the behaviors and action that you saw. These positively verified clues are important ad-

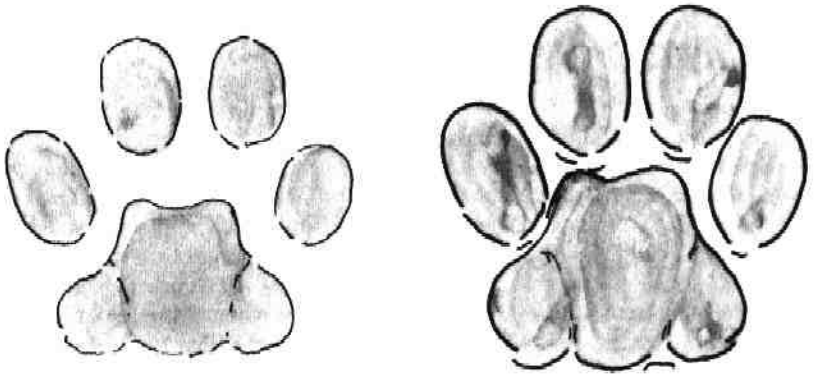
ditions to a lifelong collection of experience.

STAGE SETTING

When a set of tracks is found, think for a minute about the stage on which your story is about to unfold. *Geographic location* may limit the possible species with which you are working. *Habitat* also serves to limit the species which may be present. To interpret the location and habitat, you will need to increase your familiarity with the natural history of mammals through experience, classes and readings at home.

The *season* of the year will also provide clues. Look for foxes living in dens in the spring: however, they will only be the females giving birth and raising their young litters. Mothers will be accompanied by young during the summer. Many ungulates such as deer and elk migrate to winter ranges in the fall. Males of the deer family destroy saplings in the fall to remove the velvet covering on their newly grown antlers.

Determine what the *surface* was when the mammal made the tracks. Since time has elapsed after the tracks were made, the surface may have changed—dirt may have dried out, slush may have frozen. The surface will affect the size of the tracks. Tracks are smaller on hard surfaces and larger on soft surfaces. Follow the trail under a tree and then into the open. The surface may change dramatically in these two situations. In snow, it is often possible to obtain a clear print under a tree, but not in the open. Muds with differing contents of clay will dry at different rates. Actively growing plants spring back to position more quickly than those that have stopped growing for the year.



The type of surface changes the size of a print. A bobcat's print appears small in dust, yet large in mud.

AVERAGING

When you are following a trail, I suggest you use a process called *averaging*. First, take all the measurements of the prints and the trail that are possible. From the measurements, mathematical averages of the dimensions can be made.

Next, step back and look at several tracks, or better yet, follow the trail for a distance. While following the trail, develop in your mind a mental picture that averages the shapes of the prints. As you develop the picture, consider what the surface under the tracks was at the time the tracks were left, and estimate how fast the mammal was moving. Feet will leave larger prints on a soft surface than on a hard surface. The difference can be dramatic. A fast-moving animal may leave larger tracks. Also consider whether the animal's foot has slipped or whether it was going up or downhill. When traveling uphill the stride will be shorter. It may be helpful at this point to draw a picture of the average shape.

The averaged print will be a better representation of the mammal's tracks than

Please Turn Page

individual prints. Once the average print, including size and shape, is known, then the tracker is better able to judge what mammal is being tracked.

RELATIVE SIZE

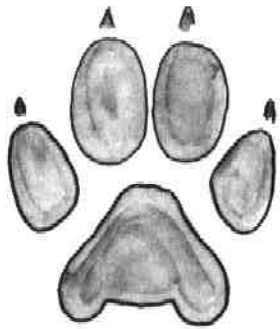
I do not emphasize learning dimensions of mammal tracks. Too often I have observed cited dimensions being used as the absolute criterion defining species identification. While well-intentioned, the size criterion fails to consider the variation in the genetic pool of mammals, the variation over geographic distances, and the variation caused by different surfaces. Too much variation exists among species for a single criterion to be very effective. Any single cut-off point will discriminate against one species or the other.

Instead of absolute measurements, I emphasize learning to judge *relative size* within taxonomic groups. For example, the fox is the smallest member of the dog family and its dainty tracks leave a delicate, almost cat-like, impression. In contrast, the wolf is the largest member of the family, and the robustness of the animal is immediately apparent in the print. Using the concept of relative size, the "robustness" or "delicacy" of a track will indicate to the tracker the size of the mammal that made the track. Judging relative size will also increase your awareness and help you in the process of thinking like a wild mammal.

The skill of judging relative size can be learned at home, even in the city. Observe pet cats and dogs and compare their body size with their feet and the size prints they leave. Compare the robustness of the print with the physique of the pet.

I am not implying that actual dimensions are not important, but the tracker can benefit by learning to work from relative judgments rather than trying to memorize all the absolute dimensions. I suggest that you will benefit more by not memorizing these dimensions, but only using them as a check and another clue when making educated guesses. The practice of taking measurements when prints are recorded will enhance your ability to judge relative size and to relate that judgment to absolute sizes.

(Right, this page) Relative size comparison of prints of fox, coyote and wolf. (Left, opposite page) Claws in a print register in various manners. Different visual impressions appear in this wolverine print including the lack of a claw on one toe. (Right, opposite page) The position of the urine stain identifies the male coyote, left, and the buck deer, center. Notice the far-forward position of the stain in reference to the hind feet of the buck. The stain from the female deer, right, is close to the hind feet.



CLAWS

The appearance of claws in tracks can be confusing. Ideally the claws will show as unattached depressions in front of each toe. The depressions may be either simple round holes or wedge-shaped indentations. However, many times the imprint of the claws will be continuous with the toes. The resulting impression is of a relatively bigger and pointed toe pad. Learn to recognize pointed impressions left by claws and to distinguish these from the toe pads. The toe pads may show a rounded point.

Elizabeth Biesiot

IDENTIFICATION OF SEXES

Many times when following a trail you can, with careful observation, verify the sex of the animal being tracked. Size, posture during urination, blood, and social behavior are important indicators.

The female of most North American mammal species tends to be smaller than the male. This is true particularly within the weasel family, where this sexual dimorphism is dramatic. Remember though that the tracks of a small female long-tailed weasel will look like the tracks of a large male short-tailed weasel. Tracks will reflect the size difference, but are not absolute indicators of sex. Don't believe the person who says you can identify sex of elk or deer by size alone. Size is an excellent clue, but only a clue, as there are large bucks and small bucks.

Within the dog and cat families and ungulate order, posture during urination can be an excellent clue. When males are urinating the stream tends to be directed forward of a well-placed pair of hind legs. Therefore, the urine stain will appear well in front of the hind legs. For females the urine stain appears only slightly in front of the hind legs. Male canines also lift their hind legs to scent mark an object by urination. The exception is the wolf, where both the dominant male and female mark by leg lifts, and subdominants of both sexes do not. Cats also mark territories by expelling urine directly backwards onto an object.

While tracking coyotes and bobcats, I have seen blood as droplets on the snow and in association with urine stains. Coyotes and wolves are seasonally monestrous, having one period of "heat" per year. Blood may flow from the vulva before estrus. I presume that with bobcats and some other carnivores the presence of blood would be a good indicator of sex if found in association with urine. Other bits of blood on a mammal trail might come from an injury.

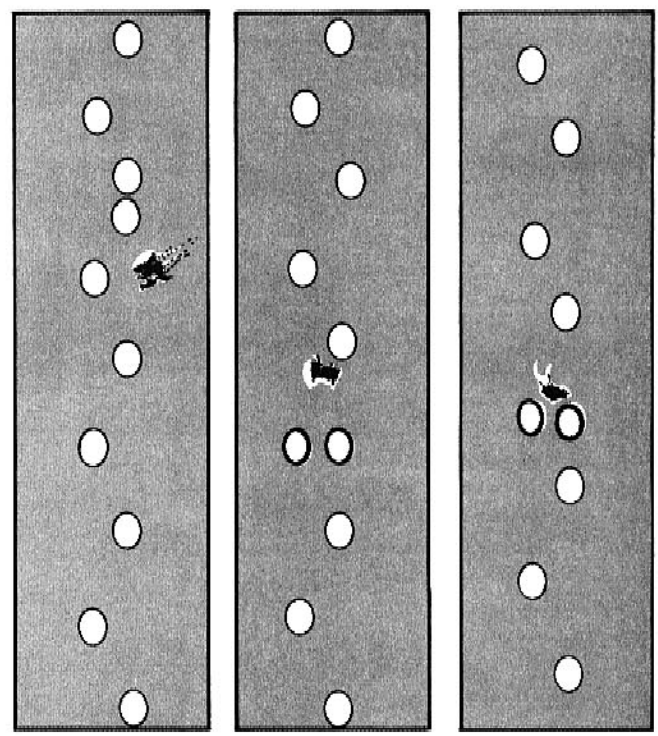
Females tend to be associated with their young, and a large set of tracks with one or two smaller sets may represent this. This may be of great importance to you as the tracker, such as when you are in grizzly bear country. It is not wise to surprise a grizzly bear with her young! Ungulates, the hooved animals such as deer, form separate male and female herds. The male and female young are found with the adult females. This is often true in the winter after the breeding season is over.

OTHER MAMMAL SIGN

Many types of mammal sign exist, ranging from bones to limb-chewing to scat. Chewings on branches or tree trunks are among the most easily observed sign. First, note the location of the chew: high in the tree (porcupine), about three inches up the trunk (voles), about 18 inches up the trunk (possibly beaver), under a low branch but done by a mammal on the ground (porcupine), shoulder height (ungulate). Relative size of the debarked area may help separate squirrel chews from porcupine. When investigating chewings, note the width of individual teeth and the direction that the teeth moved through the bark. Relative tooth width helps separate mouse from squirrel from porcupine chews. Ungulates debark trees by raking their lower incisors (they don't have upper incisors) up or at a slight angle to the tree trunk. Porcupine and beaver chew at great angles to the trunk.

Antler trees or rubs are those trees used by the ungulates to scrape the velvet from their newly grown antlers. During the process, much of the bark is scraped from the tree. The edges of the bark appear very frayed and do not show the clean cut of chewed bark. Most rubbing activity occurs in August, but may vary in geographic

Cont. On Page 58



Elizabeth Biesiot

Cont. From Page 47

areas. Usually deer, elk and moose will select a small sapling or group of saplings. These may be bent over double while scraping and occasionally they snap. Less often the ungulates use larger trees. In Yellowstone I have been shown larger-diameter trees scraped by bison. Certainly the bison, mammals with horns, are not trying to remove velvet, but they do scrape the bark from trees.

Marking trees are used by members of the bear and cat families. The trees, which are marked by scenting, rubbing, clawing and chewing, probably hold much more significance for the mammals than we as humans perceive. A bobcat clawing a tree may merely be sharpening its claws, but I doubt it. Whether we can perceive the true meaning of these trees or not, they are important clues about the life of the mammals.

Bears tend to use trees near commonly used trails. They will stretch as high as possible, clawing the sides of the trees, or simply rub their backs all over the trunk, breaking off small limbs. This rubbing may be to scratch an itch, but I suspect that it is related more to the habit carnivores have of rolling in scat and the remains of animals. Bears, especially grizzlies, occasionally will debark most of a tree trunk. Evidently they do this to get at the cambium, or inside bark layer. The presence of long, fine bear hair as opposed to the coarse undulating hair of the ungulates verifies identification. Claw marks can be separated from antler fraying by looking closely for indications of four or five claws starting high and being raked down the tree. With antlers, some of the motion is up the tree, and seldom do you find an even spacing of rips that is indicative of claws.

Small twigs are often eaten by rodents and lagomorphs (rabbits, hares, pikas). The size of the tooth marks and the amount of chewing necessary to sever completely the end of a branch are important clues. Rabbits, jackrabbits and hares often are able to completely cut a small branch in one bite, whereas a vole would take several bites. Winter chewings may be higher on the tree than expected because small mammals have been working from a platform of snow or from within the snowpack. The browsing of moose and other ungulates may be identified by the jagged edges left on the branches. Because these animals lack upper incisors, they therefore mash and tear off small twigs instead of cutting them off.

Trackers generally want to know how much time has elapsed since a mammal passed. To know this, you must look at a track and judge its age. The ability to age a track is a skill that can be learned. There are two phases that each tracker must practice. The first is the test pit and the second I call the step test.

Test pits can be made anywhere, including your back yard. To construct the pit, select an area of exposed soil that is not going to be disturbed for a few days. Then start at one end by making a single footprint. Look at the footprint and note the appearance of the fresh track. I believe that it is more educational to use actual prints than to make a mark on the ground. Taking notes or photographs will help later. One hour later add a second track to the side of the first. Then add a track at four, eight, 16 and 24 hours. Each time you add a track analyze the effects of aging on your known-age prints.

To gain experience construct test prints in other surface materials such as grass, mud, snow and gravel. Also construct pits so that the study period will overlap with weather events such as rain, a nightly freeze-thaw cycle, or a windstorm.

The step test is performed when actually looking at a track. Simply step next to the print you are observing (the reason for practicing on your own footprints earlier). Next, step back and look at your own track. Evaluate the difference in the appearance between the two tracks. One processes—gravity—ages all tracks. As time goes by the edges loose their sharpness and start to fall into the print. How much decay has occurred due to gravity? From your experience with the test pit, make an initial estimate of age.

Next, think back over the last two hours, the last eight hours, and the last day or two. Review in your mind what the weather has been. Has it rained? Snowed? Has the wind blown? Has there been a freeze-thaw cycle? Did the sun shine? Has the soil dried out? When did these events occur? Tracks left early in the morning may show fresh damp soil thrown up. Tracks made in the snow last night may show refrozen water ice in the bottoms, newly formed ice crystals, or hoar crystals on the surface indicating formation after the mammal passed. Pockmarks may be present from rain, or fine dust may have blown in. The edges of snow may show cornice formation due to the wind. Was the morning dew or frost disturbed by the animal? Revise your estimate based on answers to these questions.

Look for other clues that may help with aging the trail. If the vegetation was bent by the passing mammal, has it regained its former position? Remove soil and scat from the vegetation where it has fallen. Is the vegetation from under the scat still as fresh-appearing as the vegetation beside it? If so, the tracks are fresh. Can you still detect moisture in the scat or is that scat possibly still steaming? With the last clues, make your final estimate of the age of the track.

When following a series of tracks, you can do several things to help visualize and understand the trail. Walk beside the trail so that you do not disturb the tracks. Mark those tracks that you might like to return to later for photographs or detailed measurements.

When possible, try to track into the sun. If it is not possible to face the sun while moving, occasionally stop and turn to face the sun as you look at the tracks. Doing so may emphasize relief in the tracks.

Frequently shift your gaze from the tracks directly at your feet to some distance up the trail. Try to understand why the mammal has taken a specific route in reference to the overall terrain. Looking ahead on a fresh trail may allow you to detect the mammal before surprising it.

If the trail is lost, use measurements of stride or group patterns to locate where the next set of prints should be. First, assume that the mammal continued in the direction it was traveling. However, if more tracks cannot be detected in that direction, check to make sure that the mammal didn't backtrack in its own prints. If that doesn't work, mark the last visible sign and start circling. Make little circles at first, but keep enlarging the circles until signs are detected again.

Finally, let me give you one last technique, the one I call elimination. Sometime in every tracker's career, a situation will be found where the positive identification of the mammal just doesn't happen. The best thing to do at that point is to start down a mental list of mammal groups. As you do, determine how many of the clues fit that group. Then work within the most likely group and go through a mental list of mammals from that group one by one. When one mammal is finally chosen, then go over a mental list of what you know about that mammal to see if it fits the picture. Often you'll think of the animal that best fits the clues to become the central character in the story of the tracks.