00:04

Whether we want to or not, humans spend a great deal of time considering death. And it's possible we've been doing so since shortly after homo sapiens first began roaming the landscape. After all, the first intentional human burial is thought to have occurred around 100,000 years ago. What might those early people have been thinking as they took the time to dig into the earth, deposit the body and carefully cover it up again? Were they trying to protect it from scavengers or stymie the spread of disease? Were they trying to honor the deceased? Or did they just not want to have to look at a dead body?

00:45

Without the advent of a time machine, we may never know for sure what those early people were thinking, but one thing we do know is that humans are far from alone in our attention towards the dead. Like people, some animals, including the corvids, the family of birds that houses the crows, ravens, magpies and jays, also seem to pay special attention to their dead. In fact, the rituals of corvids may have acted as the inspiration for our own. After all, it was the raven that God sent down to teach Cain how to bury his slain brother Abel. But despite this clear recognition by early people that other animals attend to their dead, it's only fairly recently that science has really turned its attention towards this phenomenon. In fact, a formal name for this field -- comparative thanatology -- wasn't first introduced until 2016. In this growing field, we are beginning to appreciate what a rich place the natural world is with respect to how other animals interact with their dead, and it's in this growing body of knowledge that that time machine to our early ancestors might be possible.

01:54

So what are we learning in this growing field? Well, right now we can split our understanding into two main groups. In the first, we have animals that display stereotyped, predictable behaviors towards their dead, and for whom much of what we understand about them comes from experimental studies. This group includes things like the social insects -- bees and ants and termites -- and for all of these animals, colony hygiene is of critical importance, and so as a result these animals display rigorous undertaking behaviors in response to corpses. For example, they may physically remove carcasses from the colony. They may consume them. They may even construct tombs. We see similar hygiene-driven responses in some colony-living mammals. Rats, for example, will reliably bury cage-mates that have been dead for 48 hours.

02:47

In our other group, we have animals that display more variable, perhaps more charismatic behaviors, and for whom much of what we understand about them comes from anecdotes by scientists or other observers. This is the animals whose death behaviors I suspect might be more familiar to folks. It includes organisms like elephants, which are well-known for their attendance to their dead, even in popular culture. In fact, they're even known to be attracted to the bones of their deceased. It also includes animals like primates, which display a wide variety of behaviors around their dead, from grooming them to prolonged attention towards them, guarding them, even the transportation of dead infants. And that's actually a behavior we've seen in a number of animals, like the dolphins for example.

03:38

You may remember the story of Tahlequah, the orca in the resident J pod in the Puget Sound, who during the summer of 2018 carried her dead calf for an unprecedented 17 days. Now, a story like that is both heartbreaking and fascinating, but it offers far more questions than it does answers. For example, why did Tahlequah carry her calf for such a long period of time? Was she just that stricken with grief? Was she more confused by her unresponsive infant? Or is this behavior just less rare in orcas than we currently understand it to be?

04:17

But for a variety of reasons, it's difficult to do the kinds of experimental studies in an animal like an orca, or many of these other large mammals, that might elucidate those kinds of questions. So instead, science is turning to an animal whose behaviors around death we've been thinking about since BCE: the crows.

04:37

Like insects and primates, crows also seem to pay special attention to their dead. Typically, this manifests as the discovering bird alarm calling, like you can see in this photo, followed by the recruitment of other birds to the area to form what we call a mob. But it can be a little different than that too. For example, I've had people share with me seeing prolonged silent vigils by crows in response to deceased or dying crows. I've even had people tell me of witnessing crows place objects like sticks and candy wrappers on or near the bodies of dead crows. And this mix of observations puts these birds in a really important place in our scheme, because it suggests on the

one hand they might be like the insects, displaying these very predictable behaviors, but on the other hand we have this handful of observations that are more difficult to explain and feel a bit more like what we see in some of the mammals like primates and elephants. And like those animals, crows share an extremely large relative brain size and the kinds of dynamic social lives that might invite more complexity in how they respond to their dead.

05:45

So I wanted to try to understand what was going on when crows encounter a dead crow, and what this might teach us about the role of death in their world, and possibly the worlds of other animals as well, even those early versions of ourselves.

06:01

There's a number of different ways that we could explain why crows might be attracted to their dead. For example, maybe it's a social opportunity, a way for them to explore why that individual died, who they were and what impact this is going to have on the neighborhood moving forward. Maybe it's an expression of grief, like our own contemporary funerals. Or maybe it's a way that they learn about danger in their environment. While all of those explanations are worth pursuing, and certainly not mutually exclusive, they're not all testable scientific questions. But that idea that dead crows might act as cues of danger, that is. So as a graduate student, I wanted to explore that question, particularly with respect to two ideas. The first was whether they might be able to learn new predators, specifically people, based on their association with dead crows. And the second was if they might learn places associated with where they find crow bodies.

07:06

So to do this, I would go out into some unsuspecting Seattle neighborhood and I would start to feed a breeding pair of crows over the course of three days, and this provided a baseline for how quickly the crows would come down to a food pile, which, as you'll see in a minute, was really important. Then, on the fourth day, we would have our funeral.

07:27

This is Linda. Linda is one of seven masks whose job was to stand there for 30 minutes with her little hors d'oeuvre plate of dead crow while I documented what happened. Most importantly, though, her job was to come back after a week, now without the dead crow, so that we could see if the birds would treat her just like any old pedestrian, or if, instead, they would exhibit behaviors like alarm calling or dive bombing that would indicate that they perceived her as a predator. Now, given that we already knew crows were capable of learning and recognizing human faces, it may come as no surprise that the majority of crows in our study did treat the masks that they saw handling dead crows as threats when they saw them over the course of the next six weeks.

08:13

Now, if you're sitting there thinking, alright, give me a break, look at that face, it is terrifying, anyone would treat that as a threat if they saw it walking down the street, know that you are not alone. As it turns out, a lot of the folks whose houses we did these experiments in front of felt the same way, but we'll save that for another time. So you may be comforted to know that we did control tests to make sure that crows don't share our preconceived bias against masks that look a bit like the female version of Hannibal Lecter.

08:46

Now, in addition to finding that crows were able to make associations with people based on their handling of dead crows, we also found that in the days following these funeral events, as we continued to feed them, that their willingness to come down to the food pile significantly diminished, and we didn't see that same kind of decline in our control groups. So that suggests that, yes, crows can make associations with particular places where they've seen dead crows. So together, what that tells us is that while we certainly shouldn't discount those other explanations, we can feel pretty confident in saying that for crows, attention to their dead might be a really important way that these animals learn about danger.

09:28

And that's a nice, tidy little narrative on which to hang our hats. But in life and death, things are rarely so neat, and I really came face to face with that in a follow-up experiment, where we were looking at how crows respond to dead crows in the absence of any kind of predator. And suffice it to say, we found that in these cases, the wakes can get a little more weird.

09:54

So this is what that experimental setup looks like. You can see our stuffed dead crow alone on the sidewalk, and it's been placed on the territory of a pair.

10:03

(Squawk)

10:04

That is the alarm call by one of those territorial birds, and it's coming into frame. Pretty soon, its mate is going to join it. And so far, this is all very usual. This is what crows do. OK, right now it's getting a little less usual. Not everyone here might be familiar with what bird sex looks like, so if you are not, this is what it looks like. You're basically seeing a confluence of three behaviors: alarm, as indicated by the alarm calling; aggression, as indicated by the very forceful pecking by both one of the copulatory birds and one of the excited bystanders; and sexual arousal.

10:54

Clearly, this is startling, and interesting to think about and talk about. But if our goal is to understand the big picture of how animals interact with their dead, then the most important question we should ask is, is this representative? Is this something that's happening consistently? And that's why being able to do systematic studies with crows is so valuable, because after conducting hundreds of these trials, where I was placing these dead crows out on the sidewalks on the territories of hundreds of different pairs, what we found was that, no, it's not. Contact of any kind, whether it was sexual, aggressive or even just exploratory, only occurred 30 percent of the time.

11:38

So given that this wasn't representative, this was the minority, we may be tempted to just dismiss it as irrelevant, odd, creepy, weird crow behavior. But what may surprise you is that behaviors like aggression or even sexual arousal aren't all that rare, and certainly aren't constrained to just crows. Because while the popular narrative when it comes to animal death behaviors tends to focus on affiliative behaviors like grooming or guarding, that is far from the complete list of what even our closest relatives do around their dead. In fact, we've documented behaviors like biting, beating and even sex itself in a wide variety of animals, including many primates and dolphins.

12:27

So where does this leave us in our understanding of animals and their death rituals? Well, for crows, it suggests that, like insects, they may have a strong adaptive driver in their interest in their dead. In this case, it might be danger learning, and that might have acted as the inspiration for our own rituals as well. But when we look more closely, we see that there's no one simple narrative that can explain the vast array of behaviors we see in crows and many other animals. And that suggests that we are still far from completing that time machine. But it's going to be a really fascinating ride.

13:08

Thank you.

13:10

(Applause)