



Rock outcrop &
Little Bluestem - old orchard trail

A human being may well ask an animal: "Why do you not speak to me of your happiness but only stand and gaze at me?" The animal would like to answer, and say "the reason is I always forget what I was going to say"—but then he forgot this answer too, and stayed silent; so that the human being was left wondering.

—Friedrich Nietzsche, *On the Advantage and Disadvantage of History for Life*

The dog is just about to answer my question

by Frannie Lindsay

except he always forgets
the pithy, rehearsed response he had ready
in perfectly fluent Doglish, his tar-black lips
taking their time to form each *ooo*
And consonant, each virtuoso diphthong,

and then he forgets what I asked him and why,
and now the mother noun and all of her dazed little
adjectives have skittered off into the weeds,
leaving only the scent of their eloquence.
And though his dopily honest eyes

peer in the approximate right direction; although
his ears exclaim about something-or-other; although
he knows a scavenge in dirt is fun—rooting around
for his soggy ball, clamping his dagger-teeth
deep in an unlucky bird shadow;

still, like a great great aunt who can't quite
recall the names of her dinner guests,
he's turning each page of his blissfully colorblind
scrapbook of dreams so he might remember
what fun is, one of these days.

Doctor Dog

The Health Benefits of Humans' Best Friend

by Gayle Goddard-Taylor



The greyhounds move quietly through the adult day care center, stopping to gently touch nose to hand or rest a muzzle on a knee. They are rewarded with petting and cooing. One of the dogs approaches an old man, hunched in his chair and staring into the long distance. A staff person whispers that the man has been completely unresponsive, failing to initiate or return conversation with anyone in the room, and he will likely ignore the dog.

But the dog knows better. A nuzzle is returned with petting, and the man's eyes begin to focus on the dog.

"My wife and I used to raise German shepherds," he says to no one in particular, and the words begin to flow.

In those few seconds of dog-human interaction, when canine eyes met human eyes and hand touched head, history repeated itself. It might have been something like that, the first tentative reaching out between species that occurred tens of thousands of years ago and ultimately led to the domestic dog.

That animals provide us with a multitude of intangible gifts is no secret. Ask any dog, cat, or horse owner about their beloved pets and a gush of anthropomorphic descriptions of their relationship will ensue. His dog knows when he is sad and tries to cheer him up; the cat knows when she is sick and lies atop her purring soothingly; the horse begins whinnying as soon as, and only when, its owner's car approaches the stable.

Can dogs actually love? Does a cat have a sixth sense about illness? Can a horse really differentiate between car engines? The relationship between humans and animals has long been the subject of novels and movies, but in recent years science is catching up to the fact that our pets do indeed confer health benefits to their human families.

Before the question of how and when those benefits accrue, we need to understand how the closest of interspecies bonds—that of humans and dogs—has evolved over the years. Underlying that bond is the greatest attachment of all, our connection with the natural world that has been shaped by millions of years of living—and learning to survive—within it. This relationship, which evolutionary biologist Edward O. Wilson labeled biophilia in his book of the same name, is imprinted in our neural circuitry. It is why we are, for the most part, fascinated by and tend to gravitate toward other species and natural habitats.

The first creature to actually be domesticated was the wolf—the gray wolf, in particular, from which modern dogs evolved. While the dog's predecessor is no longer in doubt, thanks to DNA evidence, the matter of exactly when, where,

and in how many locations the first domestication(s) occurred is the subject of much debate.

In the nineteenth century, the earliest remains of a doglike animal (based on the length of its snout) were discovered in a cave in Belgium and dated to 31,000 years ago. But the archeological record so far showed no more evidence of these creatures until the bones of a similar animal were discovered in western Russia. Carbon dating put these remains somewhere between 12,000 and 14,000 years ago, predating humankind's own transition to agriculture.

In a paper published in 2009, a group of Swedish researchers contended that studies of the mitochondrial DNA of 1,500 dogs point to a single domestication event about 16,300 years ago in China. In an article for *Archeology* (September/October 2010), authors Jarrett A. Lobell and Eric A. Powell reported that archeological evidence suggests that domestications of the dog occurred in multiple locations—and at different times. It is the theory to which John Bradshaw, PhD, biologist and author of *In Defence of Dogs: Why Dogs Need Our Understanding*, subscribes.

“The apparent contradiction between the archaeological evidence and DNA evidence can be reconciled if we posit not just one domestication event, but several, in different parts of the world,” Bradshaw writes.

The archeological record isn't all that helpful, however, in pinpointing when humans and dogs began their journey together. Recent discoveries of grave sites in Asia and Europe containing humans and dogs buried together date back 14,000 to 15,000 years. But they don't provide evidence of a “first domestication” event.

Just when enough trust had been built between the two species to overcome suspicion can only be imagined. One theory suggests it happened when the more sociable wolf ventured into a hunting camp to snatch scraps. Another theory, perhaps more plausible, imagines that humans collected and raised the cubs of the more sociable wolf. Cubs may have been selected for their

temperaments and would have likely bred with other more tractable wolves until a creature with the temperament and willingness to live among us and serve mankind emerged.

Evidence of one of the earliest ways in which the dog was trained to be of service to humankind is contained on a Roman fresco dating to the first century AD that depicts a dog leading a blind man. In the mid-1700s, guide dogs were trained at a Parisian hospital for the blind, although the modern guide dog movement didn't gain strength until later when, at the end of World War I, thousands of soldiers robbed of their sight by mustard gas returned home. Additional guide dog training schools sprang up across Europe and then spread to the US.

Training a dog to fetch or to navigate for us relies largely on temperament and trainability. Over the past few decades, dogs have expanded their repertoire even further. Researchers from all parts of the globe who have studied the relationships between dogs and their owners have found that stroking the pet or even simply making eye contact causes oxytocin to surge in both pet and owner. That surge has been shown to lead to lowered blood pressure and heart rate in both.

This soothing end product of merely stroking a dog (or cat, horse, or even a guinea pig) is one way in which animals have become, in a sense, health care providers. It has fueled an explosion of studies in a field now known as Human/Animal Interaction (HAI) to further investigate this phenomenon. Even before the relatively recent wave of studies, a variety of animal-assisted therapy programs emerged based on anecdotal evidence.

These days, therapy dogs routinely visit nursing homes and assisted-living complexes to comfort elderly residents and generate more social interaction. At the Cummings School of Veterinary Medicine at Tufts University in Grafton, Massachusetts, researchers have found that owning a dog motivates the elderly to exercise. The six-year-old program, Tufts Paws for People, dispatches certified pet visitation teams to nursing homes, libraries, hospitals, and residential facilities for children with behavioral issues. Paws for People

recently partnered with the national Pet Partners, which has strict standards-based requirements for its dogs and handlers. Anecdotal evidence that the soothing presence of a therapy dog is beneficial in a variety of situations is mounting.

“The field of human-animal interaction has really gotten larger over the past 10 years or so,” says Megan Mueller, PhD, a psychology professor at Tufts who has carved out a niche in the field of human-animal interaction. “People have been studying it for a while, but it wasn’t their primary field. It would be nurses or social workers or pediatricians. Now we’re seeing it become a mainstream field, but it’s still very interdisciplinary.”

Mueller is studying whether an equine-assisted therapy program for adolescents with symptoms of Post Traumatic Stress Disorder (PTSD) can help either through the youths riding, or simply through grooming horses and being in their presence. All the kids in the study are also receiving standard treatments as well. Equine-Assisted Therapy (EAT), while not new, has been the focus in recent years of researchers who want to determine what the most effective treatment modalities are in cases like these.

There also is ongoing research on the effect interacting with animals may have on children diagnosed with the pervasive Attention-Deficit/Hyperactivity Disorder (ADHD). Sabrina Schuck, an assistant clinical professor of pediatrics at UC Irvine, recently concluded a four-year study that examined a group of 8 and 9 year olds with ADHD. The study utilized a certified therapy dog in conjunction with a standard cognitive/behavioral treatment protocol to determine if the dog’s presence would reduce the children’s symptoms and encourage social skills.

The children were divided into two groups, with both receiving the standard treatment. But only one group was allowed to spend time playing with a therapy dog as a reward for behaving well. The other group was rewarded with cuddle time with a stuffed animal. The dogs were of different breeds, and the study was conducted in 12-week increments with

follow-ups done six weeks out. In all, 90 children were part of the study.

“Our main aim was to see if the presence of a dog improved behavior in school and at home for these children,” says Schuck. “We also wanted to see if the children gained particular social skills, specifically empathy and reduced bullying and aggressiveness. And we wanted to see if parent-child relationships improved.”

While both groups showed a reduction in the symptoms of inattention and hyperactivity, the greatest changes were demonstrated by those children who interacted with a live dog. This group also showed the greatest improvement in social orientation and adaptive social skills. “An interesting finding,” Schuck notes, “was that the rate of improvement was faster in the dog group than in the control group and that the gains appeared to hold up—at least in the short-term.”

Parents and teachers reported marked improvements in their children’s behavior, from sitting still more often to demonstrating greater calmness, both of which allowed the students to focus on the learning challenges at hand. “Perhaps not surprisingly, a number of the families whose children were involved in the study ended up getting a dog,” says Schuck.

Anecdotal evidence abounds that veterans with PTSD can benefit greatly from the calming influence of a dog. But because there have been few evidence-based studies that support the premise, the federal Veterans Health Administration does not currently provide service or emotional support dogs to vets suffering from PTSD. It does provide veterinary care for the service dogs of veterans with a permanent disability, however.

The difference between a registered service dog and an emotional support dog is primarily a matter of access. Service dogs are allowed into spaces, such as airplanes and restaurants, that are off-limits for emotional support dogs. For veterans who have found relief through the companionship of a dog, this lack of access can be a significant hardship. But the issue has now come to the fore, both because of the numbers of veterans suffering from PTSD and the champions who advocate for emotional support dogs for them.

Butch and Theresa Bouchard, both PTSD sufferers after serving in the

Canadian military, don't need an evidence-based study to tell them that having a therapy dog means the difference between a life spent in fear of leaving the house and a life lived to the fullest. Butch suffered from severe PTSD after serving in the pirate-infested waters off the coast of Africa. His sleep was interrupted by horrific nightmares; he perpetually fidgeted and frequently overreacted to everyday occurrences. He was also unwilling to leave the house without his wife by his side.

"The military is very good at teaching you to function when you're at a very high stress level," says Butch, "but then you have no switch to turn it off."

The Bouchard's marriage had reached a crisis point by the time they heard about therapy dogs through Luis Carlos Montalván, a highly decorated veteran and author of the best-selling book *Until Tuesday*. Montalván, who suffered from PTSD before acquiring his dog, Tuesday, now travels the country with his dog, advocating for veterans and assistance dogs.

Not long after meeting Montalván, the Bouchards adopted Skittles, a rescued Australian shepherd puppy, and Butch's nightmares soon began to disappear, his fidgeting decreased, and the pair could be seen all around town—without Theresa in tow. Then, the worst happened. The young dog died on the operating table as she was being anesthetized for spaying. Her death sent Butch into a downward spiral. But a breeder in British Columbia heard about his plight and offered a pup from a recent litter. The new companion, Spirit of Grace, took up her post with enthusiasm. But the family's tortured journey through the complicated world of service dog training and government regulation transformed them into advocates for emotional support dogs.

Spirit has provided Butch with the needed "off-switch." Whether she is sensing his elevating heartbeat or detecting the chemicals produced in his brain, she will nudge him with her nose or pull on the leash to divert him from whatever he is hyperfocusing upon.

"When she does that," says Theresa, "she's preventing him from having an anxiety or panic attack."

Here in the US, the matter of dogs for PTSD sufferers was tackled from a different angle by service dog trainer Rick Yount, who established a unique school at a VA hospital in Menlo Park, California. In 2008, Yount recruited 200 vets with PTSD and trained them, in turn, to train service dogs for disabled vets. It was a stroke of genius. Vets who feared revealing they suffered from PTSD were more than willing to participate in a program to help fellow soldiers. The program was well received, turned out properly trained service dogs, and led to a career as accredited service dog trainers for two of the veteran-trainers.

Yount presented his findings at the 2009 Veterans Mental Health Conference and the annual meeting of the International Society for Traumatic Stress Studies. Yount reported that veteran-trainers demonstrated improvements in a variety of areas, including increased patience, impulse control, and emotional regulation and decreased depression, pain perception, and startle response. Their communication skills also improved, as did their sleep behavior, and a positive sense of purpose emerged.

Since then, 3,000 service members and veterans have gone through Yount's voluntary Warrior Canine Connection program at "Healing Quarters" in Brookeville, Maryland. But there still remains the need for science-based evidence that would convince the VA and insurers to provide financial assistance for costly training. To that end, Yount and author Meg Daley Olmert, who wrote *Made for Each Other: The Biology of the Human-Animal Bond*, have partnered on a small government-funded pilot program, the Warrior Canine Connection study, which will involve 40 vets with PTSD.

According to Olmert, the science on oxytocin has been done; she believes that oxytocin is working its magic for vets. "PTSD is a very complex disorder that has neurochemical, behavioral, and sleep-interruption effects. Basically, the veteran is stuck in 'fight-or-flight' mode. The only thing that will turn that off is oxytocin."

Each veteran-trainer in the Warrior Canine Connection pilot will work with the young dogs for two weeks at a time. Before and after each session, the veteran's

levels of neurochemicals, including oxytocin, will be measured. Also gauged will be a range of the psychological symptoms of PTSD. All measures will be rechecked at six months and again a year after the program concludes.

“The genius of this is that the training of the dog is the medicine,” says Olmert. “The veteran with PTSD is willing to participate (as the trainer of the pup) because he’s knows he’s helping a fellow veteran in need. The science is that this kind of training and nurturing of the dog releases oxytocin in the brain and body of the vet with PTSD. It’s a win-win.”

If neurochemicals are the elixir at the bottom of all of the aforementioned therapies, it is the dog’s extraordinary physiology that is at work in the numerous other ways dogs warn us, protect us, diagnose life-threatening health concerns, and even protect the environment. We are talking about the dog’s nose, which seems to detect scent out of thin air—and, in fact, does.

Biologist-author John Bradshaw explains that at some point in the past primitive humans had more acute olfactory abilities than we have today. Over the millennia, the part of the brain devoted to odor detection shrank in order to make room for expanding human vision to include color detection. Canines, on the other hand, evolved into far more advanced scent detectors, a skill they apparently found more useful.

“We have complicated color vision so it’s been a trade-off,” says Bradshaw. “Dogs and humans together are the best of both worlds.”

Tucked away in Alabama is an unusual program that is devoted to exploring and utilizing the dog’s olfactory talents. The Canine Performance Sciences Program at Auburn University’s College of Veterinary Medicine has a mission statement that says it all—“the continuing improvement of animal detection science through research and technology to serve the nation and society.” The program has gained international recognition for its dogs and the tasks they undertake.

“We utilize dogs as a mobile sensory tool in a variety of ways,” says Craig Angle, associate director of Canine Performance Sciences. “Anything you

want to detect, we devise ways to have dogs detect it—explosives, viruses, microscopic fungi growing underground. It’s really amazing what the dogs’ capabilities are.”

And just how far do those capabilities extend? Beginning with the nose itself, science now knows that dogs can detect scents that are in the parts per trillion, although it is suspected it doesn’t stop there—it’s just that the tool to accurately measure anything smaller has yet to be invented. A Labrador retriever’s nose contains as many as 300 million sensory receptors spread across 30 square inches of surface area that is configured in numerous folds. The human nose, by comparison, has about 5 to 6 million receptors. The amount of the canine brain devoted to olfaction is roughly 30 to 40 times that of the human brain.

“A large part of why they detect smells so well has to do with fluid dynamics and how air flows through the dog’s nose,” says Angle. “They are able to separate the air that comes in so that about 12 to 13 percent goes to the olfactory tissue and the rest goes into the lungs.”

Over the years, Auburn has developed its own breeding program to come up with a dog that has not only superior scent detection but is highly motivated to put its nose to work. The breed, which has no real name, is largely from Labrador retriever lines that have shown exceptional detection traits. Pups spend their first year of life, like any other dog, learning to be a good citizen but are also being evaluated for behavioral traits, trainability, and intelligence. “It’s amazing to see,” says Angle. “These dogs don’t want to retrieve or even be petted. They just want to work the air currents and the environment.”

The trained dogs are placed with clients around the world for a variety of scent-detection jobs. While the “bread and butter” of the Auburn program has always been its explosives-trained dogs, more recent uses to which these specialized canine noses are being put have been nothing short of astonishing. In recent years, these dogs have been put to work resolving some thorny environmental issues.

The bumblebees of Scotland, which are under siege by an as-yet-unidentified

threat, found a champion in a rescued springer spaniel. Toby, a former explosives-detection dog, was retrained by the British military to the scent of bumblebee larvae to help researchers at the University of Stirling locate the nests. Because the nests are usually underground or in dense undergrowth, they are difficult for researchers to find. The inspiration for locating bee nests by their odor came from research that showed badgers hunt bee nests by scent.

Perhaps the dog's nose has found its highest calling over the past few decades. Researchers pushing the limits of canine olfactory sleuthing have found that dogs can be trained to detect chemical changes in the human body, as when a diabetic experiences a change in insulin levels or when an epileptic is about to have a seizure. Called "alert" dogs, these canines provide an invaluable service to their owners, who can be far more mobile knowing that their dogs will inform them if their conditions are about to change. One of the most significant findings, however, has been the dog's ability to sniff out cancer.

It was the friendship between two Arkansas men that sparked the idea of seeing whether a dog could detect thyroid cancer. Donald Bodenner, MD, director of the Thyroid Center and chief of endocrine oncology at the University of Arkansas for Medical Sciences (UAMS), and Arny Ferrando, PhD, professor and researcher at UAMS, are both dog lovers. Bodenner mused one day whether dogs trained in explosives detection could be retrained to find thyroid cancer when a lab diagnosis was tricky. That was all Ferrando needed to hear—his own dog, Frankie, was a search-and-rescue dog.

The two began collaborating on a study in which Frankie was imprinted with the chemical signature of metastatic thyroid cancer in the urine and blood of a person who had already been diagnosed with the disease. Frankie was able to detect the cancer in 90 percent of urine samples and 100 percent of blood samples he was presented with. Since scent detection of various cancers had already been proven in previous studies, the men decided to go further. They wanted to find out if the dog could actually help a doctor diagnose thyroid cancer in instances

when the diagnosis was more difficult. The hope was that in those thorny cases, the dog could provide a “second opinion.” In this second study, urine and blood samples were taken from patients at the clinic and were given to Frankie for his opinion. The results were matched up with the final pathology.

“Frankie was able to correctly diagnose the samples 92 percent of the time,” says Ferrando. “The important thing is that when the pathology says it’s benign and the dogs say it’s benign, those people don’t have to have the surgery. The doctor can say let’s look at this in another six months or a year.”

Bodenner, Ferrando, and trainer Stefani Waggoner are now trying to secure the funding for a study that would compare the abilities of “general-source” or shelter dogs against the purpose-bred dogs of the Auburn veterinary school’s scent-detection program. The results may not only produce an economic solution to finding appropriate dogs for scent training; it could mean a second chance for shelter dogs whose prospects would otherwise be slim.

Back at Auburn’s Canine Performance Sciences Program, dogs have been imprinted with the scent of viruses, both human and animal. The dogs have already proven that they can detect a particular bovine virus that can affect large numbers of cattle, although that ability has not yet been put to work in the beef industry. And they have shown that they can differentiate between human viruses in a lab study.

“If there were a virus outbreak in Europe, we could utilize the dogs at the borders as a way of preventing that virus from coming here,” says Craig Angle. “We can’t screen the mass population but we could put a dog at each gate as people exited the planes. The dogs could detect the virus in a breath sample or even a person’s sweat. I haven’t yet found a target the dogs couldn’t detect.”

Critics, who see cancer-sniffing dogs as impractical, say that it is only a matter of time before pharmaceutical companies isolate the metabolic signatures of various cancers and develop an artificial “sniffer.” Ferrando says he’ll still put his money on the dogs. “I can’t believe that science will be able to duplicate

what 150,000 years of evolution have done,” he says. “It’s hubris to think we can recreate the dog’s nose.”

Nor, some would argue, will research make it possible to reproduce the myriad and diverse other ways that dogs, and indeed other pets, help humankind. Robots, perhaps can—and probably are—being developed to see, hear, and fetch for us. But will we get the same surge of oxytocin in our brains when we stroke a robot or gaze into its eyes? And will we want to accompany it on a daily walk to benefit both our hearts and our bodies?

The answers seem obvious. We are drawn first and foremost to the living and breathing animal and less to its utility, just as the old man was drawn back to the present to stroke the head of the greyhound. As countless others have instinctively reached out to touch a dog—or a cat or a horse. For thousands of years, it’s just been that way. 