



Urban Tracking—Start Right to Finish Right Steve White

We've all seen it. A K9 starts the track from the driver's seat of a car a suspect abandoned only minutes earlier. He tracks around the front of the car across the right shoulder of the road and continues on through backyards, parks and greenbelts. It's as if his nose was on rails—tracing every step the suspect took. When he hits a street crossing he hustles across and quickly reacquires the track on the opposite planting strip. It looks like this one's in the bag.

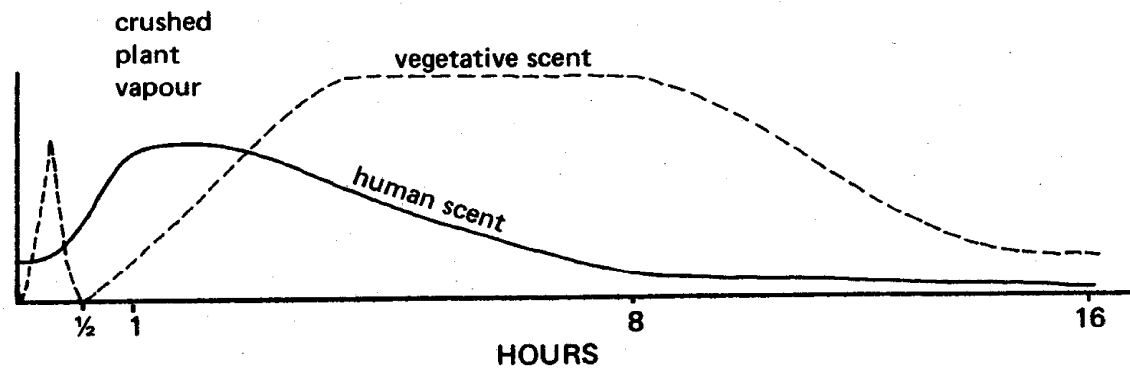
Then it happens, the K9 tracks right up to edge of a large parking lot. Poof! Nothing! The dog checks every edge of the parking lot but finds nothing. As soon as he hits the asphalt his head comes up and he vaults for another edge. Again, nothing. After long, hard effort to reacquire the track, a containment officer suggests the suspect might have had a car in the lot. Well-meaning or not, the comment burns like acid.

So often, new techniques are borne of frustration. Case like the one above prompted my agency to take a hard look at how we taught tracking. The result of this analysis pointed toward a fundamental flaw in many tracking dogs—reliance on vegetation. It turned out this unproductive trait was a natural by-product of typical tracking training regimens. We had started tracking training the traditional way, with short run-away tracks on nice grassy surfaces. The goal was to shape tracking behaviors by making it easy for the dog to succeed in the early phases. We thought grass was our friend in this regard. Unfortunately we were wrong. This approach ignored one critical piece of information about scent and two fundamental aspects of behavioral conditioning. Now we'll examine those problems and offer a solution.

Problem 1—Scent is dynamic and multifaceted.

Thorough study of *Scent and the Scenting Dog* by William Syrotuck¹ will benefit any K9 handler or trainer. Even after three decades, that little book holds more valuable information per page than any book written on the topic. One chart¹ shows the relative intensity of the human and vegetative components of a track or trail. The vegetative component starts at virtually no scent; but once someone steps on the plant and crushes it, vegetative fluids containing chlorophyll are released. The scent from these fluids reaches maximum intensity at about 15 minutes and then quickly evaporates substantially in another 15 minutes. Then putrefaction begins. Vegetative scent slowly increases, plateaus at about the four hour mark, and slowly diminishes within the next day or two.

On the other hand, the intensity of the human component of the scent picture starts at a relatively low level. The sloughed human skin rafts and sebum nourish bacteria which reproduce and off-gas. It takes about a half an hour for this process to ramp up, but then it quickly increases over the next hour or so. Intensity of human scent then plateaus for another couple of hours before slowly declining over the next few hours.



A glance at the chart clearly shows that during the first half hour of a grass track's age the vegetative component is not only far stronger than the human component, but its strength consists largely of one of Nature's potent masking agents—chlorophyll. Think of how Clorets® gum works. It uses the principle of overshadowing to make a stronger, more salient odor (chlorophyll) capture one's attention rather than the relatively weaker offensive odor (bad breath). The same thing happens when relatively weak human scent competes with the initial punch of crushed vegetation.

Faced with a task, dogs will usually take what they perceive as the path of least resistance. Once they figure out that the task is to get to the end of the track, they'll do it the easiest way they can. If you train on vegetative surfaces within the first hour of the track's age, the dog will likely come to the conclusion that the name of the game is to follow vegetative odor . . . especially if he's punished for deviating from the footsteps. That's too bad, because so much of the scent information about who laid the track lies away from the footprints.

Problem 2 — Reinforcement histories, Newhall, and the Force Field

Ask a group of cops about the Newhall Incident and they'll probably be able to tell you how during a 4½ minute gunfight, four California Highway Officers died at the hands of two determined criminals. Subsequent investigation revealed that one of the slain officers had spent brass casings from his emptied service revolver in his pants pocket. Why, when bullets are flying at him, would any officer take the time to carefully catch his brass and put it in his pocket before reloading his weapon? Under stress his brain went limbic and neuro-muscular programming took over. Simply put, he did as he had been trained. Thus, new firearms training techniques were borne of this failure, and as a result many officers' lives have since been saved.

So what does this have to do with tracking training? Dogs' trained behaviors often degrade under stress just as ours do. Two interrelated behavioral phenomena are responsible. First, under stress, behavior tends to drift toward the thing learned first. The other factor at play is depth of reinforcement history—a fancy term to describe how many times a behavior has been successful in the past. Having their initial training on vegetative surfaces, many (if not most) tracking dogs get stressed and seek vegetation when the track traverses hard surfaces and gets difficult. The video at



http://www.i2ik9.com/HITT_Article_1.htm illustrates the effect of what I call the Force Field. You know the one . . . that force field that seems to raise tracking dogs' heads 18 inches above asphalt until the next patch of vegetation. We've all seen dogs like these that treat street crossings as places to raise their heads, eyeball the far shoulder and drag their handlers to vegetation on the other side.

<Insert Video 1 here—Typical Multi-surface Head Raising>

Problem 3 — Shaping tracking requires very small criterion shifts

Unfortunately, once dogs have learned to track on grass and are introduced to hard surfaces it is very difficult to reduce the vegetative odors in fine enough increments to ensure the dog's success. It's too often an all-or-nothing proposition—lots of rich, salient vegetative scent or virtually none. It's just too big a shaping gap for many dogs to handle. Thus when we begin tracking training on grass, we're likely to later violate the first of Pryor's Ten Laws of Shaping Behavior: "Raise criteria in increments small enough that the subject has a reasonable chance of success."ⁱⁱ

The solution — Train tracking on grass last

Yes, you read that correctly. If you want a reliable urban tracker, grass is the last surface you should teach. The good news is that it's easier than you might think. I call this system Hydration Intensified Tracking Training, or HITT®.

First we'll have to get some help from our old friend, Dr. Ivan Pavlov. Classical (aka: Pavlovian) conditioning occurs when two stimuli are paired together often enough that one reliably predicts the other. The power of classical conditioning is that the animal has no control over whether or not the association occurs. It's involuntary. Think about it. When Pavlov's dogs heard the bell they didn't think, "Hmm . . . the bell means food, so I guess I'll drool now." Once the bell was associated with food their autonomic systems did the rest. Food is not the only thing to which classical associations can be linked. Anything the dog perceives is subject to association, even if the dog is not consciously aware it perceives the stimulus. Thus associations can be layered; that's just what the HITT® system does as it associates food with a sprayed stream of water which is also associated with tracklayer scent.

The beauty of this system is that you can systematically fade the lure (food) and prompt (water) in very precise fashion. The result is what behaviorists call Errorless Learning—a procedure in which the degree of difficulty increases in such fine degrees the dog does not face the stresses associated with increased expectations. Actually, I think in Real World applications we should realistically expect Less-Error Learning, since none of us are perfect and life often throws us curves scientists never face in a sterile lab setting. In either case HITT®-trained dogs are every bit as comfortable tracking on hard surfaces as on vegetated ones.

HITT® Tracking — As easy as 1, 2, 3

Step 1 —Teaching nose-down behavior on hard surfaces. In the course of their lives with humans, many dogs have learned there's not much point to putting their noses down



on asphalt or concrete, so they just gaze longingly at their handlers, waiting to be told what to do next. You'll start on a large asphalt parking lot with a bunch of treats and a clean garden sprayer full of unchlorinated water. For a couple of reasons, I like to start this process in the evening at a commercial parking lot (e.g., Costco or Sam's Club) right after closing time. With plenty of residual scents in the area, the dog starts to learn scent discrimination from the very beginning. End-of-day activity in the area helps the dog learn to ignore what it sees and trust its nose instead. Work in the evening when the pavement has started to cool.

Fill a brand new one-gallon garden sprayer with unchlorinated water. Distilled, well, or spring water do not kill off the scent producing bacteria. The tracklayer sprays a line 1" wide water line about 25'-30' long on the asphalt. The width of three parking stalls is about right. At the end of the sprayed line he turns to the downwind side to walk back around to the start. The tracklayer then goes back over the line and places one treat on the line every four inches—about a palm-width apart—leaving a small pile of three or four at the end. The video at http://www.i2ik9.com/HITT_Article_2.htm illustrates what it should look like.

Almost immediately you can bring your dog to the start of the sprayed line. Hook your six-foot lead to a buckle collar or the dead ring of your training collar. Do **not** use your tracking harness, or drape the lead under a foreleg. After all, at this point your dog is not tracking. He's just eating. You don't want to blur the associations you've already made with the tracking equipment, so keep it simple. I suggest holding your lead with the dog-side hand, and feeding treats from your off-hand as you walk the dog up to the line. Gradually lower your hand as you approach the start point. Just as you get to the start of the line with your knuckles almost scraping on the ground, "get clumsy" and drop the rest of the treats right at the line's start. Let the dog take it from there. Stand up, keep a slightly slack lead and move forward with your dog as he eats the treats.

Here's the hard part. **Remain silent!** Let the dog learn what works and what doesn't. This approach is intended to build dogs that can work independently as they handle scent problems. Make sure there's no tension in the lead. Neither let the dog wander more than a lead-length from the track nor back-track for missed treats. Just as the dog gets to the last three or four treats, gently sidle up to him with treats in your off-hand. Smoothly lure him up and away from the end of the spray line before he starts trying to figure out where the rest of it goes. Briefly and calmly praise him as you walk away together. The video at http://www.i2ik9.com/HITT_Article_3.htm shows a working police dog completing his first HITT® exercise. We had to spend a moment or two teaching this dog to accept treats off the ground before we started. You may want to be prepared to do the same. Some handlers might worry that their dogs will start hoovering any and all food they find on the ground. The reality is that for a brief period they might. However, it won't take long before the dog finds tracking to be so self-reinforcing that he'll pass by some of the treats you've placed. Also, once he learns there are bad guys afoot food fades out of the picture pretty quickly.



Step 2—The 80/20 Rule for making progress. Repeat the process above until the dog has settled into a smooth fluid style of eating the treats off the ground. Once the dog is 80% successful you're ready to start systematically raising criteria. At this stage there are three aspects of behavior that define success. First, how many treats did the dog hit? He does not have to eat them all, but he should put his nose on a treat for it to count. 80% or better is your goal for this aspect. Second, did he move smoothly forward with the sprayed line bisecting his body along its length? Since he's eating treats off the ground there will be a certain amount of "inch-worming" as his back end pushes forward while his front end pauses to eat. That's of no consequence and will disappear as the treats are faded in later stages. Third, how much of the duration of the exercise did he spend on the sprayed line versus off experimenting with other things? Again 80% of the time is your goal. If the error rates for any two aspects tally to more than 20% then repeat the exercise at that level until the dog settles into the activity.

Once the dog is 80% successful at any step you're ready to start raising criteria, but by no more than 20%. That's the essence of the **80/20 Rule—an 80% success rate yields a single criterion shift of no more than 20%**. Remember Pryor's "Second Law of Shaping"ⁱⁱⁱ—Raise only one criterion at a time." You're more likely to meet the dog at its level, and if something goes wrong you're not left guessing which variable caused the problem.

At this stage of the training the variables that can be shifted are:

- Treat spacing;
- Total "track" length;
- Spray width;
- "Track" age

Because it can be difficult to keep track of which criterion was shifted when, it helps to keep detailed training records. One helpful tool is the Tracking Training Progress Card below. (Available at: http://www.i2ik9.com/Tracking_progress_card.pdf.)

The completed version (Available at:

http://www.i2ik9.com/Tracking_progress_card_completed.pdf) shows how after each 80% successful track one criterion was shifted, and that no criterion was shifted twice in succession. This helps keep the game interesting for the dog while ensuring that you move forward toward your real world tracking goals.

<Insert Graphic 1—Tracking Progress Card>

<Insert Graphic 2—Tracking Progress Card—Completed>

Step 3—Making it "real" tracking or trailing. There's never a single point at which you can say we're "really" tracking now and no longer just teaching head lowering. The move from one to the other is so smooth and seamless that it compels us to look at the activity differently than we have in the past. Rest assured if you start right and follow the 80/20 Rule, you'll be able to progress steadily to the point where you're ready to introduce other surfaces. You'll know your dog is ready for concrete when your spray width is at about 18" (and has usually evaporated by the time you start) and your treat spacing is an average of 50' (with a small pile of 5-10 treats at each drop).



You'll use a surface transition to teach nose-down behavior on concrete. Set up a short sprayed track with about 50' on asphalt and a 10' to 15' short stretch on concrete. About 10' before the transition point, decrease spray width to about two inches and treat spacing to about one foot with a small jackpot at the end. Run the track as you normally would and you'll probably find the dog only briefly casts around at the transition point, if at all. From this point on you should be able to fade out the water and treats on concrete even faster than you did on asphalt. And that's the way it will be as you proceed to teach the surfaces in this order: Asphalt, concrete, gravel, dirt, dirt-with-sparse-vegetation, grass, woods. This way you're training from the least porous surfaces to the most, building a trailing dog that is comfortable anywhere. The video at http://www.i2ik9.com/HITT_Article_4.htm shows a police dog candidate in his eighth week of K9 Academy working a lightly misted, all hard surface track having treats spaced an average of 50' with a toy at the end. Note the dog's consistent nose-down focus and calmness in the face of sparse scent conditions. This dog has gone on to be a productive police dog.

This system has proved its usefulness as a remedial and advanced skill-building tool. Once a dog has had the HITT[®] associations established, you can re-introduce spray to support a dog as it works on new tracking skill modules (transitions, environments, aerodynamic issues, etc.). If a K9's tracking ever takes a turn for the worse, it's pretty easy to design diagnostic tracks and re-introduce spray as you execute your remedial plan.

Of course, while you're building solid tracking behaviors you'll work on the dog's other police skills, building his love of finding articles and engaging bad guys. Once those skills are as solid as the dog's tracking, you can meld the skills together to teach the dog that fairly often there will be some evidence on the track, and once in a while there will even be a bad guy at the end. This will foster ongoing nose-down behavior while motivating the dog to handle those tough Real World tracks bad guys leave for us.

ⁱ Scent and the Scenting Dog. William Syrotuck, 1972 and 2000, Barkleigh Productions

ⁱⁱ "Don't Shoot the Dog!": The New Art of Teaching and Training, Karen Pryor, 1984 and 1999, Bantam Books

ⁱⁱⁱ Don't Shoot the Dog!: *ibid.*