

Birds of a Feather: A Study of Cohabitation between Urban Humans and Crows



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I. « Liminal species »? What is that again?

When most people nowadays hear the term ‘liminal’, they probably think of the now-popular object of discussion, liminal spaces. Never-ending hotel hallways, nondescript concrete rooms, twilit streets with uniform trees; there is the mark of something eerie, imperceptible, the feeling of being caught-in-between. This is etymologically proper, as liminal derives from the latin limen, meaning ‘threshold’. Of interest to me, a zoosemiotician, is not these mysterious, cryptic spaces, but species of the same character. You’ve probably never seen them.

You probably have no idea what drives a respectable researcher to go out late at night, shuffling through the witching hours, roaming city parks tirelessly through freezing temperatures or sweltering heat waves. Yet, throughout the project that inspired the writing of this book, this is precisely what I found myself doing.



Semioticians are very respectable researchers, but zoosemioticians can be a bit odd at first glance.

Think of nature. Think of its biodiversity. Think of all the living organisms, their teeming interactions, their nuances and symbioses; do you picture a human city? Likely not! If I had to guess, a concrete jungle would be the last biome on your mind. The fact is, the idea we have of ‘nature’ today typically still excludes human environments. This is because these environments— cities, subways, houses and shopping centers, to name a few—are thought of as by humans, for humans, and, essentially, for humans alone. By following this logic, it is also likely that you do not consider the animal species that inhabit these same cities to be proud representatives of biodiversity. Rats, pigeons, cockroaches and crows may seem closer to creatures denatured by the urban environment than to animals simply evolving within their ecosystem, like any other species. Saving them, understanding them, or protecting them is not a possibility often considered. It is not the purpose of my book to convince you that we must do these things per se. It is, however, my intent to tantalize and respond to a curiosity; a curiosity that tickles us who hear the faint skittering from the streets at night, or see ourselves in the watchful eye of a crow.

These are the liminal species. It’s time I introduce you to each other.

A. The semiotician and the crow

It was not a nice day in Tartu, the scientific and university capital of Estonia, but it was at least an interesting day. The sun was already going down behind the horizon even though it was only 3 p.m., the thermometer showed -27°C and the wind was lowering the temperature even further. There were easily 30 centimetres of snow everywhere, the Emajõgi River was frozen over, and no one in their right mind would venture outside without a good reason.

It is possible that the researchers are not people in their right mind. At that time, while surveying the banks of the river, my attention, however, was on a much more pressing matter: my camera's reliability. If the crystalline air froze my camera, this trip would be for nothing. Dedicated researchers, the passionate few who leave behind the comfort of their hibernation armchairs, must be prepared to find their specimens precisely where they are. The world of these critters does not disappear when it becomes covered in snow; and so, as one thing leads to another, I found myself tucking my camera beneath my coat and traversing the icy banks of the Emajõgi. These subjects, these evasive beings, these easily-missed worlds, live among humans. Among our streets, among our rivers... and, yes, among our Estonian winters.



A very nice specimen of *Coloeus monedula*, called “jackdaw” in English and “hakk” in Estonian, during the end of November at Tartu, Estonia.

Finally, I found them. A small *Coloeus monedula*, or ‘jackdaw’, was confronting a larger and bigger *Corvus cornix* (“hooded crow”)—probably over the half-frozen contents of a plastic package that one of them had picked from a garbage can. With agility, the little Coloeus, known as “hakk” to Estonians, plucked the piece of food from under his opponent’s beak. In the exciting moment of his triumph, however, the jackdaw took to flight with an unstable push, and, unsure of the airs, crashed straight into my leg! The morsel drops between my feet. There he is; coming to his senses, hopping a respectable distance away. The fruits of his victory are just beneath me, and, although I might tower over him as once did the cyclops over Odysseus, this proud “hakk did not abandon his precious loot. Slowly, slowly, with not a snippet of sudden movements, I start to back up. It advances at my pace, step by watchful step, until it is finally able to snatch its coveted nugget and fly away.

Properly speaking, the event only lasted a few seconds. Yet, as those who have had such moments with animals will know, it serves to reveal the life of corvids in the city; these noisy, intelligent, bizarre species that have chosen to live alongside us, despite having never asked for our permission or opinion.

Few people carry crows and jackdaws particularly in their hearts. They have not the grace of the heron, the poetry of the nightingale, nor even the twittering humility of the sparrow. These are the species that we consider at least with indifference, and that we hunt without qualms when they start to scratch a little too much where we don't like it. They carry a strong symbolic charge, often negative, from which we do not really know where it comes from, and it seems strange to say the least to want to devote an entire book to them. On the contrary, I think that there is a lot to learn from our encounters with them, even from the most fortuitous encounters. It is true that, when one works in zoosemiotics, one quickly takes a liking to particularly intelligent, social, inventive or adaptable species that our fellow citizens consider unlovable (rats, crows, ants, octopuses, termites and many more attractive ones which are not the subject of this book).

Crows, pigeons, rats, mice, cockroaches and countless others are not on the exterior of the human world; they are truly among it, and have been for as long as there have been 'human' worlds being built. We have not domesticated them. We haven't had to! These animals are determined to live by our side, wild, frightening and familiar. And, what is more, they have a name: the liminal species. Fitting neither in the biological categories of domestic nor wild, these eternal undesirable companions of humans, what do we know of these shadowed companions of ours, always sitting at the border?



In Estonia, like in most parts of Europe, corvids, like this specimen of *Corvus cornix*, are not migrating in winter.

B. Who are they?

If domestic animals (or "domesticated" or sometimes even "tamed"), whether cattle, working animals or pets, are the subject of in-depth studies and, for the most part, attentive care (there would be a lot to say about on this point concerning the living conditions of cattle, but this is not the subject of this work); if wild animals generate fear, curiosity and fascination in us, the same is not true of liminal species.

They are, all together, too common to really scare or fascinate us. They do too much to bother us to pique our curiosity or trigger our empathy; too vulgar to benefit from systematic care, dedicated protection or awareness campaigns. Moreover, liminal species are little studied, rarely appreciated, often misunderstood and generally poorly known. Some people might only ever give these beings awareness as they are dialling the exterminator.

However, they too are companions of humans, sometimes for thousands of years. Very different companions compared to our pets and domestic species, certainly, but long-term companions all the same. Naturally, liminal species will vary with their environment. The species to be found in this category will differ according to the regions, climates, infrastructures and human populations they encounter, not to mention basic geospatial distributions. Just as European forests, African savannahs and the Oceanian islands do not present the same wildlife, Tartu, Douala and Nouméa do not house the same liminal species.

It is my hope that, by introducing the curious issues surrounding liminal species, our indulged curiosity in turn will bring deserved attention, research, and tolerance for the overlooked species in the liminal borders. I do not intend to cover all dimensions and difficulties around our overlapping worlds—there is simply not time, space, nor living researcher enough as of now. Yet, with the commencement of a little awareness, a little feeling for our skittery commonplace cohabitants, I see the beginnings of a better life in common.

These species could be classified mainly into four categories of liminals, each having its emblematic representatives:

- 1- The invisible liminals: These are species that are very present in our cities but whose way of life makes them invisible to most inhabitants, such as certain species of molluscs living exclusively in underground passages and sewers (the catacombs of Paris are thus an ecosystem on their own, and the biodiversity of snails there is impressive for anyone who takes the trouble to take an interest in them). Most of our fellow citizens are unaware of their existence, despite the media coverage of some, such as the crickets of the Paris metro (endemic to lines 3 and 9), which even have the right to their own protection league, or the mosquitoes of the London (less popular, for

obvious reasons). Most are invertebrates, but colonies of bats, usually pipistrelle, found mostly in old buildings and churches, can also be considered part of it.



Pipistrellus pipistrellus pipistrellus (I am not the one deciding animals' names...) is the most common species of bat in Europe. It is a protected species

- 2- The ultra visible liminals: These are species that do not hide to live in broad daylight by our side, towards which we experience not very intense emotions but generally less negative than towards the other categories, ranging from the simply annoyed embarrassment (this is generally the case with pigeons) to a certain form of benevolence (this case is often observed with smaller birds: sparrows, tits, blackbirds). This category includes almost only birds (which have the particularity of being able to be seen clearly by humans while remaining out of their reach), a notable exception being made by small mammals, usually living in peripheric areas, but sometimes entering the city, especially green areas: rabbits, foxes, beavers, minkes etc. But they are more occasional visitors than permanent neighbours.



Corvids, like this *Corvus corone*, are present in most cities in Europe.

- 3- The swarming liminals: These are species that trigger an almost visceral rejection and a strong feeling of repulsion. If it is possible for us to tolerate the presence of some, because we have a rational awareness of their usefulness (as in the case of earthworms), the first reflex against them is, at best avoidance, at worst destruction,

some even being seen as particularly harmful (such as aphids in gardens and vegetable patches, ants in apartments, moths in textiles or food, or termites in the wooden structures of homes). In the vast majority of cases, these are insects, and cockroaches are undoubtedly the strongest urban example and for which the reaction is the most violent.



Insects are not usually favourably seen, but some, like this ladybug, benefit from a very good reputation

- 4- The intermediate liminals: Both hidden most of the time and regularly visible, too big to be swarming like insects but all the same tending to generate an almost instinctive feeling of rejection, this is the category to which I dedicate my previous book. Twice liminal, they border both our spaces and our definitions and it is the category that concentrates the most fantasies, representations, narrations and, also, real issues. The main representatives of this category, often confused, sometimes even undifferentiated, are mice and rats.



In Europe, in cities, *Rattus norvegicus* is the most commonly encountered species (contrary to rural areas, where mostly *Rattus rattus* is living). Its reputation is generally a bad one, even if it is not necessarily deserved (but that is another story, in another study).

From these categories, I have deliberately omitted species whose liminal status may be debated. Species that are active objects of concern, such as parasitic bedbugs and lice, have no

place in this book, since they are not coexistent with us, but exist at our expense. I have also left out species that live non-exclusively or non-permanently in human environments to the degree that no serious modification of behaviour has been observed, such as peregrine and kestrel falcons or certain urban river fish. Moreover, species that are generally domesticated but can be found wandering in cities, such as “feral” cats, have also been excluded from this introduction.

C. Must we *really* live together?

This cohabitation of the human and its liminals (or perhaps it is the liminals and their humans) was not always and is not always an easy and peaceful journey, as I briefly mentioned. And often, when people learn that I study these species and our cohabitation with them, the question is posed to me: Why, anyway, should we live together?

In this book, I would like to approach this question from different angles, in order to provide an answer that I hope will be satisfactory and relatively complete, even for people who would have no prior knowledge of the subject and would only discover it over time. of these pages.

In our first chapter, “What you see is what you get”, we are going to return to this initial question, and approach it with several different angles. Since I’m often asked why we should want to live with the liminal species, I would ask why we wouldn’t! They’re there. They have been for a long time. What reasons exist that would push us away from our neighbours? The perspectives that we have inherited push us to run away from them, or else drive them away from us. How much of this knowledge we possess is well-founded, truly established? How much, and to what extent, have we been subject to beliefs and superstitions that are taken for knowledge? New research can inform us greatly, here.

As I said above, these species are not well known, including by scientists, often for the good and simple reason that they do not interest us, we do not want to have to do anything with them and we do not want to know anything about them. The less we know, the easier.

Conversely, we can come to believe we know and understand these species after having collected only fragmented, situational data, difficult to analyse in the living context. This leaves space for beliefs to fill in the gaps. But this attitude is not scientifically satisfactory, and it seems important to me to go back to the root, to what we believe we know about liminal species.

We will see that those beliefs, as long as we take the time to dissect them with an attentive eye, are very often erroneous, paradoxical and that some even contradict each other. This does not mean that the people who adhere to them are stupid or illogical, because these beliefs do not come from nowhere: they have a history, which will have to be developed later.

This chapter will thus be an opportunity to present, with supporting study, the paradoxical perception that we have of the liminals, and to submit this perception, or rather these perceptions, to the test of facts, studies, experiments and the story.

The second chapter, “It’s been a long journey together”, will cover in detail an aspect of the liminal species relationship that is as disturbing as it is predictable: we have never lived without them, and we probably never will. This will remain the case against all wills to sanitize or humanize, no matter the strength. Even if we did “succeed” in this project, there are cues aplenty that demonstrate it to be a characteristically bad idea.

It would seem that there are indeed answers to the why of our life with them. It is here that this somewhat traumatic story will be developed, which is very often at the origin of our paradoxical perceptions. If it is a good thing to contradict a false idea, it is important to understand how it was built, what it is based on and what it calls for, in order to be able to deconstruct it and better reconstruct it.

We will, in our explorations, find that the species with which we live cannot frighten or offend us all on their beastly own. They travel, roost, flap and squeak with a rich symbolic value, speaking directly to us with our individual and collective unconscious. Sight of them, awareness of their presence, thus generate dramatized reactions, difficult to overcome without an understanding of their symbolic biases; which, themselves, are difficult to understand!



During nesting season, some specimens of corvids, like this *Corvus frugilegus*, can become aggressive if humans are passing by too close to their nest, or if a chick falls on the ground. But these behaviours are rare.

Fortunately, research, in the diversity of its fields and specialities, regularly brings to light new knowledge about those who live alongside us without wanting to. And our cohabitation, certainly forced, can become much more tolerable in the light of these new data, until, perhaps, becoming bearable or even appreciable. At least, I will try to convince you of it.

Before offering a few words of conclusion, I also wanted to give the floor, in this book, to humans directly concerned by cohabitation with liminal animals and the problems that they pose. All are, by their profession, directly concerned by these species, their presence, their symbolic and emotional charge with other humans. My third chapter, 'The crows' handymen', gives the floor to those humans that work directly with liminal animals. Once *why* we ought to live together is established, we must then ask *how*; and these are the experts. How can we think about it? Invent it? How- by which routes- may we make an urban area a common ground, and not a combat zone?

II. What you see is what you get

What do we understand of what we do not see? What do we perceive, moreover, of what we do not want especially to see? Often barely seen or glimpsed, liminal species are very present in our imagination, and it is not always easy to distinguish between what we believe we know, what we feel about them, and what the reality is.

The hypotheses to be proposed and explained in this chapter are the logical consequences of the results obtained during studies spanning several months, themselves extensions of previous studies I conducted in Paris on the worlds of rats and mice. The most relevant elements of this work will, of course, be presented so that the link between the data and the hypotheses are as clear as possible.

The launch of this study follows directly on from a previous study in Paris, this time involving rats and mice. And to be completely honest, I probably wouldn't have decided to study them together and even comparatively if the preliminary results hadn't shown that only two-thirds of the respondents were sure to tell the difference between the two species. When it came time to study crows, I chose to use the same method, for the same reason.

This should not necessarily surprise us, despite the fairly obvious differences in morphology between the different species of corvids: we must not forget that, under normal conditions of cohabitation, the different species are very often only seen very furtively or hidden behind the branches of trees, passing in front of the window or above the head, flying away as soon as passers-by are too close.

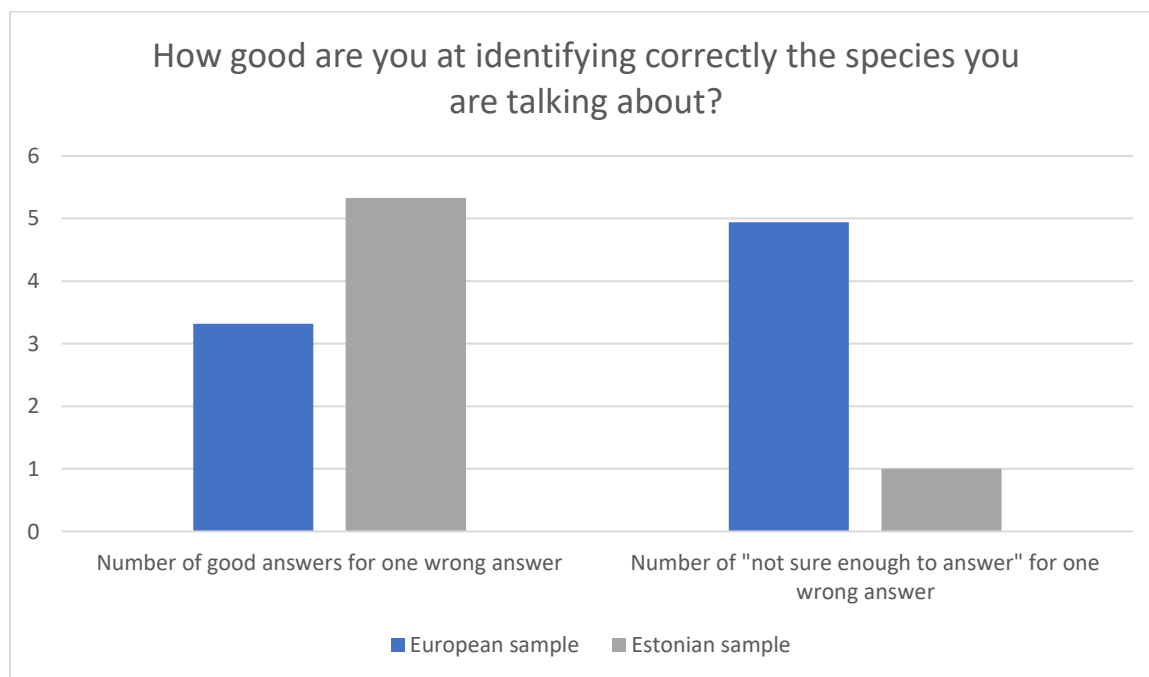


Figure 1 - Metacognition test: how are people good at knowing when they are (or not) knowing something

For a better overview, as well as for practical reasons (Estonian is clearly not the most spoken language in the world, and finding a satisfying sample is not an easy task), two samples were tested: one with Estonian participants and an English-speaking European panel. In the test here represented (Figure 1), participants from European and Estonian samples were asked to correctly identify different species of corvid. If they felt unsure, they could opt-out of

answering. Although much more confident than the international crowd, the Estonian nationals scored with lower accuracy, suggesting an overconfidence that is reflected in their low number of “not sure enough” choices.

This introduced a problem to us from the get-go: unreliable metacognition. Until we knew how well our interviewees knew what they knew, until our interviewees could reliably represent the degree of certainty in their responses, we could not take their testimonies as reliable data. As a reminder, metacognition is knowing that we know what we know, as well as being able to assess to what degree of certainty we know that we know what we know. For instance, I can tell you with perfect certainty that the capital of Colombia is Bogota. I can, with some certainty, place Colombia on a map. With even less certainty can I tell you where Bogota is within Colombia, and with confidence I can tell you I have absolutely no certainty how many people live in Colombia, not even less regarding how many live in Bogota.

Clearly, among the respondents who are sure of their ability to distinguish between the two species, we do not know how many overestimate their ability, at least until they have been tested on this aspect.

A. I want to believe

For ultravisible species like the crow, which avoid us to a greater degree than seagulls pigeons or sparrows, we have a precise idea of what they are. More precisely, we believe we have a precise idea of what they are. When I started to interview my participants, the behavioural traits they attributed to crows and jackdaws were immediately revealing. Something odd was ongoing.

Since complaints about crows were existing already in Tartu (and we will come to that point in a moment), I made sense to ask what were the professions, the areas the aspects of urban life that were impacted by their presence. And not everyone seems to agree.

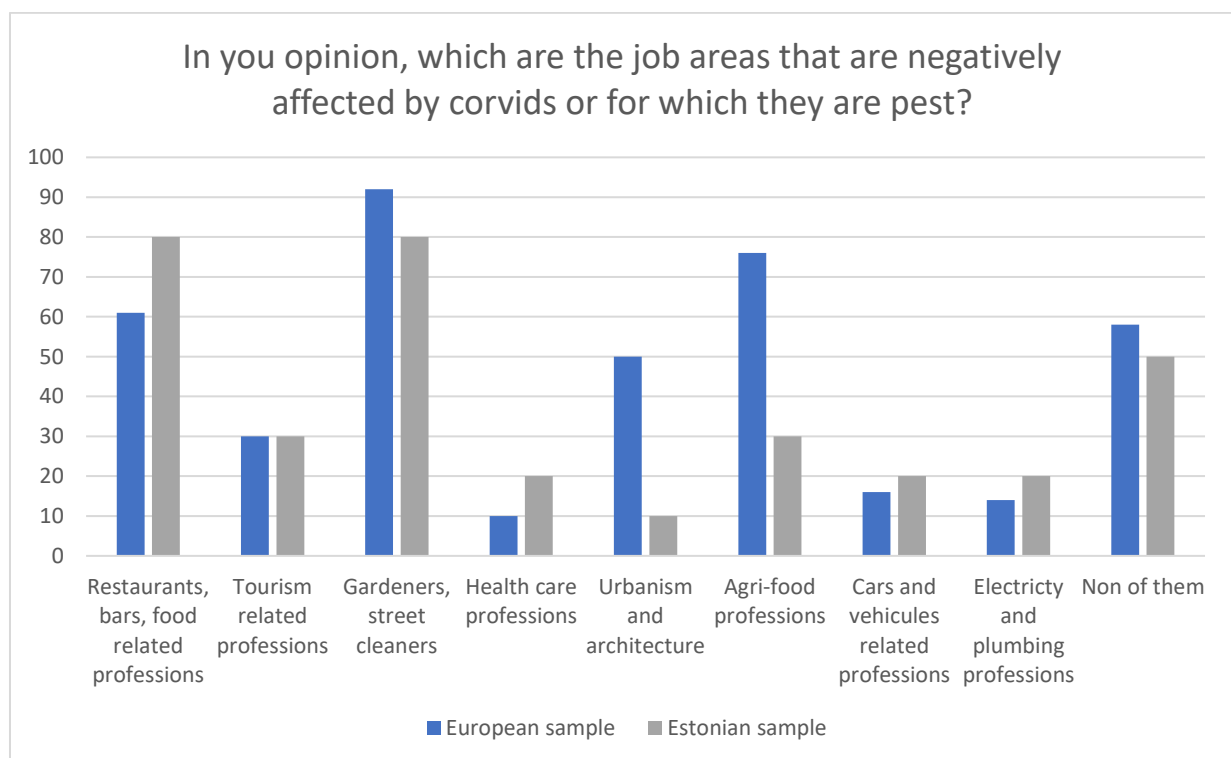


Figure 2 - Nuisances beliefs: where do people think the major impacts are?

Since crows and jackdaws have comparable behaviour in European cities, it would have made sense to find similar complaints towards crows originating elsewhere. This was not consistently the case. Observe that Europeans found corvids to be significantly greater nuisances for agriculture than Estonians. Urbanism and architecture, with an even greater disproportion, were viewed as negatively impacted by Europeans, where Estonians appeared significantly more relaxed.

Such differences could not be explained by material elements: the field observations didn't find anything relevant on this aspect, which made sense since both situations of cohabitation were relatively similar. At least, similar today. But the history of humans and liminals is a long one, and when looking at this history, we can find answers to explain these beliefs, or more exactly, how from a cohabitation between the same species, human cultures have constructed different beliefs that in return impacted this cohabitation. That will be the subject of the third chapter.

While Europeans gave heavy negative values to the behaviour of these soaring scroungers in agriculture and architecture, note that Estonians held them as disproportionately negative in two areas: the food-related service industry of restaurants and bars, and health-related professions. This pattern is quite close to what I already observed about rats when studying them in Paris, a lot of people thinking they could be nuisances to these particular areas since they were also thought (but without any real material ground) as carrying diseases, and consequently described as such. But here, it is not the case. When asked to attribute adjectives to corvids, only a very small portion of both samples agreed in saying that corvids were carriers of diseases.

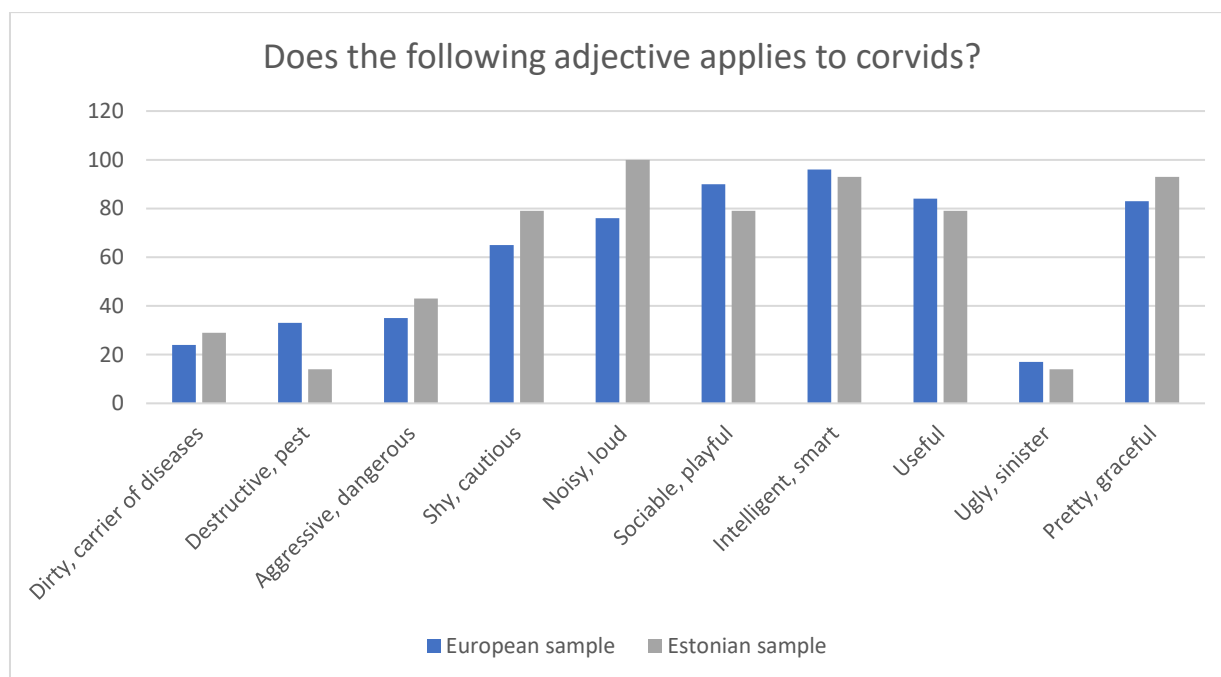


Figure 3 - Qualitative beliefs: what does the average corvid look like in the mind of the participants?

So what was going on there? The first thing we can see is that the Estonians consider in general corvids a bit less playful and a bit more aggressive than the European sample. Comparative observations in Paris led me to think that this difference could come from the behaviour of the crows themselves, much used to tourists and strong interactions with humans and many cities in Europe, and consequently also more tolerant regarding human behaviour, than they can be in Estonia which is less touristic and populated. Crows are also quite bold food beggars, which can explain both the aggressive aspect and the belief in nuisances in food-related areas. But other cities in Europe are heavily populated by seagulls¹, even bolder and more confident, which can make corvids appear like quieter and more peaceful species.

But it still not explaining what we found. The more we puzzled over the results in Tartu, the more confusing they became. Estonians believed that crows impact health twice as strongly as the representatives of Europe. Only very few of them believe that they are carriers of disease. They are able to find them more generally aggressive than the rest of Europeans, and yet less destructive; even perceiving them as shy! How could this be? How could it be that a surveyed population held general perspectives on a species that labelled them as more aggressive than another, while also receiving them as pointedly shy?

¹ When this study began, seagulls and gulls were present in Tartu, but it was a relatively new phenomenon.

How is that possible? *Ab esse ad posse valet consequentia*. “From the fact that it exists, it follows that it is possible.” Well, it is, but only if we understand that, regarding the species they have to live with, humans are building beliefs, emotions, symbolic values, not from the same places (some are from our cultural background, some are from our first-hand experiences, some are from stories we have heard, some are from religion, mythology or superstitions), and that can coexist in each one of us without the need to be consistent between each other. In some cases, people can even have a very different opinion (or different and inconsistent beliefs) regarding the crows they are passing by every day in the street and “the crow”, the abstract representation they have of this animal. It is not uncommon. It is not even that weird.

It is the cohabitation paradox.

B. The twilight zone

What can all of this seemingly paradoxical data tell us about our beliefs and attitude towards these species? Indeed, if humans seem able to differentiate their feelings from their beliefs, can we really speak of a paradox? Isn't it quite simply a lack of information, which leads to adherence to beliefs, like any lack of information? Is there really a paradox in the attitude of our fellow citizens towards our urban neighbours?

We may take for instance the Estonian belief that ‘crows are noisy’, a trait which broke away from the European sample. It can be a real nuisance. In Tartu, there were so many complaints about that aspect that the city officials decided to do something about it. They requested that the University Natural History Museum set up an experiment, to see if was possible to use noise repellents in order to chase away crows from some particular areas. Not only did it not work very well (at first, crows indeed went away, but they quite soon understood that the danger was not real, and became less sensitive to the repellents), but at the end of the experimentation, the inhabitants were, in fact, more bothered by the noise of the repellents than by the one made by the crows.

There is a difference between an animal and its cultural representation; a difference, even between this representation and our very engagements with the animal. Let's take another example.

I asked my participants how they would behave if they found a bunch of corvids in the middle or in front of a place they want to go because they have something to do. Here was their reaction in Figure 4. In day-to-day situations, people (and in particularly Estonians) that were so sure that corvids were very noisy, maybe a bit aggressive, sometimes even destructive, show no fear of being disturbed by either the noise, the behaviour of crows or the possibility they could steal or damage something.

Whereas the data represented in figure 2 represented an Estonian opinion of corvids that held them as nuisances in restaurants and bars, it was also a common Estonian position (more common than in the rest of European sample) to hold a negative opinion of an owner that attempts to chase these animals away.

If both samples stated that these birds were “pretty, graceful” they are not so many to find aesthetic pleasure in their presence, but if an important part told they were “noisy” or “aggressive”, they are also numerous to say that they will probably stay a bit longer, just to watch them or even feed them.

It could be possible to play this game for a very long time, but it is not exactly telling us how we can be so inconsistent and paradoxical regarding species we are yet used to living with for decades, centuries, millennia for some of them. The explanation is in fact quite simple: our relationships, any relationship (with other human beings, with pets, with food, with our house, our officials, our gods or, here, our liminals), are not uniform. There is no uniform thread linking us to the Other; there is a fibrous string, interwoven and overdetermined by meanings: emotional, symbolic, financial, historical. All interweave with all; and all may, if rendered in a statistical medium alone, appear to be in conflict, leading to behaviours that would by this perspective seem to be paradoxical. In fact, they are the most logical of relations. We find ways to deal with multiple and contradictory internal representations.

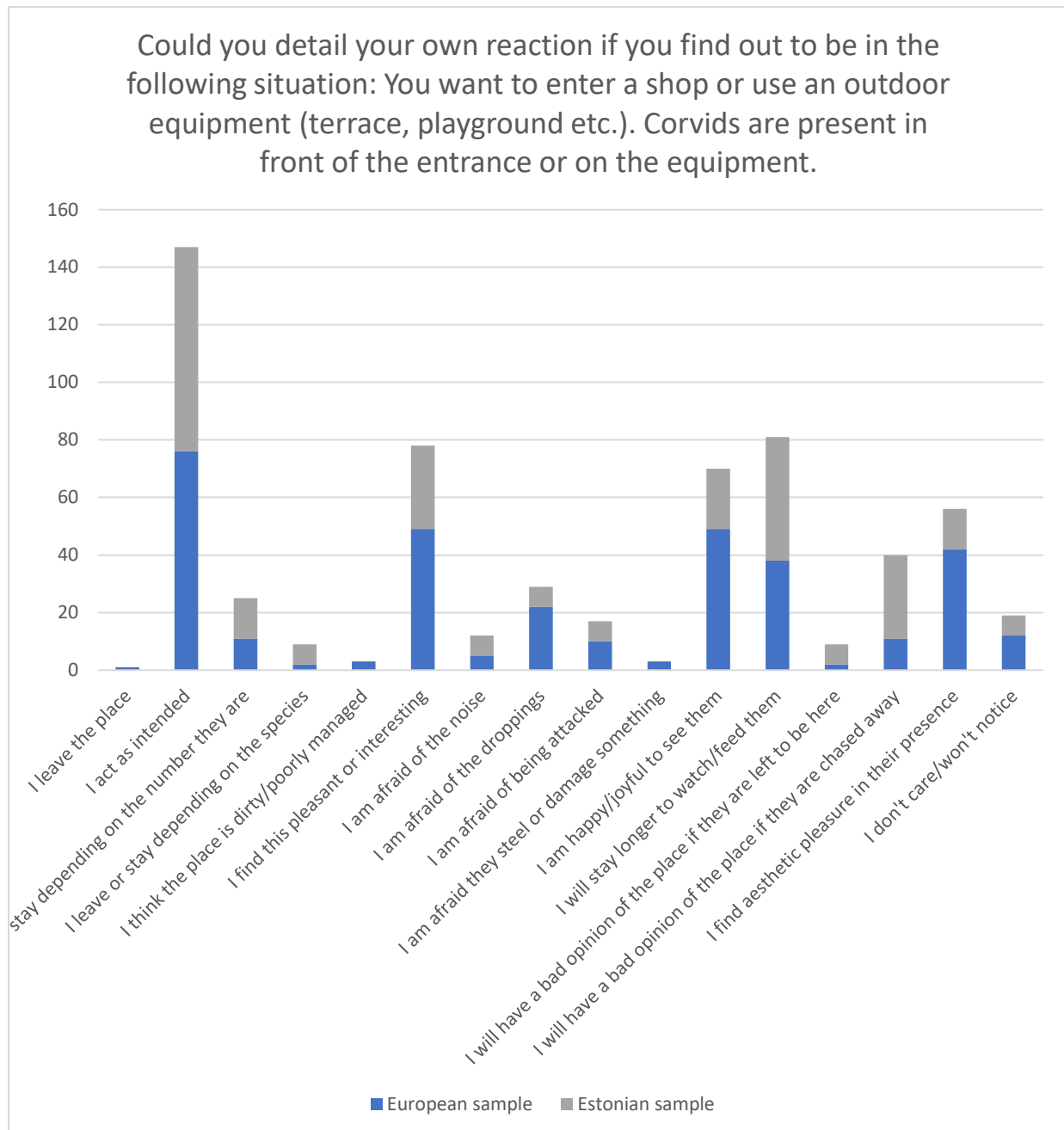
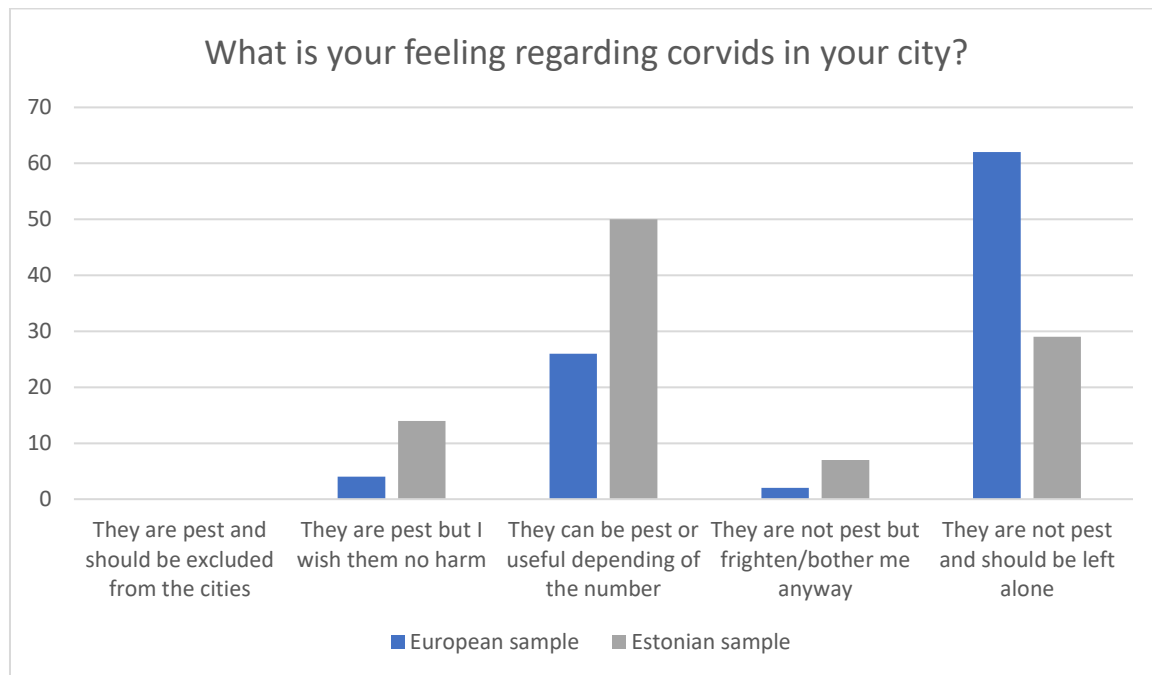


Figure 4 - Day-to-day behaviour is sometimes very different from the "idealistic" behaviour

To illuminate the activity of this paradox, I furthered my paradox. I asked my participants how they feel, personally, about the corvids in their very own city. The majority of the answers were consistent: in an inverted proportion (explicable by a tradition to give more measured or strong answers, by previous experiences with officials using lethal or radical methods towards a liminal species or not), the two samples chose to say some variation of “corvids can be pests, or useful, depending on the number”, or “they are not a pest and should be left alone.” Both make equal amounts of sense.

Even if it could also have been a consistent answer, no participants chose the option to state that “they are pests and should be excluded/exterminated from the city”. During the study about the rats, this option was a bit more popular...

But there are, also, some answers that show how the paradox can be very present in a very obvious way in city inhabitants.



Respectively 4% of the European sample and 14% of the Estonian one show a situation where their beliefs (“corvids are pests”) enter into conflict with their emotions, and more precisely their empathy, as they were uncomfortable with the idea of having any harm do to the birds to solve issues that they believe are very real.

On the other side of the spectrum, 2% of the European sample and 7% of the Estonian one show a reverse situation, where their beliefs (“corvids are not pests”) were not enough to mute their negative emotions (being bothered or being afraid).

Thus, there is dissonance between our perception of a species and its reality. If our fear is stronger than our beliefs, if our very marked relationship towards a bird does not agree with the relationship lived on a daily basis, it is because their presence ignites in us very deep signals that distort our perception of the facts. Although the origin of these warning signs will have to wait, let us ask, for the moment, what are the facts?

C. Don't let me be misunderstood

Crows are, more and more, well-known for their intelligence. In the study, most of the participants were very aware of that, and “intelligent, smart” was the second most chosen item after “noisy”. But their level of cognition is not always precisely known by inhabitants. They are used to their day-to-day intelligence (and in particular their ability to open and empty everything they shouldn't, like trash bins), but are usually quite amazed when they are told that they are also members of two very private clubs in the animal kingdom: the “attested self-awareness” one, and the “tools use” one.



Under the common name “crow”, they are actually different species (like these two *Corvus cornix*, sitting with a *Corvus frugilegus*), not always easy to differentiate, especially since they get along quite well with each other.

Corvids, via their representant the European magpie (*Pica pica*), were among the first non-mammals to pass the mirror test. This test is used to try to understand if a species is able of self-awareness, by testing a specimen in front of a mirror and see if it recognizes itself². The method is the follows: place a light, smell-free mark on the body of a sleeping animal. Place the awoken animal in front of a mirror, and see how it reacts. In this case, five magpies were given stickers on their throats: red, yellow, or black. By their positioning, the stickers would only be visible in front of a mirror; moreover, if the feeling of a sticker alone was enough to trigger a response, researchers would know thanks to the black stickers. Instead, the magpies with coloured stickers immediately began to scratch their own throats when confronted with a mirror; they recognized the image in the mirror as their own. Black-stickered magpies, on the other hand, had no special reaction.

As if it was not enough, corvids are also known to be tools users. In this aspect, they are not the only group in the birds family able to do so (parrots are also particularly gifted) but they

² There are a lot of criticisms regarding this test, mainly because it is oriented in a way that it only fit species that have the sight as their dominant sense. Corvids being able to recognize themselves does not mean that they are exceptions in animal kingdom, but that they are the ones for which, among the birds family, we have the most solid evidences.

are surely the most prolific. In Scotland, the black crow, or carrion crow (*Corvus corone*) has special techniques to open mussels without having them snatched by seagulls.

Their cousins from New Caledonia (*Corvus moneduloides*) are masters in using sticks and hooks (that they sometimes do themselves) to find insects, to push or pull something out of a cavity or, in a laboratory with researchers, to open a wild variety of locks, traps, mazes and puzzles. It is believed that their very close cousin, the Hawaiian crow (*Corvus hawaiiensis*) is as gifted as them, unfortunately, since there are only 109 remaining individuals in captivity, and the species is extinct in the wild, the real range of its ability will probably remain unknown.

When tested by researchers, the rook (*Corvus frugilegus*) also shows the ability to use tools to solve problems and puzzles, even if this behaviour has not been, at the moment, observed in the wild. However, some observations of the hooded crow (*Corvus cornix*) using bait to catch fish in the wild have been made.

And the big, black, and intimidating raven (*Corvus corax*) is one of the very few known species to... make toys to play with.

Even as we accept, in principle, the intelligence of corvids, we nevertheless fail to suspect the extent of their playful, sociable, attentive behaviours. Corvids are partners; they are parents. If we let them, they are neighbours. They are able to give company to and nurture a disabled partner for months, or even years. The Centre d'Ecologie et des Sciences de la Conservation, in Paris, has observed the most wonderfully complex social practices. Reproducing only every other year, crows welcome their younglings into the parental nest at night during the first year of their independence. Think of this example set by the birds the next time your twenty-year-old needs to crash on your couch!

These discoveries, like so many in the ecological sciences, are very young. How is this so? We have lived with these species for centuries; can it really be that we only came to know these dimensions of our peers now? This is partly explained by advances made in research technologies and methodologies.... But only partly.

III. It has been a long journey together

Understand that we are not here to simply blame, in militant fashion, the human being's ineptitudes when a problem of cohabitation emerges. From an ecological, semiotic point of view, our species has adapted to interlock with other species; and typically, it has adapted the way it could. Our criticisms are made, not in the name of judgement, but of exposition and understanding, and in the name of understanding, we must go back in time.

And for that, we have to go back in time. Our species have, indeed, a long common history, and it has not always been peaceful. Historical facts, unforeseen events, legends and myths too, have long-term marked our collective imagination, our symbolic world, and our unconscious. These facts cannot be dismissed easily on the pretext that they belong to the past. They belong to our history as a species, they have shaped us, shaped our reactions, influenced our fears, our dislikes and our rejections, and fed our imagination.



Cohabitation is not only made of factual events: stories, superstitions and legends are also parts of it.

Crows and ravens, a little indistinctly, hold a special place there, those of the scourges that we can only suffer without ever being able to get rid of, grain thieves, messengers of death, magical animals sometimes. It is not very surprising to find that as soon as our species began to be able to drive out the liminal species, first from the home, then from the city, it tried to do so. Some of these attempts are still ongoing, and between the pros and the antis, the debate rages between the latter, supporters of cohabitation (not always comfortable with the animals in question, but trying, all the same, to make room for them, or simply opposed to the idea that we hurt them), and the former, seeking to find new ways and methods to try again to obtain a city without these troublesome Others.

This image we build upon of a city; the scrubbed-clean, chalky white and blue printed idea of civilization, purged of beastliness and exclusively human, is just that: an image. The animals

in the city are within their natural environment. They thrive there, they hide there, they return there. The cobblestones litter the ground with the uniformity of a misshapen riverbed, the rigid trunks of the lamppost are perched upon indiscriminately by the crows.

If we are to reconsider the clichés and beliefs that prove dangerous, we must come to draw information from new scientific discoveries to combat them. Dangerous for them, dangerous for us, and dangerous for these cities we try to share. Until perhaps becoming “allies, rather than just next-door neighbours”.

A. Witches and snitches

Although the favourite playground of the modern corvid is the city, our coexistence with them did not begin there. Just like the rats of my previous publication, our shared history began in rural areas, where our species' quaint habit of growing and hoarding grain attracted profiteers of all kinds. As the rodents attacked what was piled up in granaries and grain silos, birds moved in for the sowing periods, in which grains were scattered about and left unattended, exposed. Additionally, the most delectable insects of the earth were churned up and exposed to the air.

It is obvious that, in competition for food, our cohabitation did not start under the best auspices. The inventiveness shown over the generations by farmers, growers and market gardeners in trying to keep birds in general, and crows in particular, away from their fields and their fruit trees testifies to this millennial clash.

Intelligent, not easily afraid of humans and quick learners, corvids were particularly formidable opponents in this battle. It was not uncommon (and still is not uncommon today) to see them perched snidely on one of the scarecrows intended to scare her away. In the English language, the term "scarecrow" is a very transparent witness to this stormy cohabitation.

As cities grew larger and more populated, corvids, like many other liminal species, followed humans. Although relations were still not positive per se, they relaxed a little as crows ravaged fewer fields and scavenged more refuse. The abundance of human waste, from food peelings to by-products of early industries, led corvids to settle and stay. This is the primary role we find them in today: thieves of unattended food, garbage collectors, and the vultures of other liminal species. Their taste for fields has not left them; they are still present en force in the countryside during the sowing season, and in some regions continue to turn our gardens inside-out as might have a herd of wild boar. Depending on the environments human cultures and habits produce, corvids may adopt any range of habits, in turn. In Tartu, for instance, their habit of knocking over and stealing paraffin candles can be irritating to the living, to say the least, and only imaginably annoying for the dead.



In Raadi Cemetery, the graves' candles are one of the favourite targets of the local corvids...

There is another contact between corvids and humans, however, which has disappeared from the modern day but marked minds, myths and generations. Indifferent scavengers, ravens and crows are not picky when it comes to corpses; dead meat is dead meat, free protein is free protein. Even though corvids don't attack humans, they don't need to feast on human flesh. Humans do all the human-attacking for them. Religious crusades, civil revolts, feudalistic conflicts for territory or public executions are all inventive ways humans have to leave bodies out in the open. Corvids, our good neighbours, are the first in line to enjoy them. If humans have always known who had caused the death of their fellows, the presence of these animals, black, numerous, with pointed beaks and talons and with powerful and not very melodious cries, on the many battlefields and places of execution also impressed. At times when religion still held a major place in the lives of populations, the close link that seemed to be established between these birds and death found its place in different cultures. Sometimes they were only heralds of it, and were thus birds to which the Roman augurs paid particular attention. Sometimes, they had a role of ferryman, psychopomp, or psychopomp deity attributes. And sometimes they were a sign of a curse and a mark of death placed by a wizard or a witch on his victim.

Observing these originary associations between corvids and society, it follows that to interrogate our present perspectives upon them, we must to the past. How did these beliefs integrate into our cultures? How might these meanings have carried through the generations, informing our relationship to liminal species long after their first, irreversible impressions upon us? What has society forgettingly come to believe?

B. Voice of Death and eyes of Odin

In antiquarian times, Roman and Latin cultures held ravens and crows to be omens of great importance. With Christianization, these birds joined the vast cohorts of the Devil's messengers, alongside snakes, cats, and even owls. They are companions to witches, and harbingers of death.

But in northern Europe, their role is more ambiguous. The influenced areas of Scandinavian mythology see corvids as representatives of Hugin and Munin, thought and memory, the two crows who whisper in Odin's ear and report to him what they have seen across the vast world. Their presence cannot then really be considered as evil, as is the case with Christians, since to be under their gaze is to be under the gaze of the Allfather.

In one way, however, this cultural area continues to strongly associate corvids with death, since they are also said to accompany the Valkyries and designate them the most courageous warriors. Again, the scavenger diet of corvids probably played a major role in this aspect of the legend.



Hugin and Munin are one of the most popular (and probably one of the first) representations of corvids in Europe during late Antiquity and Middle-Age.

Although far North, Estonia is not a Scandinavian land. While some elements suggest association with Scandic myth, it is from a distinct cultural area. This may be evinced by the severity of difference between Baltic and Nordic languages, which is not even in the same family of languages as the rest of Europe—Scandinavia included. As such, we should be careful not to implicate Hugin and Munin too much in Estonian historical implications. The Estonian mythos of crows, indeed, reads crows as omen-bringers, but for potentially different reasons. Moreover, Baltic beliefs, as received today, have blended with Christian traditions. This is visible in the Siberian cousins of the Estonians, the Khanty and Mansi, who designate the Annunciation as “the Day of the Crow. Moreover, a bird linked to death, black or white, scavenger or angel, is a common element across numerous cultures. Perhaps it is their stark, dualistic colour that allows them to be associated with the deceased soul leaving the body.

But, like their Scandinavian neighbours, it is indeed the role of omen that dominates among the Estonians. The crow has been called the “witch's bird” or the “wise bird”, and he is supposed to have gifts of clairvoyance and the ability to predict the future. Joining certain aspects of Christian superstitions, some stories say that the crow is in fact not a bird, but a bewitched human. In the western islands, it was forbidden to point at the crow, but the exact reason (fear, bad luck, pity) is not clear.

In a strange (since these two cultures have never really crossed) proximity to the uses of Roman augurs, the crow is the most commonly known oracle bird of the corvids. Here, a distinction seems to operate between ravens and crows, the first ones being harbingers of death, natural disaster or war, and the second ones more of mishap, trouble, quarrel or bad news (in the old folk songs it brings a message of death or war). The two species are therefore particularly observed by all those who try to predict the future: if a crow was seen wiping its beak, it was a sign of famine; where the crow pointed its beak, where it flew, did it crow an even or odd number, all these were important in interpreting the oracle.

In a lighter register, and also closer to its rural origin alongside humans, more than predicting one's fate, the crow would predict the weather: if it was high up in a tree or its beak was towards north, cold was coming; if its beak was towards the wind or it was cleaning itself, rain was coming; if it was walking on the ground, warm weather was coming.

Given these elements, we are less surprised to find ambivalent feelings in humans today. Even if the birds are no longer feared as signs of death or misfortune, the carriage of strong, complex and omnipresent symbolism resonates across generations. This symbolism has spread, implicitly more than explicitly, in texts and stories, songs and uses, and has shaped a collective disposition.

As a result, without really knowing anything specific about them, it's as if we've known them forever, especially since they live with us on a daily basis. In fact, we still have a lot to learn about them.

C. Learning to love you

Let's take a closer look at how crows think. If you were already impressed by their tool use, we'll have to brace ourselves as we learn about their ability to plan ahead. Although it may seem basic, we may peer into the crow's mind by knowing that crows know, quite precisely, what they want to do, why they typically can't do something, and what they will need to attain their ends. This can lead them to modify and combine elements, or construct a tool that will answer this need. They are able to see the potential use in an object; what, if given proper use, it could become. They're not just intelligent—they're creative.

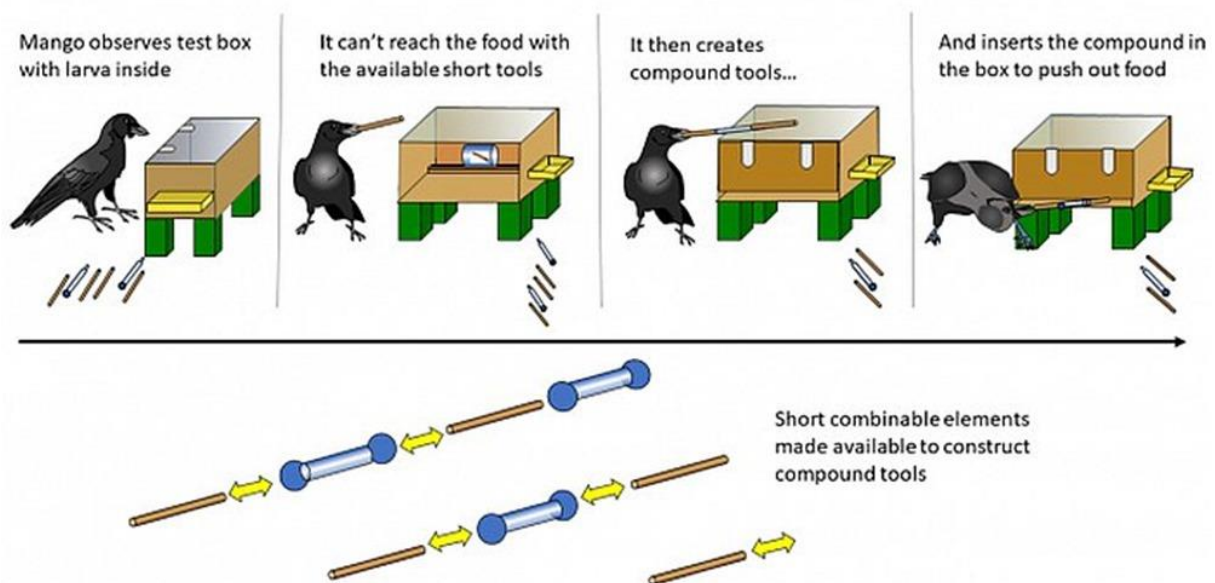


Figure from an experiment done with Caledonian crows (*Corvus moneduloides*) by the team of Auguste von Bayern from Max Planck Institute for Ornithology.

If we have a kind of fascination with them, they are also strangely fascinated by us. Crows are part of the very few species able to recognise human faces, meaning that they are able to distinguish humans individually but observing their faces. Even more, they are able to conserve a life-long memory of these different faces and to behave with caution or aggressivity towards one specific human if he or she has been threatening or violent to them, even only once.

This ability, if it is attested today, is still not understood. They are not using it to recognize each other, using different identification marks. This is not a shared semiosphere, the “bubble of signs” that we are having, for example with our pets, when both species are adapting to the other (and the best proof of that is that we are not, even our best ornithologists, able to distinguish a crow from another, if we except very obvious signs like a missing claw or a white spot of feathers). Face recognition is a highly complex ability, very well studied in humans, that needed it deeply during their evolution to communicate with their conspecifics. But there is no obvious reason in crows for developing it. Yet, here it is. And it is probably the most obvious sign of an uncomfortable truth.

We have lived for these species for centuries, and we still know very little about them. We don't know how or why they differentiate us; we don't know how they're raised. We don't even know if they mate for life. What abilities might they have that we are completely

unaware of? Why might it have taken us so long to ask the ‘right question’? Why, in the cases of close human-crow relationships, might they have chosen the humans they have? We know not. But, if the information we have is to mean anything, we may say they are probably willing to let us know more of them, if we can really try.

IV. The crows' handymen

The specialists that granted me interviews, who provided some of the qualitative data to the raw figures of my research, enabled me to deconstruct the prevalence of certain common ideas. Without them, it would have been impossible to stay on the ground. May they all be warmly thanked.



You will find in this section the content of the interviews I have had with them. The form is not always homogeneous, because all of them did not wish or could not be recorded. For some, the exchanges were fragmented because they were carried out in an informal setting, not allowing an interview of sufficient duration to ask all my questions at once.

A. Frédéric

This part is translated from the French notes of the interview realized in Paris.



PSD: What is the repartition of the crow population in Paris?

FJ: Our team studied the repartition of the crows in Paris (Work for a Master thesis, unpublished). Our study, a bit like what happened with your previous study about rats in Paris, concluded that crows are not overpopulating, that the major nuisances are done by young adults in big flocks very dependent on easy food (like in trash cans) and that the real solution would be in better waste management, rather than any regulation measure.

PSD: What does their behaviour look like in general?

FJ: With the help of GPS devices, a piece of important information could be gathered regarding the way a pair is interacting with its younglings. Crows are known for their parental care, but the tracking showed that, during the first year of their life, younglings are hopping from one spot to another during the day, exploring their environment, but come back at night to the parental nest to sleep next to their parents.

PSD: Why is this information so important?

FJ: This information is major to understanding how crows can learn, especially by imitation, since they can benefit from a long observation period next to their parents. It is also an important clue of the strength of the bond crows can have with their younglings and could explain more easily some aggressive behaviour when they feel their nest threatened.

PSD: And regarding their behaviour towards humans?

FJ: There are two major behaviours sources of complaints by inhabitants. The first one is grass and garden damage. Our team proposed a trial that showed that simple changes in grass management were efficient in completely suppressing this problematic behaviour.

PSD: And the second one?

FJ: Aggressions during nesting season. These aggressions are very rare. Our team advertises our work, in order to be called in case of aggression toward humans and to try behaviour management solutions. In all other situations, the crows are well tolerated by inhabitants, who are even sometimes feeding them. It is also interesting to note that, for many inhabitants, crows with leg bands are born in captivity and set free in the city later, so must have a use.

PSD: Tell me more about these leg bands.

FJ: Crows are monitored through two devices. The first one is the leg bands: the crows are trapped in a cage in the MNHN (the French National Museum of Natural History), and receive two bands (one on each leg) of different colours every year. Some crows appear to enter the trap voluntarily to access easy food, even after being trapped once or twice. The leg bands can be registered in a database through a citizen science program.

PSD: And the second ones?

FJ: GPS devices: this aspect of the monitoring allows our team to understand the movements of the crows. It was through this device that the CESCO team discovered that younglings are returning every night to sleep with their parents after foraging during the day in the city. It also showed that experimented adults are territorial, younglings are living in big flocks and crows can move from and to the countryside if needed (like during the pandemic or hunting seasons).

PSD: You talked about aggressions during nesting season, could you elaborate?

FJ: Inhabitants can call our team in case of aggression from an individual. Usually, we will simply find a chick fallen from the nest, will relocate it to a place where the parents can take care of it without being disturbed, and the aggression will stop. In some cases, when an individual is aggressive in a nest defence (usually the male while the female is on the eggs), “shock therapy” has been tried and proved efficient. The male is captured with a net gun, a device completely harmless for birds but very impressive. The aggressive individual is kept in a cage for more or less 72h, during which it is also veterinary checked, to exclude aggression caused by pain and injury. After that period, the individual is set free, observed back to its nest and no aggression occurs during the rest of the nesting season. I hypothesise that crows that have been familiar with humans (fed when young, for example) are bold enough to try physical contact when in defensive behaviour. The shock therapy is “re-writing” humans as a dangerous species in their minds and making them use demonstrative behaviours (alarm calls, wood-knocking etc.) instead of physical ones when defending the nest.

PSD: Apart from identifying some aggressive individuals, are there other applications to the monitoring system?

FJ: The monitoring program has also been used successfully in monitoring potential avian viruses that could be transmitted to humans. Our team has shown (unpublished results) for example that avian flu was not a disease carried by the crows (there is no trace of the virus nor antibodies in the blood and feathers of the individuals checked), indicating that they are not a species vector of this disease. In the case of new zoonosis bird borne, this kind of monitoring could allow a quick response, able to set apart birds that can be vectors and birds that cannot, helping the setting up of appropriate public health management.

PSD: Talking about public health, how are the crows perceived by the officials and the inhabitants?

FJ: Crows in France are registered as a pest species, meaning that hunters have the right (and the duty) to “regulate” their population. This situation led to a certain kind of narrative where hunters, to justify their actions, emphasize the nuisances, the destructiveness or even the malevolence of these species. In one of our works, the CESCO team showed that regulation is much more costly than the damages generated by the crows (8 million euros per year versus 43 million euros per year). Even more, a year without almost any regulation (2020) showed that it had no impact on the general size of the population nor the number of damages.

PSD: Is there a way to involve inhabitants in a more positive way?

FJ: The monitoring of the crows is partially based on a citizen science platform (see References and links section). It is quite logical then to see that our team is involved in developing citizen science. More particularly, the bad image that crows are suffering from encourages us to communicate a lot about them and try to introduce them to the general audience through popularization and popular science.

PSD: Besides citizen science, what can be done regarding this aspect?

FJ: Our team is also starting to study the different communications and narratives surrounding the crows (especially from the hunters’ communities). A project we are working on is the creation of a comic book, introducing the journey of a real woman deeply involved in the citizen science program monitoring the crow, in order to show how interest in this species can arise, how the relationship with them can evolve and why this kind of citizen action is important for science.

B. Piret



PSD: Could you explain what your job is and how birds in general, and more specifically corvids can have an impact on it?

PP: Editor at Estonian magazine Eesti Loodus (Estonian Nature) - a popular scientific journal, where birds are a common topic.

PSD: Could you tell me more about the specific impact of corvids in your work, if there is some, and give me a few examples?

PP: No special impact. I have written some short news about corvid-related research from abroad.

PSD: Do you have a way to know if this is a popular topic for your readers (by their letters, comments, by the number of downloads in your digital archives etc.)?

PP: No, unfortunately I do not have such data.

PSD: How do you, yourself, feel about these species, both from a professional and a more personal point of view?

PP: As a biologist I can say I like almost all living things (except pathogens and vectors like bacteria and ticks). Corvids can be annoying sometimes but usually the quilt lies on human-made environment that is too tempting for intelligent birds.

PSD: Could you give me one or two examples about what you mean by "too tempting for intelligent birds"?

PP: Lazy or carefree attitude of humans offers birds an easy opportunity to find food (open or uncovered trash bins, trash on the street, vegetable box gardens with easy access) or entertaining things to discover and have fun with (trash, gardening tools, childrens toys).

PSD: Some people think they are pest, what do you think of this first opinion?

PP: They can be a nuisance, but again, the root of the evil is usually human-made. So by default they are not pests.

PSD: Some other people think they participate in the ambience and aesthetic of the city, what do you think of this second opinion?

PP: I am not sure if I'm getting this question right. If the point is can corvids be a pleasure to watch and/or are they beautiful birds - then yes, of course. They are fun to watch and they show their intelligence.

PSD: How would you like to see the current situation of cohabitation between humans and crows evolving in few years and why?

PP: I do not see any big problems in Tartu but maybe I am not aware of potential conflict zones in property development. (like Toometaguse and other areas in central part). But this segment is probably cooling down due economy.

PSD: As a foreigner, I am not sure to fully understand what you mean in this answer, could you elaborate?

PP: Toome Hill is breeding ground for *Corvus corone* [NDLR: *there is no Corvus corone in Estonia, this is probably a reference to the ancient nomenclature, where Corvus cornix was registered as Corvus corone subs. cornix*] and there was a property development project called Toometaguse apartments nearby.

C. Veljo

PSD: So, first, can you introduce yourself and explain what your job is and probably what species like crows, or birds in general, what kind of place they take in your job?

VR: My name is Veljo Runnel, I work at University of Tartu National History Museum as a citizen science expert, so working with citizens who are eager to contribute to research or science, and I will help them with some technological solutions how they can help us with data, with nature observations and I think this

work also got me into contact with people about... talking about corvids, contributing nature observations about corvids. But, myself... what was the second part of the question about corvids?

PSD: What kind of part they have in your job, for example, is there a lot of programs in citizen science focused on birds, or... are these kinds of programs for example very popular in Estonia?

VR: Yes, I think this is quite universal that birds are in nature enthusiasts more popular than other animal groups, or even plants. I think most of the nature observations data come from birds observations.

PSD: Rather than insects...

VR: Than insects, yeah...

PSD: ... that are maybe a less fancy group?

VR: Not just less fancy, actually... of course some insects can be boring or even disgusting, but some are really interesting and look cool and nice, but it is more difficult actually identify the species, and there are hundred or thousand times more species than birds species, and just not enough identification guides and people actually can't tell you what species they see so it is more challenging and I think people just give up more easily. But with birds, there are people already knowing the bird species, there are some courses or you can join in with groups for observations, and so it is much more easy to join these groups of birds enthusiasts.

PSD: OK. And more specially, are corvids, I would say, a popular group, is it a kind of group that people, I would say, like to observe or are they seen more as a nuisance... some people even say sometimes "they are pest"?

VR: Yeah, I think with birds observations, it's just... not that corvids are some kind of special group but they are common birds, and there is no so much interest into common birds. It comes to... I don't know... let's say... sparrows or grey tits or... yeah, there are some species which are very common and people are not so eager to observe them or to give the data about them... just... they are somewhere and just not so interesting.

PSD: I remember when I explored the database link you send to me, if I trust the database there is more woodpeckers in Tartu than ducks.

VR: Yeah!

PSD: When I was doing a bit of research on how people in Tartu perceive more specially the corvids, there are apparently two very, I would say, different and almost irreconcilable opinions. The ones who think they are pest, and the ones who really like theme especially because apparently they are a part of the aesthetic of the city, of the ambiance of the city, of a kind of gothic touch of the city. Do you observe these opinions in the citizen science program, what things did you see about these opinions, did they...



VR: The citizen science projects, they usually are not about opinions, so it's about data, getting data and observing birds, so... if somebody will tell us "I saw a bird, or a corvid, some crow", so they don't tell us if they like it or not, it is just the fact.

PSD: But some people could have said, for example "yeah, but they are pest, why should we be careful or care about"...

VR: Sometimes people just call the Museum staff to ask "what can I do, I have such and such bird in my hands (?)" or some species they want to do something about it, they feel that they are intruding their space or somehow disrupting their way of life or pooping on their cars or... and so they sometimes call and ask help or some advice but it's... so I am not taking these calls usually in the Museum, I'm not in position to say how much these calls... how frequent they are...

PSD: But they do exist.

VR: They do exist, and in some social media groups, of course I see that people are complaining about them and usually, there will be this polarization, that some people will say "let's get rid of gulls, or crows, or jackdaws, there is too much", but then again there is another group that will say "why are you complaining? They are part of the city life, or nature, and we have to live together. Also, there is no point to fight because they're coming back, you cannot kill them all or chase them away, so at some point you will have to deal with them anyway."

PSD: Maybe they are more tired than liking them, in this situation then! More specifically, in these citizen science programs, have you programs that are centred on the corvids family or...

VR: No, I think Estonia is just too small, even if a researcher is researching corvids, it happens so rarely that... I can't remember... Marko Mägi actually, he researches city corvids because city government actually ordered this research...

PSD: Yeah, about the noise repellents?

VR: Yeah, yeah, to get to know them better, and if the repellent will not work, maybe to use another strategy to chase them away, so it was purely on this... how to say?

PSD: Nuisance and pest management?

VR: Yeah, so it was not directed to researches to get to know corvids better but the initiative came from the city government. So I cannot remember right now if there was any purely research... I mean, research coming from researchers to know, to learn about corvids. Maybe Marko can tell you but... but certainly not with the help of citizen science. So there are so general birds observations programs and monitoring programs, so corvids are part of them but not specifically.

PSD: The Suvine aed...

VR: Suvine aialinnupäevik, yes.

PSD: Sorry.

VR: No it's good.

PSD: I could only find the 2020 data for this program, are the 2021 data available?

VR: 2021 should be available. And usually they, I mean the organization who will do this program is actually the Estonian Ornithological Society, they will upload on this Elurikkus system also, and finally you will find all this garden birds monitoring data from this Elurikkus.ee site, so you will see that...

PSD: They have been put in the database from the program?

VR: Yes, so there is a column "Project" so you can identify these observations has been done on this specific program or not, and there are also some others like this "Winter bird count" and, I think, some several others more specific like Estonian birds atlas where there is quite strict monitoring protocol, so it is not so easy for everybody to participate so you have learn actually the protocol, you have to carry on, and also the people who are responsible for this atlas project, they want to be sure that you know the species actually, otherwise it is not

comparable with others' data. So you have to get real good experts on birds to participate. But this garden bird program I think is more relaxed and not so controlled on how much do you know species. I think you can find some erroneous data, so people are reporting one species but it could be actually another ones.

PSD: Are usually these kinds of programs very popular in Estonia... I would say in the number of participants but regarding the general population of course.

VR: Yes, I actually did the comparison at some with others countries and its... I don't remember the percentage, but actually quite stable. So the part of population that is interested into birds is quite universal, not depending so much on the country or nationality... Maybe it's just in some countries where the situation is... political or economical situation is more critical so people don't have time or resources to spend on bird watching. But if it's a nice society, people are more or less happy with their lives, I think the percentage is more or less the same in population

PSD: Ok, and in Estonia you would say it's stable from one year to another?

VR: Yes, it is stable.

PSD: Ok. On a more personal aspect, I would say, how do you feel towards these species of corvids, the ones that are in Tartu, the ones in general, and how do you feel that your job has an influence on how you are seeing them? Because maybe you know more things about them so you are more tolerant to them or, on the contrary, because you know things a bit ugly like nature can be ugly and dirty you are less tolerant towards them... how is your vision, your opinion?

VR: Yes, yes, I think it's from my education and my personal interest, I can trace it back to my very early years so it's already difficult to say which part is more prominent: is it education or my personal history with nature, and my parent's part (because my father bought me books, a lot of books about nature). And now the job I do I think actually comes from my personal... hum...

PSD: Background?

VR: Background and there is another word, I cannot recall the English... So I think it's not that much anymore my job that is influencing my point of view to nature. But of course, as a biologist, I can see that every species has a reason to be as they are, and I am not judging them based on what they do to humans and cities. Of course, they could be nuisances, but I will never go to radical actions. So I'll...and I say that to other people too, I say from my personal point of view that I see that there are species just looking for a space to live, and they can adapt in human environment, and people are actually taking natural environment away. So species are trying to live somewhere and if urban environment is suitable, they will inhabit this space, so I see a kind of natural process, and I don't see any point going to extremes with this. Of course if you have a very specific problem, your property is seriously damaged, you have to do something to preserve your living environment or your...car or...

PSD: Your security sometimes.

VR: Your security, yes. But if it's just comfort, I think you can step back and leave nature to live together with you, so... you don't have to do extremes because just your comfort or you want to have the noise level a bit less, but actually, anyway, the cars, your neighbours... the nature is really not so prominent in this comfort zone disruption, so I think it is... to do something because of that, because of the noise level or you just don't like corvids, you don't need to do these actions, to take down the nests, to kill birds because they are too loud for you or you see the droppings on the side of the road and you don't like that you see birds droppings... it doesn't justify to kill birds or to take the nests down.

PSD: And do you feel that these citizen science programs or the popularization, I would say, programs or actions, help really the people to have this step back as you say, or maybe more tolerance or wider comfort zone, as you say... So you feel that, do you see that in your job?

VR: Yes. Sure. And the more you talk about birds in general, and you show their life, their struggle as humans are struggling with their lives, people can relate and see that they have to survive, they have to do something, and they finally respect if they see they are similar to our own species. And if you show videos or films about they mate or grow their offspring, going to their lives and show people, people are feeling more this... how to say it?

PSD: Agency?

VR: Yeah, or respect towards other species. So I think it is very important to share the knowledge about birds and how they adapt to the environment and what is important in their lives.

PSD: Before doing this program on corvids, in Paris I did a quite similar program about another not-very-liked species, because we have rats in Paris, so I was doing this. And one of the findings of the study was that a part of the group that I studied, in the participants, a very precise age group, had a very, very positive view on rats comparing to all other groups. And it was the group that were little kids when the movie *Ratatouille* went out in the cinema. And well, it is not about knowledge, real knowledge about rats, it is about narration, and proposing a narrative. So, what do you think, in the case of corvids for example, is really efficient, is it the knowledge, sharing the knowledge or constructing a narration, the life of one individual in particular like in an animal film, do you think both are necessary, which one is more important or are they equally... what is your opinion on that?

VR: Well, when I start to think about it, I think that narration is really important. Of course, it goes usually putting into human perspective and gluing some traits to animals which they don't actually have, and movies show them like human-like... but yeah it's a really good way to give people an option to relate, to have this more personal relation. So in that sense, it's really, really important, and as you said it had impact. It has impact. But the important is I think not to let facts go out of wind, you actually should consider that you show at least some truthful facts about animals or nature. If you will change actual facts, show falsely some aspects, so...

PSD: That's a problem

VR: ... finally if these kids will grow up and discover that there have been lies in these films... not good.

PSD: What was interesting in his group, because they are grows-up now, is that some of them were really sure that rats were pests but they have still more empathy. That's "okay, I know they're nuisances but I don't want any harm to them". Maybe it was also a way to open, as you say, the thing like "okay, maybe they are loud, and doing nuisances, and they are dropping", and developing the empathy can be also the aspect when you can't change the fact because they are there and the facts are there. But yeah, if it was full lies at some points reality and what people thought about would have collapsed and usually it's not going to end very well.

VR: Yeah, I remember from my childhood, there are, I think, two authors who wrote... one was a translated author, Ernst Thompson, I think, the story about animals and they were... narration very close to like to talk about humans, human family and tell adventures and troubles... so it was... every story was about a particular animal and his life and challenges, so you could really closely relate, it had really great impact on me. Second was an Estonian author, but I cannot remember the name... but similar stories about animals, maybe actually he was a bit copying from Ernst Thompson. But they also had impact on me as a child.

PSD: But they were not, as you say, completely false facts...

VR: Yeah.

PSD:... they were just truth narrated. Isn't that?

VR: They showed the aspect of... they kind of insisted on this aspect which made animals more human-like, they were given names and the way the authors describe their actions and

relations, they used the same words or adjectives as for humans so... But you know about animals you know that they don't have languages so they cannot say to their partner "I care about you" or things like that. But, yeah, they used this kind of elements which actually made animals human-like, what they cannot be actually, so it was a bit exaggerated, and I realized of course, I realized then too, but I learned about these animals and I think I develop empathy towards animals without reading these books, although I realized it was not completely truthful but it helped me develop empathy.

PSD: So it was a good, you would say, middle ground between complete narration and absolutely true facts of knowledge?

VR: Yes.

PSD: Ok. Do you have another thing or another point of detail about the corvids and about your job more specifically that you would like to add?

VR: About corvids?

PSD: Or about the citizen science impact that you can have on the vision of the birds or the perception or how people care more about general biodiversity and become as you say a bit more tolerant in the situation... anything that you...

VR: Maybe, coming back to the beginning, the people are more seeing rare species or special species and not giving much attention to common species. I think that the citizen science projects can change this and there are actually some initiatives where there are some species of year initiatives. And there was been, for example, Estonian Ornithological Society, every year, they announce bird of the year. And sometimes they are very rare species, but some years very common, like... sparrows. It was for sparrows. And people get to know a lot of facts about this very common bird, and talked about it, and observed it. So I think this is really important in citizen science, we have the power to make people to look toward common species and learn about them.

PSD: I don't know exactly for example about this species in Estonia, but I know that in Paris it took us years to realize that this common sparrow was slowly disappearing. And because they were so common people took years to acknowledge that they were slowly disappearing. So you can have this situation when, paradoxically I would say, a common bird can be also less protected, because it's so common that the dropping of its population is not acknowledged.

VR: Yeah, if these citizen science programs are not monitoring by a strict protocol, so people are just observing what they like then it can happen, and you cannot go back in data to compare, for example, ten years ago, how many sparrows there were and now, because people just don't observe them that much... But with this most strict protocol programs like Bird Atlas, with help with these projects, you can track down these common species also.

PSD: Do you say that the... I am sorry...Suvine... I will never...

VR: I know what you are saying.

PSD: This one. Do you think it's more like a strict monitoring program or a more free program, in which category would you say that this one is for example?

VR: I think this is some middle ground. Because they don't... I think they don't count birds, in a sense every garden, garden owner, or person who observes birds on this particular spot takes responsibility to observe. So they are observing all the species, like a competitive aspect, and if there are sparrows, you can be sure that they will report sparrows too. And in that sense it's a good way to monitor also sparrows. In another way, people are... the places people are observing birds, they do what they like it to be: if they have a city garden and also some nice place in nature or summer cottage, they will prefer to report birds from this summer cottage and maybe in that sense it's not so strict, they will prefer the place where there is already more species. It doesn't give you completely neutral view, because people will choose the place where they will observe birds. If you want completely strict protocol, so somebody

will put randomly observations places in Estonian and go then and record every birds species there and every individual and compare and go back in time and compare in time, but... This is a middle ground, I think you can count on people will report also common species like crows or sparrows.

PSD: Ok, if you don't have anything else to add it will be good for me.

VR: Not coming anything else to my mind right now. It's just, it sometimes takes time to process, it will maybe...

PSD: You have my email.

V. A Few Words of Conclusion

The book you have just read is the result of a study carried out over 2 years in Tartu, and to a lesser extent, in Paris.

It remains less exhaustive than I would have liked, and some aspects remain unanswered to this day. This work is the counterpart (in English and for this project) of another small booklet which I had written at the end of the project on the rats. It had rained, and it was an opportunity for me to show the public how science works, even when a project is incomplete, even when we don't have all the answers.

This work is therefore incomplete, I recognize it and I apologize for it, but it has the merit of existing.

With the ordeal of the pandemic and confinement, something quite unprecedented happened but which resonates strongly with the subject of this book: humans have rediscovered animals in the city. Deer in town, wild boar in the suburbs, families of ducks in the middle of crosswalks, everyone who lived on the edge entered and sank deeper into the concrete jungles. Another kind of preliminary one could say, which crossed the border. And humans liked that. They enjoyed seeing more or less wild animals strolling through what they believed to be their city, just theirs, *Homo sapiens*, and surprised themselves by wanting it to last, as if we could rub shoulders with foxes every day on our way to go shopping.

The pandemic has made a more diverse and therefore more visible a phenomenon which, however, is the norm in the city: the cohabitation between urban species. So, of course, the crow is not as imposing as the deer, and crossing it one evening at the bend of a roundabout does not have the same effect on the human opposite (although the encounter with a deer may be much more dangerous). But he is at home with us, the city is his natural environment.

I hope I have been able in this book to show why we should not be offended by this cohabitation, why it does not cause us all the harm that our imagination attributes to it and why, since there is nothing else than to admit that these species are in town at home and that they are there to stay, it is probably wiser to learn to really know them and, perhaps, to appreciate them at their fair value. Admittedly, they are not perfect. But neither have our human neighbours, and we've learned to live with it.

Maybe it's time to try a little bigger notch of living together.

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