EXCERPT from Dog Smart: Life-Changing Lessons in Canine Intelligence (Nat Geo, 2024), by Jennifer S. Holland

Chapter One

What Makes a Dog a Dog?

On a tropical beach some years ago, I met what may be the doggiest

dog of all my canine acquaintances. My husband, John, and I got

married at an ecolodge in Costa Rica, and after the little ceremony, our

hosts arranged a special excursion for us—a boat trip to a private beach

with a picnic lunch and a return trip at dusk.

But we weren’t quite alone on our private beach. Three dogs showed

up soon after we arrived and hung around nearby. They were scruffy and

skinny, gritty with dirt and sand. They spent the day nosing around in

some trash up the beach and wrestling with one another and lying in the

sun biting at their various itches. I thought they’d all beg from us, but

two of them kept their distance. The third dog was friendlier than the

others. Pretty quickly he was taking baby carrots from my hand, and

shortly after that he allowed us to pet him. By day’s end, he’d had a relatively

full lunch, a cup of fresh water, and some good back scratches. He

trotted off and checked in with his pals now and then but soon returned

to the hands that were feeding him. Smart pup! We named him for his very unneutered status: Mr. Ball Dangles (apologies).

Two things struck both John and me about this experience. First, it

seemed likely that Mr. Ball Dangles’s behavior was mirroring that of his

ancestors as they crept toward domestication thousands of years ago,

which was a fascinating thing to consider. Second, it was interesting just

to watch the dogs exist, as comfortable doing their thing “in the wild” as

any pet dog would be lolling on the couch. Eating trash may seem a rather

unfortunate way to make a living, but the animals had nothing to compare

it to and appeared unfazed by their lot. The trio mostly got along: Brief

spats were resolved without bloodshed through the masterful modes of

communication that dogs share. And why be surprised by the beach dogs’

comfort in their own skin? Animals exist in all sorts of conditions we

might find unpleasant. And of the estimated one billion dogs on the

planet, some 85 percent are free roamers.

I’ll repeat that, because in my little Western dog-on-my-pillow bubble,

both of those figures shocked me (and maybe they do you, too). By some

estimates, there are a billion dogs on Earth, occupying every continent

except Antarctica (and pups have visited even there). The vast majority

of the world’s dogs—as many as 850 million of them—live on their own,

unleashed, uncollared, unspayed, unneutered, untrained, and without

benefit of kibble deliveries or routine veterinary care. Free roamers are

also known as street dogs and village dogs, and by evolutionary standards,

they’re doing just fine. Better than fine. In fact, the number of free-roaming

Canis familiaris across the globe is many times that of all the other

members of their genus combined—including wolves, coyotes, jackals,

and dingoes. They are clearly doing something right. Something smart.

Smart about us

When I ask cognitive ethologist Marc Bekoff what he thinks is at the heart

of intelligence in animals, he doesn’t hesitate. “Adaptability,” he says.

“Those animals that adapt, win.” Winning for any living thing means

getting along in its niche; that skill requires creativity, problem-solving

abilities, and the flexibility to navigate day-to-day complexities. It means

being able to learn, remember, and adjust as needed. It means being

capable of choosing and then making smart choices based on context—

knowing when to hold back and when to go full force. Adaptability is the

piece at the very center of the survival puzzle for nonhuman animals.

Being flexible is smart because being flexible means making it through.

Especially for animals living among us or even at the edges of environments

shaped and dominated by humans, survival requires a big dose of

cognitive curiosity and behavioral plasticity. We see it in wildlife adapted

to urban and suburban living all the time. Raccoons challenged to breach

tight-fitting trash can lids or squirrels raiding “squirrel-proof ” bird feeders

must use their smarts to win a meal—and the harder we try to outwit

them, the more innovative they become. Dogs, like other animals that

have learned how to benefit from our presence, live particularly creative,

thoughtful, and flexible lives. Intelligent lives.

But for dogs, intelligence also means taking full advantage of an interspecies

relationship that gives them a leg up in the struggle for survival.

Do dogs learn and adapt better than others? Not necessarily. But they do

it differently, because of what they are and how they came to be, and

much of what they think and do is shaped by this extraordinary history—

by their willingness to associate more closely with humans than do

any of their kin.

Consider the gaze. What is it about a dog’s eyes that makes them seem

to say so much? Partly it’s about muscle movement: Dogs have the musculature

to raise their inner eyebrows and create that puppy dog face. You

know the one: It makes you forget you were about to yell at your dog for

grabbing the whole roast chicken off the counter. It makes you want to

scoop him up and cuddle him and rub his chicken-filled belly (poor baby

is so full!). That’s no accident. Pups with the tiny mobile muscles that

power the “adore me” face likely flourished better than their less expressive

kin, because humans with lots of resources to share responded to That

Look. (Let’s call it intelligent anatomy!) We selected for that face by loving it so much. Wolves can’t produce it. Canis familiaris is the master of it.

And though scientists once dismissed dogs’ facial expressions as mere

“involuntary displays,” more open-minded researchers are now finding

evidence for intent—and intelligence—behind those signals.

When a dog and a human gaze into each other’s eyes, both experience

a bump in endorphins, dopamine, and prolactin—all feel-good brain

chemicals—along with oxytocin, the so-called “love hormone,” according

to influential research out of Japan. Scientists call this phenomenon

a “gaze-mediated hormonal feedback loop”—the very same one that

operates between human mothers and their infants. Duke University

canine cognition researchers write that over the course of their evolutionary

journey and ours, dogs appear to have “hijacked the human

bonding pathway,” adopting behaviors like that puppy dog gaze that

trigger our nurturing instincts. And because we are looking back at them,

the effect is mutual, and mutually reinforcing. Dog feels good. Human

feels good. Give a dog extra oxytocin to sniff, and she’ll gaze at

you all the more.

This trick didn’t work on wolves tested in captivity (they rarely make

eye contact with their human handlers anyway). A study published in the

journal Science found that when human mothers looked at photos of their

children and photos of their dogs, the same brain areas related to emotion,

affiliation, and reward were activated. “Aspects of our biology appear to

be tuned into dogs and children in remarkably similar ways,” the study

authors write.

We know that dogs know when we’re paying attention to them and

when we’re not. Research has shown that a dog told to leave food alone

will snatch it more readily when the tester has her eyes closed or her back

turned, or when she’s distracted. Dogs also know the scents of human

emotional states. A study of golden retrievers and Labradors tested how

armpit-sweat odors generated by happy or fearful male strangers affected

the animals’ interactions with those men and with their owners. Pups

exposed to fear smells showed more signs of stress and had higher heart

rates than those who sniffed happy or neutral smells. The fear sniffers

were less interested in novelty, less confident, and needier, seeking more

contact with their owners. They were less apt to socialize with the strangers

than were the happy-sweat sniffers.

Moreover, our emotions are specifically represented in dogs’ brains:

Functional MRI studies show that viewing a “happy” human face sets off

distinctive brain activity in our pups, mainly in the temporal cortex, where

complex visual information is processed. Stroking your dog can lower

stress hormones like cortisol and insulin, and even slow your heart rate

and lower your blood pressure. It’s another manifestation of the mutual

love fest between us and our very good boys and girls. How incredible is

that? Over generations of coevolutionary selection both inadvertent and

purposeful, we have forged a bond with dogs so powerful that our mutual

feelings alter our physiologies.

So it seems that dogs have evolved to know us inside and out. And the

urge to befriend us starts remarkably early. In what must have been the

most fun and chaotic dog study ever, Evan MacLean and Emily Bray and

their colleagues at the Arizona Canine Cognition Center borrowed 375

golden retriever puppies from Canine Companions, a nonprofit that

breeds dogs to assist people with physical disabilities and post-traumatic

stress disorder (PTSD), to try to tease out whether there is a genetic basis

for the dog-human bond. MacLean later tells Science: “Working with

puppies is a lot like having young kids. It’s a balance between extraordinarily

cute and rewarding moments, and frustration that leaves you at

the brink of insanity. There is nothing that will not be chewed or peed

on, including all of your research equipment, your clothes, and your

body.” The team’s goal? To determine whether Canis familiaris come with

“interspecies social intelligence” encoded in their DNA, or if domestic

dogs are born blank slates? They considered whether the puppies, barely

eight weeks old and having had limited human interaction, would look

at human faces, follow human gestures, and approach people for help

and attention. The animals did all these things. They understood

human-initiated social signals without having prior experience “reading”

people, suggesting dog pups are biologically primed to socialize with us.

And wherever they live, dogs learn who their friends are. Pups who

belong to no one in particular are simply part of the fabric of the community

in much of the world; adaptive intelligence is clearly their superpower.

Some adopt a person or family and become a sort of at-a-distance

pet, getting fed regularly as a result of their social savvy. In What Is a Dog?

longtime canine researchers Raymond and Lorna Coppinger write that

the village dog is “a natural species … with a self-tailored lifestyle that

suits it just about perfectly.” It is not a “stray”—it has its own identity.

That independent identity didn’t stop John and me from fantasizing about

scooping up Mr. Ball Dangles from that Costa Rican beach and whisking

him home with us to give him a new life. But some ethologists would

take issue with such good intentions, arguing that village dogs are not

lost souls needing to be “rescued.” Trying to shoehorn them into restricted

lives with owners and leashes and fenced-in yards often backfires when

the dogs don’t take to the life that we think is best for them.

People often argue over whether to rid the streets of these wandering

pups or leave them be. I’m very sensitive to the fact that free-roaming

dogs may bite and spread diseases—rabies being the most devastating—

and may harass livestock and threaten native species. It would be naive

to suggest that the impacts of unhomed dogs are entirely benign, especially

where they are present in large numbers. Ask experts like conservation

biologist Abi Vanak whether these roaming pups are a concern, and he’ll

describe them as an invasive species across India—pointing to their role

as predators, competitors, aggressors, and pathogen reservoirs among

wildlife—and stress their very real threat to people.

Also, let’s be real: Life isn’t always a walk in the dog park for these

animals. Friends of mine, Pia Sethi and Nadir Khan, who live in Gurgaon,

near Delhi, India, have spent more than two decades catching

street dogs to provide needed care, to vaccinate them against rabies, and

to neuter or spay them. They’ve witnessed high mortality rates among

the dogs they call “Indies,” whose lives are cut short by accidents, diseases,

parasite infestations, exposure, and starvation. It sure puts a darker

spin on the romantic idea of the animals’ “freedom.” No matter how

intelligent the dogs are at navigating the streets—and they are very

intelligent at it—in Pia and Nadir’s experience, “they are rarely thriving.”

The average life span of free roamers, if you include puppies, is only

around three years. (Adults do a bit better.) That’s typical for small- to

midsize carnivores in the wild, but it’s a much shorter life than most

well-homed pet dogs enjoy.

Still, street dogs are dogs, uninterrupted. Instead of learning human

vocabulary or how to shake a person’s hand, they put their intelligence

and creativity toward what’s relevant to them: day-to-day survival. “Street

dogs know the lay of the land and map the availability of food,” Sethi

says. “They know the spots where people throw food and garbage, and

they know the houses where people might feed them scraps.” One especially

intelligent Indie named Pipli, she says, heads out every night and

comes back with a bunch of flatbreads, knowing exactly the time and

place to collect her meal. Remarkably, she shares her spoils with an unrelated

paralyzed dog, another Indie, even regurgitating food for him.

Though the village- and city-born dogs are skittish and slow to trust, Sethi

isn’t surprised that their tendency toward humans is in their DNA. “Even

the wariest are human commensals in urban areas,” she says. Dogs living

in a pack will quickly shift their alliances to a person if it benefits them.

She notes that during Diwali, the festival of lights, when firecrackers light

up the city, “we are often tracked down by our Indies who spend the night

in the safety of our home. The next morning, they are back on the streets.”

Adaptable and open to an interspecies relationship that has proven to be

beneficial to them, contemporary street dogs offer us a glimpse of their

ancestors’ smarts as well.

Studies of these street dogs have suggested key aspects of the domestication

story that led to the remarkable human-canine relationship. In

What Is a Dog? the Coppingers pulled together research done by various groups over the years on populations of free-roaming dogs in Mexico, Italy, and elsewhere around the world.

Those study subjects were mostly scavengers on hum an refuse heaps. The researchers noticed that dump-diving dog populations included many chubby puppies and a solid cohort

of adults, but very few juvenile dogs. Most of the weaned pups simply

didn’t make it on their own; they weren’t mature enough at two to three

months old, when their mothers stopped providing care, to compete

successfully for food, water, and shade. And yet some individuals were

clearly surviving to adulthood, because adult dogs were plentiful.

“How does the pup make the transition from a fat neonate to a reproductive

adult?” the researchers wondered. What they found seems to offer

a key insight into the process of domestication: As soon as the mothers

stopped feeding their puppies, the youngsters’ best shot at surviving was

to solicit care from some receptive person, they explained, adding that it

helped if the human thought the pup was cute. It follows that establishing

a friendly relationship with the people who were already generating food

resources may well have been critical for juveniles among the earliest dogs,

too. That would mean that the social intelligence to understand the

behavior of members of another species—and ultimately the ability to

trust and elicit help from that species—was foundational to the evolution

of domestic dogs, as it remains essential to the survival of their modern

descendants.

Not that dogs are unique in exploiting anthropogenic opportunities.

As early humans altered all corners of Earth we occupy, we inadvertently

created new niches that begged to be filled. And other animals happily

obliged: Everything from cats to rats to houseflies to pigeons to bedbugs

adapted to fill the new spaces—not because humans consciously decided

they should, but because evolution made it so. That is, natural selection

acted on natural variation, and the creatures that adapted best to

human-dominated environments settled in for the long haul. That it’s

such a well-worn evolutionary path supports the idea that dogs took a

similar one. (Evolution is efficient that way.)

Deliberate human activity has certainly modified Canis familiaris into

hundreds of breeds displaying an extraordinary range of sizes, looks, and

behavioral tendencies. But my sense is the earliest dog was not so much

a wolf turned woof by human direction as it was a product of the natural

order of things, at least at first. And some of the group’s earliest members

almost certainly took the first and biggest steps toward domestication

themselves. As Kathryn Lord, an evolutionary biologist at the University

of Massachusetts at Amherst, puts it, “Dogs did not predate us, but we

didn’t need to have any direct control or contact with them for

them to evolve.”

Either way, I have a new respect for how dogs have molded themselves

to fit into the niches available to them all over the world. Isn’t that how

nature defines the best and the brightest—the ones who demonstrate the

capacity to “make it work”? Nicely done, really.