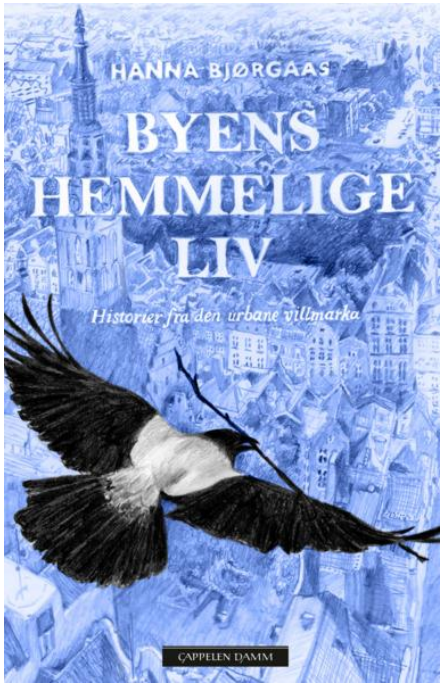

Cappelen Damm Agency *Fall 2021*

The Secret Life of the City

How to go out the door: An exploration of urban nature

Going out into nature is like going to a party. If you don't recognize anyone, you'll probably make a quick exit. But if you know a lot of people, and make new friends via old acquaintances, you'll be more tempted to stay out late.

I'm a biologist, surrounded by penguins and whales in Antarctica, one of the world's most dramatic landscapes. The tourists I'm guiding have paid small fortunes to come here for a nature experience they cannot get anywhere else in the world. Or is that really so?

One of the species we find, among the glaciers and whale skeletons, is an orange lichen. This lichen, that brightens up the penguin colonies, grabs the attention of both myself and one of the tourists. It is beautiful and exotic like the rest of the scenery. What's most surprising is that this orange lichen is an urban globetrotter, one of the most common species in cities all over the world – one that I probably see at home every single day, although I've never seen it, the way I have done here. Has the city blinded me to these strange organisms? What else have I overlooked?

This is the start of my project: To go out the door with an open-minded interest in the nature I encounter, for a year. Is it possible for me to experience nature in the city?

The majority of Europe's population live in urban or densely populated areas, and urban nature is what most people are familiar

foreignrights@cappelendamm.no
www.cappelendammagaency.no

with. In this book I find the most fascinating expert knowledge we have about species and urban nature. But the book is also a declaration of love to the biologists and experts who shared their knowledge with commitment and enthusiasm. The goal is to inspire myself – and other city dwellers – to feel that they too are part of nature, even in the city. Can we find a new way of going out the door?

The book comprises eight individual essays concerning different species groups and processes, along with an introduction, a conclusion and a do-it-yourself chapter. The chapters are bound together by a story, told in a first person perspective about my encounter with the city's living organisms – as well as my own thoughts and prejudices.

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The Secret Life of the City
Hanna Bjørgaas

Hanna Bjørgaas (b. 1986)

Hanna Bjørgaas holds an MA in biology from the University of Oslo and additional education in outdoor life. With her competence from biology's traditional disciplines, such as botany and ornithology, she works with communication and interdisciplinary collaborations, for instance with architects and artist.

Bjørgaas has a wide and varied experience in conveying the joy of nature to others. She has worked as a tourist guide in the Arctic and Antarctic regions. She has held several field courses and guided trips focusing on plants, fungi and lichen for institutions and organisations such as the University of Oslo and the Norwegian collective organization for biodiversity. She has also worked with small-scale farmers in Brazil, written several pop-science articles, and contributed to arrange conferences on ecology and farming.

Biology has become more of an obsession than a vocation for Bjørgaas, who admits to feeling a bit naked without a pair of binoculars and a magnifying glass hanging at her neck.

Summary
translated by Matt Bagguley

Chapters

Introduction

“Are the penguins no bigger than this?”
On an Antarctic glacier, I realize that I’ve been blind to the nature right before my eyes. About Instagram nature, the so-called wilderness, and the Catch 22 of tourism.

Chapter 1. January. Crows – Mirror images of city-dwellers.

My first encounter when I get home to the city is with a delinquent crow. Reluctantly I begin spying on crows and find that city crows know more about me than I do about them. I talk to crow researchers Geir Sonerud and John Mazluff – who have dedicated their lives to trying to fool crows – about the solidarity and gossip within the crow world. I take a deep look at the brains of crows (and mammals) to find out if crows really are capable of having a language. I find out that crows are smart, vindictive and loving – mirror images of us.

Chapter 2. February. Evolution and cinnamon buns.

A sparrow challenges me shamelessly over a cinnamon bun – as if he had the physical advantage and not me. What made it so cheeky? This chapter is about the similarities between a ski-jumping ski and a starling’s wing; about how birds’ personalities change when they move into the city; and how the gift of impudence can reside in the serotonin receptors of the brain. I discover that evolution can happen at an expedited rate – and realize that my cinnamon bun is a low price to pay for a front row seat to the city’s nature.

Chapter 3. March. Birdsong.

A night-time experience gives me access to messages in a language I cannot decipher. I find that I’ve been misinformed about who is singing – and why. I'm starting to feel naked without binoculars. I go back in time, to a forest in Oregon in the sixties, and find that the birdsong there is like a well-coordinated orchestra – and that city-noise profoundly alters the notes.

Chapter 4. The Ant Wars. About sex, cohabitation and dirty windshields

I experience an invasion in my own home. The ants are totally unconcerned with the distinction between outside and inside. While wondering how these primitive creatures manage to adapt to almost any habitat, including my kitchen, I find that they are far from primitive. The secret to world domination is intricate cooperation and communication in a language we have no access to. I find that this language can

be hacked. After conversations about the decline of insects and empty windshields with insect researcher Anne Sverdrup-Thygeson I decide to make peace with the ants in my kitchen.

Chapter 5. June. The Seagull Paradox. The city as a refuge

Seagulls and pigeons make very little effort to appear charming. Why are they here in the city in the first place? Shouldn't they be somewhere else entirely?
In this chapter, along with bird-lover Bjørn Olav Tveit, I try to see the inner city through the eyes of the animals really thriving there. Instead of high-rise buildings and paved streets, I see islands of safety, nutrient-rich beaches and dry cliffs. I talk to seagull researcher Arild Breistøl about why it was specifically seagulls that moved into the city, about their rather surprising eating habits, and about the seagulls' overview of the week. I discover how the city's parks and gardens can be refuges for surprisingly many species, and how pigeons sweat heavy metals through their feathers. I go out to where the seagulls should actually live, and see what it's like there.

Chapter 6. July. Stories from the Underground.

The city seems lifeless in the July heat. Will the urban summer ruin my entire project? I lose heart and long for the forest, but find my old friend the linden tree living here in the city – well camouflaged, as a hedge. I go straight to the old linden forest, where these ancient trees are connected by a network of fungi that distribute nutrients and help them communicate. Do fungi live in the roots of the city trees as well? I want to know what's going on in the earth beneath, but seeing through the ground is difficult. Mushroom researcher Klaus Høiland and mushroom expert Per Marstad are unable to help me further. I almost give up, but an unexpected Russula puts me on the trail, and I eventually find an answer under a magnifying glass. In this chapter, I also encounter the evolutionary ghosts of primeval oxen and elephants, in the form of the city's crudely-shorn linden trees.

Chapter 7. September. The Borderline Cases – About the city's most misunderstood creatures

I join bat experts Magne Flaathen and Kjell Isaksen and get to try the sensory apparatus of a bat, and I find out what it sounds like when a bat is on the pull. However, despite persistent attempts I do not see a single bat. They belong to the night. With their love of the dark and confidence in their own hearing, bats are a challenge to categorize. Maybe that's why they're so scary? At a French football stadium, I discover that it's not only bats that run into trouble in our floodlit cities. In the end, I finally see a sleeping bat, and start sympathizing with these shy and anxious creatures.

Chapter 8. December. The Secret Writing of the City – About those who live off air and cooperation.

With my nose buried in the bark of a huge old tree in the park, I return to lichen, where it all started. Along with lichen researcher Einar Timdal, I investigate how lichen seems to become squashed flat on its way from the forest into the city. I learn to read the written language of the city's lichen, which can give an indication of the city's air quality. I get carried away by 150 years of scientific quarreling, and how the discovery of what lichen really is paved the way for a new way of looking at life, competition and cooperation. And I find that the city, Antarctica and outer space have a lot in common – from the lichen's point of view.

Early chapters from the book:

The Secret Life of the City
Stories from the Urban Wilderness
By Hanna Bjørgaas

Translation © Matt Bagguley
Translation Grant Support received from NORLA

Intro. An Old Acquaintance

It began with a yellow-orange spot. I was standing opposite the penguin colony on a rocky outcrop that jutted from the snow a few hundred meters above the shore. I looked a bit like a penguin myself. The many layers of wool under my thick down jacket made my arms stick straight out from my body. I had been working as a guide for Antarctic summer cruise passengers and my job that day was to make sure the tourists didn't stray from the designated paths, and to answer any penguin-related questions.

Then, a grey-haired lady, wearing one of the cruise operator's red jackets, set a course for me. On her way across the snowfield she paused to let a couple of lively penguins run past on their way to the sea, then caught her breath as she watched them dive in. When she reached the place where I was standing at the top of the hill she said, in English but with a German accent, that she wanted to show me a photo she had just taken.

I lifted my sunglasses while shielding my eyes from the glare of sunlight. The photo she was showing me didn't have any penguins in it. It was a close-up of some round, orange-colored shapes. They looked a bit like glazed bowls lying on a yellow-orange carpet with a texture like solidified lava. "Isn't it beautiful? I saw it right down there," she said, pointing towards the penguin colony. "What is it?"

Although it was quite a way off I could see that the stones she was pointing at had an orange tint to them. In fact, the whole area surrounding the penguin colony looked faintly orange.

I looked at the photo again. There was something about it that was strangely familiar. Then I realized that what she had taken a photo of was common orange lichen. Orange lichen, *Xanthoria parietina*, is a genus of yellow-orange lichen which I had seen many times before, in more familiar surroundings – on trees, rocks and concrete. I was sure I could remember something like it growing on a tree in my own back yard. Now the two of us stood there marveling at its impressive structure as though it was for the first time. It was beautiful.

My story about urban nature began one glorious summer day in December 2017, in as unlikely a location as Deception Island, just off the coast of the Antarctic Peninsula. The island, essentially a crescent-

shaped mountain range with a lagoon at its centre, is so named because it is actually the peak of an ancient volcano. The narrow gap between the mountains – which are the remains of the volcano's walls – allows ships to sail into the lagoon which at one time was the volcano's crater but is now filled with icy Antarctic seawater.

The lagoon has been the setting of two of humanity's most determined attempts to wipe out parts of the planet's wildlife. At first the island was a center for hunting fur seals, then whales, in an era that almost destroyed the populations of both. Today, it’s not fishing boats, but cruise ships that keep the island's beaches occupied with people.

On the beach that day were two enormous seals, drowsily waving their flippers in the air. The tourists stood in a semicircle around them and took photos. While where I was standing, a few hundred meters up from the beach, hundreds of chinstrap penguins sat huddled in their nests amongst the black volcanic rocks. The snowfield leading down from the colony to the sea was a virtual penguin motorway. From my vantage point beside the colony, I could see them sliding on their bellies down to the edge of the steep snowfield, where they would jump into the sea in their clumsy penguin way and become elegant underwater torpedoes.

The tourists who were here on this December day, had paid through the nose to see penguins, seals and spectacular views. And they got their money's worth. Fortunate circumstances have made the Antarctic Ocean one of the world's most productive. Cold, nutrient-rich water from northern latitudes, pushed south by ocean currents in layers far below the surface, is forced towards the surface when it meets the Antarctic continental shelf. This water is so rich in nutrients that huge blooms of algae can form when spring, and light, comes to Antarctica. The enormous amount of calories the algae contains provides food all the way up the food chain, from minute zooplankton to seals, whales and seabirds.

A few hundred meters from shore was the gigantic cruise ship we were living on. It looked more like a Lego boat compared to the magnificent scenery which – on our voyage south – had offered us one spectacular view after the next.

From the rocky outcrop by the penguin colony, the German lady and I looked out over the glacier. At random intervals the glacier would calve, sending pillars of ice crashing down where the icecap meets the ocean. Large and small icebergs floated in the water like sequins scattered onto a dark velvet sheet, and each new ice-fall would make this sequin-carpet dance upon the waves. The falling ice blocks looked small from where we were standing, but the view was deceptive. They could be as big as houses, or apartment blocks, and their separation from the mother glacier could be tumultuous. The waves it created were easily big enough to capsize one of the many small tourist boats whirring noisily around the icebergs.

It is normal for the ice to calve during the summer, but the sight of the icebergs in the water was a reminder that most glaciers on the Antarctic Peninsula are melting faster than normal.[1&2] A colleague on board the cruise ship, a guide with years of Antarctic experience, had told me that some of the glaciers we sailed past had changed dramatically over the last twenty to thirty years.

Most of us had flown vast distances to get here. And for every hour of sailing, at cruising speed, the ship would burn off over a thousand liters of diesel.[3] The CO_2 emission we had caused by going on this

voyage was contributing to the melting of the same glaciers we were admiring; a paradox so glaringly obvious that no one could be bothered to mention it.

Because this idea about the landscape before us being untouched by humans was an illusion. Twenty-five years ago, Deception Island had perhaps twice as many penguins as it does today.[4&5] And one of the reasons for this decline is climate change.[6]

The tour operator had talked about how this strange and beautiful landscape would touch the people seeing it; about how these voyages create "ambassadors for nature". How standing beside a massive glacier, its near luminous blue ice gleaming deep within the cracks, and how visiting penguin colonies that have been stable for tens of thousands of years would awaken something within us. It would make it more important for us to make good environmental decisions back home. Our job as guides was to make sure the tourists had memorable encounters with nature, that it made an impact on them. It ought to be a cinch.

But something wasn't right.

Although some of these people were fulfilling a lifelong dream, others seemed quite indifferent. They came, took their photos, wandered around a bit, and left.

I felt like I understood why. These trips ashore were subject to strict rules and regulations. No one was allowed to walk around on their own, explore and discover things by themselves. To ensure efficiency and security in this alien landscape, excursions had to involve the least amount of unpredictability. The list of what tourists should see was specific and price tagged. It was an Antarctic adventure with a carefully edited script. On the other hand, there was no lack of beauty. The tour operators selling these trips, are selling the status gained from posting a photo of Antarctic glaciers on Facebook or Instagram. Instead of whale blubber and sealskin, what's being consumed now is beautiful scenery.

I basically came to realize that I found these herds of tourists, wearing borrowed red jackets and ill-fitting hiking boots – all of them attempting to get selfies with the penguins without getting the other tourists in the picture – were slightly ridiculous. It was hard to admit, but it was true.

What about me?

I too had been travel bragging on social media, to overwhelming waves of likes. But my degree in biology didn't render my trip more valuable or less harmful to the vulnerable Antarctic nature. I had also been lured there by the desire to see things that few others have seen.[7]

With the Antarctic glaciers and penguins before me, and with an iPhone photo of an orange lichen in my hand, it dawned on me that I knew more about Antarctica's lichens than I do the lichens in my own backyard.

It was food for thought. I have spent significantly more time in the city than in the wilderness. It's where I've always lived. I grew up in Trondheim, a medium-sized city in the middle of Norway, in a residential area near the city center. Several coincidences, along with a vague interest in nature, had led me in the direction of biology and botanical studies. But I hadn't found it particularly easy. Remembering the Latin names did not come naturally, as it clearly did for some of my fellow students who were hobby-biologists when they were growing up. I felt overwhelmed by the hundreds of species that make up an ecosystem, and they all seemed to be alike.

What saved me during my student years was the realization that I could fall in love with the details. To train my eye on a particular thread in the tangled web of different species felt great. It was like learning a craft. But there was something else about it, in addition to the sense of mastery I felt. The process of scrutinizing plants with a magnifying glass, searching for ligules or forked stem-hairs, hidden details that distinguished them from other species, brought me a sense of peace I had never experienced before. I could walk around for days, in the woods, in the mountains or by the shore, trying to find out what was living there, perhaps driven by some latent passion for collecting. Recognizing a species I had seen before was like meeting an old friend.

The world of biology opened the door to field courses, excursions and jobs. Eventually, it also took me to a couple of the world's most pristine natural areas, which I explored, binoculars and magnifying glass at the ready; looking, learning and understanding.

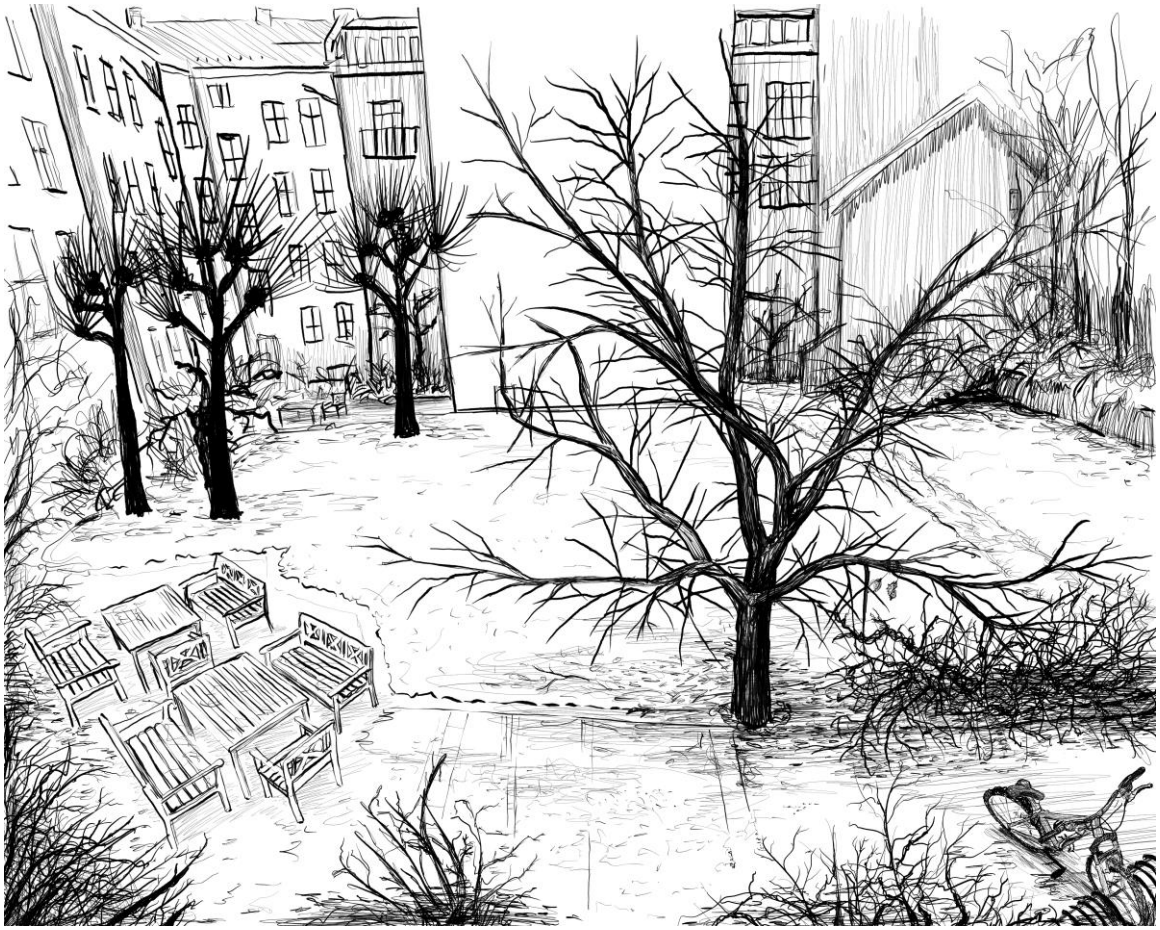
But when the trip ended, I would take off my binoculars and magnifying glass, pack them in my rucksack and go home to the city, which was now Oslo, to the orange lichens and crows and dandelions.

By the time I returned from Antarctica, it was January. The snow had all melted and the city looked drab. My adventure was over, and there were no more trips on the horizon. Far from it in fact, for various reasons I was going to have to stay in the city for some time. And that bothered me. City life is ok when I'm feeling good. But when things aren’t going so well I often find that it helps to be amongst nature, where no more is demanded of me other than my presence. And when things get really bad all I want to do is stroll around, with no direction or purpose, where there are trees and birds and lichens to look at. And the restlessness brewing inside me now was telling me I needed to get out of town.

But as things were, I had to make do with staying put, in a cramped apartment overlooking of one of Oslo's busiest roads.

On my first day back in Oslo I had no other plans than getting over the jet lag. I walked around the streets trying to unwind. The pigeons outside the subway station were pecking away at what looked like a squashed pastry. Swarms of sparrows chirped noisily from the ornamental bushes. Everything around me seemed to be shaped by humans. The wonderfully complex nature I had just returned from had been reduced to this: sparrows, pigeons, hard surfaces and right angles. A destitute landscape. I turned and walked home.

When I arrived back at my apartment I noticed something. Next to the bike rack in the backyard stood a Swedish Whitebeam from which I’d hung a couple of fat-balls for the birds. But all that remained of them were the green plastic nets, now dangling mournfully from their respective cotton strings.



January. The Urbanite's Reflection

How many times a day do you spy on a crow? How many times does a crow spy on YOU?

It would take a robbery for me to understand the potential in the black crow's eyes.

It began with the fat-balls that were hanging from the tree in the backyard. The small, acrobatic bluetits had a virtual monopoly over them. The sparrows stayed right where they were in the bushes. The magpies had a go, but since they're not built for hanging upside down, they flew off in shame after a few bungled attempts.

The day after I hung them up, the fat-balls were gone. All that remained were the two green nets wafting in the breeze. And there wasn't a bluetit in sight.

Slightly puzzled, I went back into my apartment, fetched a pair of scissors and two new fat-balls and went back out to the tree. The mesh bags had been torn open, as though they had been slashed with a knife. No bluetit could have done this. I hung up the new fat-balls, and kept an eye on the tree through the kitchen window.

The next morning I saw a crow, sitting on the branch the fat-balls were hanging from. I hid behind the kitchen curtain to avoid being seen as the bird cocked its head towards the fat-ball dangling fifteen

centimeters below. It then bent down, grabbed the string with its beak, and hoisted the fat-ball upwards. The crow teetered for a few seconds with the fat-ball still dangling well below the branch. Then it fumbled about trying to step on the white cotton string, before finally holding it down with its foot. The bird then opened its beak, and shook its head to free itself from the dry cotton string. The fat-ball was now four to five centimeters closer to the bird. With its foot still on the string, the crow bent forward, and once again grabbed the string with its beak. It lifted its foot, which was no longer holding any weight, then pulled the string a few centimeters further up.

The crow teetered a bit more, struggling with the heavy load, before once again stepping on the rope and letting go with its beak. The fat-ball was now just below the branch. Then, the bird bent down carefully, gripped the top of the net, and with a jerk of its his head, pulled the fat-ball up like an angler flipping his catch into a boat. The momentum caused the crow to stumble backwards, but with a few thrashing wing strokes it corrected itself. And there it stood, with my fat-ball in safe custody.

It struck me that if I ever had to pull up a rope with just one arm, that's exactly how I would do it.

If you have ever watched a crow picking a garbage bag apart you won't need me to explain how quickly this crow tore a hole in the mesh around the fat-ball, which, once released from the net, promptly fell to the ground. And as I watched the crow fly away, heavily laden, I thought about how determined it had been. Nothing seemed random about what the crow had done. It had a plan. Had it learned the trick from someone, or come up with it by itself?

I actually thought crows were quite repulsive. I once saw them snatching baby eider ducks that were bobbing about in a row like little balls of wool. The mother duck was at the front of the line, and had no chance of saving them. There is also something almost perverse about how well these wild animals have adapted to living off our garbage. I saw crows as unwanted, unworthy city dwellers; unlike the other city animals like the aforementioned bluetits. If I ever went out with a bag of stale bread to feed the ducks by the river, I would try to throw the food specifically towards the ducks so that the crows didn't get it.

But it had been fascinating to watch the crow solving the problem with the fat-ball. I had seen plenty of crows in my life, but they always seemed to be operating in my peripheral vision. Had I *really* seen one? What did it look like? I sat down at the kitchen table and tried drawing the crow I had been spying on. But I just couldn't come up with a good picture. My pencil scrawled a dark and shapeless creature. The only recognizable feature was its beak, a sharp, scythe-like weapon. It vaguely reminded me of a drawing by the Norwegian artist Theodor Kittelsen, *Pesta* (The Plague), which was the personification of the black death, the bringer of disease and destruction.

But while it was hauling the fat-ball up, one beak-length at a time, I had noticed a certain glint in the black crow's eyes. There was something there.

January turned out to be a good time for crow-surveillance.

When autumn comes and darkness looms over the afternoons, crows will begin to cluster; leaving their territories, dissolving their relationships, and becoming part of a large flock. These winter flocks can be enormous.[8]

One of these flocks ruled the palace gardens in Oslo where I went one afternoon. A fresh snowfall earlier that day had covered the old, compacted snow like a blanket of cotton wool. It was totally calm. The trees looked like black pillars against the pale blue sky. The wide slopes leading up to the palace, normally bustling with tourists in the summer, were almost empty. But there were a few people here and there, walking or cycling purposefully through the park.

The crows also looked like they had something important to do. They hopped around in the snow or fluttered between the branches. One landed in a large birch tree, its weight making the fresh snow cascade silently from the branches. I sat down on a bench a few meters away and took my binoculars out.

I had found that spying on crows was quite difficult. Not because of any technical difficulty; it was the opposite. There were crows everywhere when I first started noticing them, and they came so close there was almost no point me having binoculars. The problem was me. I was so used to walking past them that it took a huge effort to actually stop. Even now, having decided to look at the birds, my first impulse was to go off and spy on the people walking along Karl Johans gata, or check my phone for email.

But I had decided to spend half an hour watching crows and so I pointed my binoculars up at the birch tree. A crow squinted back at me, but gave me a few moments to study it. Its furrowed brow sat low over its eyes, and its wide beak gave the crow a large, broad gape with downcast corners – not entirely dissimilar to Mick Jagger's elderly mouth. It also didn't seem to like being looked at and had become quite vigilant when I raised my binoculars, as if it knew I was getting right up close to it, if only with my eyes.

The crow's large head was bent forward as though it was an extension of its powerful neck. It seemed front heavy. Its head, chest and wings all covered in black feathers which were curiously both matt and shiny. The rest of its body was covered in a matt, slate-gray plumage. Up close, I could see that these

feathers went all the way up to the underside of its beak, giving it a kind of downy chin. The crow stared right at me. Granted – a crow's pupils, iris and the feathers around its eyes are totally black, so it was hard to say exactly where it was looking, like a person wearing dark sunglasses.

With a little hop the crow took flight, gliding under the trees with outstretched wings, as the snow fell from the branch it had been sitting on.

It was quiet in the park. The roar of traffic around the nearby National Theater had been reduced to a faraway hum; deadened by the snow. Now and then the silence would be interrupted by a couple of muffled crow calls, *Caw! Caw!* which was all part of their daily conversation. A group of pigeons pecked amongst the snow beside a garbage bin. A cyclist with foggy breath rode up the wide slope in front of the palace, the snow creaking under her tires. She rode past the pigeons, then turned onto a trail and vanished between the trees.

On one of the lowest branches of a nearby larch tree sat another crow, clearly visible against the sky that was slowly turning blue. I raised my binoculars. Again, this crow seemed to be watching me as well. It sat with hunched shoulders as if it were freezing cold. Then something happened.

A young man wearing a suit and overcoat had come up the hill and was now walking towards the larch tree where the crow was sitting. He was holding something wrapped in white paper with the word “SUBWAY” written on it. His dress shoes looked slippy. The crow in the tree nodded its head. It blinked under its black hood.

The man then slipped on the icy path and with his arms flailing let go of what was in his hand. When he regained his balance he paused for a second and continued on his way, leaving the half-eaten baguette he had dropped lying in the snow.

The crow immediately lost interest in me, and when the man was out of sight the bird flew down from the larch tree and landed on the ground beside the man’s abandoned lunch. It pecked the baguette from different angles, then tried picking to it up with its beak. But the two halves of bread just fell apart, exposing the filling inside. The crow then looked around, picked up the half with cheese and ham stuck to it, and quickly bounded off towards some bushes a few meters away. It struggled through the stiff branches all the way into the bush, and left the half-baguette at its roots. Then, using its beak as a shovel, it buried the baguette in the snow.

The crow then reversed out of the bush, looked around again, as if checking to make sure no one had seen what had happened, and quickly went back for the other half of the baguette. It then picked up the remaining food in its beak and, with its heavy load, flew away.

The Crow Watcher

“I've been awake since five o’clock,” said Geir Sonerud, his face stretching as he yawned. Geir speaks with a calm East-Norwegian dialect that made me wish I was making a radio show instead of writing a book. “It used to be bird watching that dragged me out of bed, now it's my age.”

There we sat, cups of tea in hand, at the researcher's kitchen table at his home in west Oslo. He looked in suspiciously good shape for someone almost seventy years old. Other than waking him up early it didn’t seem like age effected Geir to any noticeable degree. It's not clear if the spring in his step, as he

strode across the living room, was due to the antioxidants in the green tea, or the bowl of nuts and dark chocolates on the table. I ate quite a lot of the chocolate anyway, just to be sure.

Geir is a biologist and crow researcher, perhaps the closest you might get to being a professional crow watcher. He told me that when he began studying biology, urban nature was not considered "nature" among his contemporaries. Nature was something that went on beyond the city limits, and only the most pristine nature was worth studying. In keeping with the spirit of the times, it wasn't really crows, but the elegant birds of prey that caught his attention when he was a young boy.

"I'm really embarrassed about how blind I was to urban nature," he laughed.

I had told Geir about my experience in the palace gardens, and the incident with the fat-ball. Both stories had made him wildly excited.

He told me that he and his colleagues had set up an experiment which was actually aimed at northern goshawks. They had placed three brown chicken eggs in a fake nest in a small area of woodland.[9] Geir had then sat quietly on the outskirts of the wood, camouflaged and equipped with a telescope. But the goshawk didn't show up, and Geir started getting bored. Until something else captured his attention. A crow had found the nest containing the eggs. Crows love eggs.

Three chicken eggs is too much for one crow to eat. So what would it do with the eggs it couldn't eat right away? The crow in fact didn't waste time eating *any* of the eggs. It looked around. Then picked up one of the eggs in its beak, and hurried off to a nearby spot where it put the egg on the ground and hastily covered it with moss and lichen. The crow then rushed back to the nest, picked up the other egg, and this time it flew a little bit further away.

With two of the eggs properly hidden, the crow had plenty of time to consume the third and last egg at its leisure.

"The crow won't waste time eating the first egg, it'll make sure it gets as many eggs to safety as possible," said Geir.

He explained that this crow had hidden the eggs based on stringent mathematical logic. Every second counts for the crow, which is surrounded by rivals on the food front. It must find the best compromise between protecting the rest of the eggs in the nest and hiding each egg well enough. While the first egg is being hidden, the nest is still full of valuables, so the crow will return as quickly as possible to protect it from competitors. The more eggs it has already hidden, the less valuables there are in the nest. This makes it more prudent for the crow to spend time hiding the remaining eggs properly, instead of rushing back to the nest.

The crow can then eat the last egg, confident that the other eggs are safely hidden for a later date.

Geir repeated the experiment several times, and the result was always the same.

"Even though it is hungry, the crow thinks long-term. It has self-discipline."

It reminded me of a study I had just read about humans and our ability to suppress our immediate desires. Forty test subjects were given the choice of getting something they like eating, let's say chocolate M&M's; either two chocolates right away, or six if they waited one minute. All of the test subjects said they would be happy to wait one minute for six chocolates. Then the two chocolates were put in front of the test subjects, and they were given the option to wait one minute for six. But only one in five test subjects managed to wait the required time to triple the prize.[10] It would appear that the crow beats the human when it comes to self-control.

Geir told me that he was once sitting at the edge of the woods with his colleagues when they spotted a crow that had found the nest containing the chicken eggs. It was right in the middle of hiding an egg.

“The crow looked around, like it was making sure no one had seen where it had hidden the egg,” laughed Geir.

“You could almost imagine it whistling innocently to itself. *Nothing going on here!*”

But then it stopped abruptly. The researchers couldn’t understand what was happening until they looked in the direction the crow had looked. Sitting in a tree quite far away there was another member of the crow family, a Eurasian jay. And it had a close eye on the crow.

The very next moment the crow pecked a hole in the egg and gulped down its contents.

“Had the crow hidden the egg as planned, the jay would have come and taken the egg the moment its back was turned. So once the jay had seen the hiding place, there was no point in continuing to hide the food! The best option was for the crow to just eat the egg right away.”

"Do you think the crow would have reacted if, for example, a pigeon had seen the hidden egg?” I asked.

“No, I don’t think so. I think the crow fully understands which of the other birds are smart and which ones are stupid,” he replied.

And this is why I’ll never underestimate a crow again. Geir's fellow researchers believe that crows have a theory of mind, an ability to understand another’s behavior.[11]

To find out what birds understand about the intentions of other birds’, and what insight they have into the mindsets of other birds, researchers conducted a series of experiments on the California scrub jay *Aphelocoma californica*, an omnivorous member of the crow family that lives in North America.[12]

The researchers found that scrub jays who have committed acts of theft themselves, understand that they too can be vulnerable to theft. If another bird sees where they are the hiding food, they will move the hidden food to a new hiding place.

Naive scrub jays, however, who have never *themselves* stolen food from other birds, are unable to imagine anyone else doing so. They may notice that another bird has seen where they have hidden food, but they won’t move the food and hide it somewhere else.

The researchers believe that these birds use their own experience to imagine what it is like to be in the other bird's place. It takes one to know one.

When you realize that someone wants something that’s yours, the next step is to try to manipulate them into not robbing you. In a number of experiments with ravens, researchers have shown that ravens will often try to prevent other birds seeing where they are hiding food. They will hide it in secret, behind an obstacle for example, or fly just far enough out of sight of the other birds. It might also delay hiding the food and wait for the other bird to become distracted, as humans might do with children when hiding Easter eggs.

Deception is also not unknown in the crow world. Ravens who are low in the flock hierarchy, usually the weaker birds, will easily lose the tussle for food if a fight breaks out. Let's say that one such lesser-raven is the only bird that knows the location of some hidden food. It would then be in the birds interests to lure the other, stronger ravens in the wrong direction. The lesser-raven will attract the other ravens’ attention by pretending to be on its way to a hiding place. The stronger ravens will then waste time searching vainly for food, while the lesser-raven sneaks off to where the food really is hidden.[13,14] Ravens

are even known to make fake hiding places, containing no food. This tricks the other birds into spending valuable time looking, and buys the first raven more time to eat the actual food.[15]

The ability of birds in the crow family, to understand the mindsets of other birds – what they think and understand – is a mental tool that few animals possess. Human children are often four to five years old before they develop the ability to understand what others understand, and this competence is usually not fully developed until after we have reached school age.[16,17]

What other secrets is this genus hiding?

All sorts of weird things can emerge when you dig a little into the family history. And the crow family tree has already produced a few surprises. Nothing about the crow's voice suggests that it is a songbird. But despite lacking any obvious musical talent, the crow family, *Corvidae*, actually *is* part of the songbird family. It may not manifest itself very often, but crows have a well-developed syrinx, or voice box.

Surprise number two: One of the crow family's closest relatives is the extravagant bird-of-paradise family.[18] Both crows and birds-of-paradise are native to Papua New Guinea. But while the spectacularly colorful birds-of-paradise only live in Papua New Guinea, one of the least urbanized places on the planet, the more discreetly-attired crow family has conquered the planet.

The large crow family is divided into several smaller genera, one being the genus *Corvus.* This genus contains more than a third of the crow species, all of which have *Corvus* as a prefix in their latin names. The genus has succeeded in spreading over large parts of the earth's land surface, and to many different environments. It is quite comforting to know that almost no matter where you travel you'll be under the watchful eye of a close relative to the crows you see back home.

Some birds in the crow genus do even better than others. There's good reason that the Norse god Odin's delegates took the form of ravens. The raven, *Corvus cora*x, is a species that can survive in most of the world's environments, from the arctic tundra to the desert, to islands in the Pacific. From their vantage points, Huginn and Muninn, Odin's very own winged messengers, were able to bring him news from most corners of the world. However, ravens prefer to avoid cities and other densely populated areas. So Odin would have missed out on a lot of useful city gossip had he trusted his ravens blindly. Had he sent out bird spies today, Odin may well have chosen another species.

Because while the raven will turn back at the city gates, the crow will follow us right in. The bird species that we name "crow" in Norway has the Latin name *Corvus corone cornix*. It is also called the hooded crow; unlike its close relative the black crow *Corvus corone*, which is all black, the hooded crow is gray on large parts of its body, apart from its wings and the area covering its head and chest that can almost resemble a black hood. The hooded crow lives mainly among humans and can also be found in Scotland, northern and central parts of Europe, and north-west Asia.[19]

There are between 150,000 and 300,000 hooded crows in Norway alone, most of them living in populated areas. We come closest to crows in the cities.[20] In the countryside they are often far more shy.

In the cities and urban areas of southern Norway (and as far north as the coast of Trøndelag) there are also jackdaws, *Corvus monedula*; a smaller member of the crow family. For a long time I thought these small, cute-looking crows were just young crows. As well as being smaller, they lack their larger cousin's severe countenance. A Jackdaw's eyes have light-colored irises, which makes it easier to tell where it's looking. That could be why I think it's so cute; an animal that reveals where it's looking will

inspire confidence among social animals like we humans. A jackdaw has a slimmer figure and a softer, rounder voice than its larger relatives in the crow family; and it says *chak*, *chak* or *carr*, *carr*, depending on what mood it's in.

The Magpie, *Pica pica*, is the crow's elegant cousin, from the same family, but a different genus. With its metallic black-and-white tuxedo, its long tail and white breast, I'd be tempted to say it was beautiful had I not become so used to seeing them hopping about nearby.

Today's crows originate from a "primordial crow" that moved out of the dense rainforest to more open and grassy steppe regions about twenty-eight million years ago.[21] When we apes climbed down from the trees and migrated to the savannas five to six million years ago, the crows had been there for millions of years already. Like us, they often prefer more open areas with a light covering of trees, to dense forest. From a crow's perspective, for example, a garden surrounded by large trees is ideal.

Gossip and Death

Back at Geir's house in Oslo the bowl with healthy sweets was now empty and he apologized for not knowing where his wife had hidden the real deal, the sinfully sugary chocolates.

After pouring more tea Geir pointed out the window at one of the neighboring gardens. Out there, on a hill overlooking the Oslo Fjord, was a huge tree with light gray bark that was smooth as skin. It looked like it belonged in more southerly parts of Europe. Geir said the tree grew stiff, red leaves in the spring. It was a copper beech tree. But now, in mid-January, it had a rounded silhouette formed by leafless branches. These branches extended from a low point on the trunk and stretched evenly towards the sky, making it a perfect climbing tree. It must have been visible from far away.

According to Geir, the copper beech is one of the city's regularly used preroosting trees. Every afternoon during winter, he said, crows will come to this tree, chatter a lot and make a noise.

Geir said that there were lots of these preroosting trees in Oslo, in the cemeteries and in the park around the palace for example, and so regularly used you could mark them on a map.

"A crow will hang out there for a while, bickering and making a racket, before flying off to a different preroosting tree. Sometimes it will return to the first tree, before making a final decision about where, and not least with whom, it will spend the night."

When darkness falls, the crows in the tree will calm down. Then, they will fly from the preroosting tree, quite silently, to the tree in which they have chosen to roost.

I have heard and read that strange things happen at these so-called crow meetings. They say that crows are put on trial there. Some people claim to have seen crows being expelled from the flock, or simply being pecked to death. A friend said she had seen a dead crow lying in a field, surrounded by a huge flock of crows. They weren't eating, or fighting, they were just *there*, standing by their deceased cousin. She wondered if she had witnessed a crow trial and subsequent execution.

While these beliefs about crow trials and executions are anecdotal, a number of studies have been done that shed light on what might actually be going on at these crow gatherings.

To find out if crows are transferring information in these preroosting trees, Geir and his colleagues attached radio transmitters to crows in a rural area a few miles north of Oslo. They then placed large piles of offal in random spots near places they had seen the crows. Some of the radio-tagged crows found the offal, and were allowed to eat their fill. When it was time to go to sleep and they left the offal, the researchers noted which trees the lucky crows spent the night in.

The next day, the researchers were monitoring the feeding spot, and noticed, unsurprisingly, that the radio-tagged crows who had found the offal the previous day, returned to it the following day. But that wasn't all: This time they brought more crows with them, many that hadn't found food the previous day, but had been in the same preroosting tree as those who knew about the offal.[23,24] So they too got a share of the meat. According to Geir, there was no indication that the crows with prior knowledge of the food had tried to get rid of their less fortunate colleagues. Quite the opposite.

"It is clear that when crows roost in this manner, there is some form of information exchange about who has found food that day," he says.

There may be a few reasons why crows tag along with the crows who have found food – there might be lingering odors in their plumage for example – but several studies of this crow genus indicate that Geir is right. Ravens in particular have been thoroughly studied. They too gather in preroosting trees, and researchers have observed that when ravens find food during the day, they can put on acrobatic aerial displays for the other ravens when they return to the preroosting tree.[26] They will roll and soar in the air in a way that seems like a pure showing off. And the ravens doing the air show will be the same ravens leading the flock back to the feeding area the day after. In the morning, before leaving with their new members of the flock in tow, these ravens will screech and squawk at the roosting tree – as if reminding their fellow crows that it is time to leave.

Other studies have shown that ravens who have found a good place to eat may even deliberately look for the rest of the raven flock in order to show them the food's location.[27] What these individual ravens gain by sharing food has been studied using mathematics: Experiments based on game theory have shown that the birds actually *do* gain something from alerting their colleagues – under certain conditions.[28] When food is found in large quantities but is difficult to locate, it pays to share.

Geir explained that winter, and snow, are such conditions when it comes to crows. Snow will obscure whatever's lying on the ground and make food more difficult to find. The crows will then be more dependent on cooperating. When food first appears, there is often more of it than one single crow can eat; it could be an open garbage container, a dead moose on the highway, or a garbage bag full of prawn shells that someone left out on the porch. Sharing something costs very little, and the crow is often dependent on the crow community for its next meal.

The crows' preroosting spots remind me of après-ski parties, where skiers meet at a bar after a day on the slopes. Beer will be drunk, and important information shared. Where was good today? Someone will have found a place with great powdery snow and a low avalanche risk, and will be going back the next day. The others, who weren't as lucky in their hunt for perfect snow, will listen intently. Most people will share this information because they know that finding a good spot is based on pure luck, and because they will benefit from doing so later.

In light of all this, it makes sense for crows to disband in the spring, according to Geir. In March-April, the supply of food becomes more reliable. In the spring there are always worms to be pecked out

of the soil, or tourists to rob. If the crow's territory is good, it will manage on its own. The crows no longer need each other, so they will put the camaraderie aside and abandon the flock. The large aggregations break up, and the crows revert to living in pairs.

But it was now January – time for living collectively. I asked Geir why some crows choose to spend the night in one place, and others go somewhere else. They all want to be where the food is, surely?

"Crows have different needs, just like us humans. One of them might be really hungry, so it will join the adventurous ones and fly far away to a huge garbage dump the following day. Another crow might be feeling tired and need a rest, so it won't want to fly that far the next day. It will tag along with the crows going down the road instead.

Geir and I got ready to venture out into the January cold. While wrapping his scarf around his neck, Geir said that it was hard to explain crow behavior without taking into account some kind of language.

"There has to be something. Nothing about the crow surprises me anymore."

If such a language exists, we humans have borrowed a few words from it. The word "crow" itself, originates from the Old English word *crawe*, which was an imitation of the sound of a crow call.[29] Or perhaps crows gave the name to themselves. Craa! Craawe! Craaawe!

The species name *cornix* is also probably derived from the proto-Indo-European word *kor-n*[30] or *k´orh-*, which, just like the Norwegian word, is an imitation of the crow's call. And the genus name *Corvus* means raven or crow in many Latin languages. This word is derived from the proto-Indo-European word *kor-ou*, which is also an imitation of the crow's song.[31]

But do these sounds actually mean anything?

I opened the door and we walked out onto the steps of the house. The frigid air made the hairs in my nose ice up. A crow gave off a loud *Crraw!* And then flew out of the beech tree.

Geir told me that large flocks of crows will gather in the beech tree. Sometimes, in broad daylight, hours before they would normally gather for preroosting, as many as fifty crows might sit there making a racket. He had seen crows fly long distances, often from three or four kilometers away, to join the spectacle.

The reason for this, he explained, will often be because there is a goshawk, one of the crow's worst enemies, nearby. But I wondered: Why would a crow fly into a danger zone? Wouldn't it be better to get out of there?

Geir explained how it is about having an overview. The northern goshawk is a master of the surprise attack when it comes to individual crows. Crows are therefore safer in a flock that has many pairs of eyes. Sitting amongst a noisy flock of crows offers protection against being surprised when one least expects it.

Since the seventies, we've known that many of the sounds a crow makes can provoke specific reactions from other crows.[32] What Geir can hear when the crows sit together in the copper beech tree outside the house is, for example, a staccato "scolding," where the crows will berate the despicable hawk for daring to get too close. The noise frightens the hawk, according to Geir, and alerts the other crows nearby. The intensity of the scolding varies according to the type of danger and how close it is.

What we humans perceive as a uniform-sounding *craw!* can vary in length, pitch and tone quality. Every crow has a unique voice, which can be recognized by the other crows.[33,34] Recent research suggests that some crows may also be capable of distinguishing between humans.[35]

Geir and I strolled down to the sea along several residential streets. The crows in the trees greeted us with an indifferent – *craw!* I told Geir that I had been visiting the crows in the palace gardens quite regularly, how I sometimes take a bag of bread with me, and how the first few times I did it, all the crows had looked identical to me. Even far more driven biologists find telling one crow from another difficult. Granted, on average there is a difference in size between the sexes, but large females can be larger than small males.

Eventually I did start noticing individual differences between the crows. Some were clearly bigger. Some were shy and kept their distance, while others would come right up to me, tilt their heads, and boldly look up at my face, so close that I would almost back away myself. Some were particularly good at catching pieces of bread in the air. One would just stay on the ground and rarely flew more than a few meters, perhaps due to an injured wing. But I was still far from being able to tell them apart.

But what about the crows? Was I imagining it, or were they approaching faster and faster when I arrived with my bag of bread? Were they recognizing me?

To answer this question, I have to make a leap in time and space, to the University of Washington, Seattle Campus specifically. It is February 2006, a few days before Valentine's Day. Seattle is a city of parks and lawns and scattered trees, surrounded by water. It is cold, and there are very few students to be seen on the straight paths criss-crossing beneath the trees on the university campus. On this winters day, the crows outnumber the students who notice a couple of human-like figures crossing the frost-covered grass. Their features are coarse and contorted, with heavy eyebrows and flat noses. What are two Neanderthals doing out there on the lawn?

The crows on campus have for many years been the closest research subjects of biologist John Marzluff, a researcher on crow behavior. Hidden under the caveman masks, he and his students are about to test how far-sighted the crows are, and how good they are at remembering an enemy.

Over the next few hours, the two Neanderthals catch seven crows. They identify them with bands around their ankles, and let them go. A flock of highly agitated crows circles overhead during and after the entire operation. They screech their hoarse-sounding – *craaw!* a sharp-sounding alarm signal, before diving towards the Neanderthals as they would when a fellow crow is being attacked by predators, or is in some other kind of danger.

Once they have captured and released the seventh and final crow, the Neanderthals enter a building, where, out of sight of the crows, they remove their masks and become crow researchers again.

A few days later John Marzluff takes a walk through the campus wearing his mask. It's something he has done before without the crows showing any interest in him. But today things are different. The first crow he encounters squawks loudly when it sees him. It does not have a marker on its foot, so it can’t be one of the crows the Neanderthals had caught. Yet it follows him, shouting and keeping a wary eye on him. Maybe it had witnessed the offense the two Neanderthals had committed a few days earlier? The squawking attracts one of the other crows, this one with a marker around its leg, i.e., one of the birds who experienced being caught. Both birds keep Marzluff under close surveillance on his tour of the campus.

Of the twenty crows he saw that day, three reacted to him.[36] A small percentage of the campus crows had realized that this Neanderthal was not their friend.

For the next two and a half years the crows were left in peace. But then, in the autumn of 2008, John Marzluff put his mask back on, and went for a walk under the trees outside the office. This went down

badly among the crows, to put it mildly. Most of them, perhaps two-thirds of the thirty-eight crows he encountered, squawked angrily at him,[37] which was a far higher number of crows than had originally been caught.

When other people wore the masks this too caused havoc among the crows. But when Marzluff wasn't wearing his he was allowed to walk in peace. What the crows were reacting to was the Neanderthal mask.

Ten years after the initial capturing of the seven crows, the majority of crows that had witnessed the incident would have most likely died. Nevertheless, in 2016, when Marzluff took another walk around the campus wearing his mask, there were more crows squawking at him than ever before.[38,39]

What the researchers think, is that when a crow squawks at Neanderthal John, the other crows rush to the place, not only to assist with the squawking, but also to see what the danger is. The next time they see the Neanderthal mask, they will have learned to associated it with danger, and sound the alarm, even though they never experienced to the original wrongdoings. When the crow-parents squawk at Neanderthal John, their young learn that this face belongs to someone who is hostile towards crows. In the children's book *Ronia the Robber's Daughter*, Ronia's father takes her around a huge forest showing her all the potential dangers: *Here's the waterfall; don't fall into it. Here are the trolls; watch out for them*. Similarly the crow parents will say: *Here's a dangerous creature, keep away from it and make a lot of noise*!

This way, a creature's reputation can be kept alive over generations.

But crows can also become friends with humans. There are stories in the media about crows bringing gifts to the people feeding them. Some crows have left colorful stones, plastic toys and dead mice on the doormats of their most faithful allies.

Geir confessed he had spent years trying to become friends with crows.

"I'm quite bitter about it," he laughed. "I've been feeding crows and magpies for years, leaving food out for them several times a week, but it hasn't made them any more trusting of me. They just squawk at me and fly off. I never get any presents either, although they do occasionally drop walnuts on my car."

I failed to remind him that much of his career has been spent catching and tagging crows.

The American crows that had made a mental note of John Marzluff and his Neanderthal mask are of the same genus but not the same species as our hooded crow. They belong to the species *Corvus brachyrhynchos*. Does the Norwegian crow behave in the same way? Geir told me how he had spoken to a Swedish woman, an artist, who had apparently become acquainted with the crows in the palace gardens. I got hold of her number, and over a crackly line from a farm outside Stockholm she told me her crow story.

A few years earlier, during winter, Sasha had been studying at the Art Academy in Oslo, and her master's thesis had been about crows. Every single day she would get off the tram at Holbergs plass with a packet of high-fat cat food (for kittens specifically) in her bag. She would follow the path leading into the palace gardens, to the same place each time, and scatter the brown cat food pellets beneath the trees. The crows sat quietly above, keeping watch until she had turned her back and was walking away.

It was a little game between her and the crows who waited until she had walked a good distance away before flying down to eat the cat food. If she turned around before being far enough away, the crows

would fly back into the trees. And if she looked straight at them, they would fly away faster than if she looked elsewhere. But as the weeks went by, the crows began descending faster and faster to the ground until eventually they were landing before the food had been put out. *They recognize me*, she thought.

One day, Sasha took her usual tram, but when she reached Holbergs plass there was a crow waiting for her at the tram stop. It had a crooked beak which made it possible to distinguish it from the others, and it followed her along the paths to her regular feeding spot. It was the first of many days where the crow stood waiting when her tram arrived.

Sasha's master's exam was due to take place in a building near to the Art Academy, and right next to the palace gardens. So when the day of the exam arrived she took her usual tram, and there, waiting at the tram stop was the crow. As usual it followed her – although this time it followed her to the exam building, just next to the palace gardens. Sasha laughed when she remembered how it had sat on the window ledge outside, peering in while she presented her thesis – which happened to be about the very same crows in the nearby park.

In Seattle, John Marzluff had known that crow flocks can develop a form of collective knowledge; knowledge about dangers or things that are good, about which animals are kind and which ones are hostile, can be shared and disseminated, over time, and from generation to generation. This creates a tradition within the crow flock; a crow culture. Sasha's story suggests that the Norwegian crow also understands which humans are their friends. While we see just a mass of grey-black crows, these crows are able to recognize humans on an individual level. Perhaps crows know more about us than we know about them.

But what about the anecdotes about crows gathering around other dead crows?

Kaeli Swift has taken the mask experiments one step further. Swift, who was one of John Marzluff's students, wanted to investigate the crows' relationship with death. She had masked students feed the crows peanuts, in the same designated places, for several days, until the crows had started waiting for the masked students to arrive.[40,41] The students then went to the feeding spot, still wearing the masks, only this time they had a dead crow with them. The crows already at the feeding spot immediately sounded the alarm. As with Geir's story involving the goshawk, more crows joined in, even though the only threat the masked students posed was the fact they were carrying a dead crow. The crows soon began flocking around the crow-carriers, while squawking and making a commotion.

On each of the following days the mask-wearing students returned, with peanuts, but *without* the dead crow. But this time the crows took a long time to come. It was as though they were trying to avoid the place where the dead crow had been seen. Those that did come squawked at the masked students, even though the students were no longer carrying a dead crow. Some crows went on the attack. It was obvious that the local crows now had an aversion to both the feeding spot and the mask-wearers.

In her dissertation, Swift calls the gathering of crows around the dead crow a funeral ritual. She believes that crows will use another crow's death to learn which places or creatures might be dangerous in order to avoid falling into the same trap themselves. A study group learning about violent death.

Street-smart Crows

We humans like to think of ourselves as the pinnacle of what evolution has managed to accomplish. In the search for characteristics that require complicated thought processes, researchers have looked mainly at the great apes, i.e., humans and our close relatives. We have assumed that humans are quite alone in having a language, in understanding what others think, in making and using complex tools, and gaining knowledge from others that we can store for later use.

In other animal groups, we have often looked for intelligence among the animals that most closely resemble ourselves. The owl, for example, is often considered the smartest member of the bird family; perhaps because it has a flat face, a high forehead and eyes that face straight ahead just like us? But the owl is in fact fairly stupid (if you were to dunk an owl in some water, you would see that its large head is predominantly made up of feathers). Crows, on the other hand, are quite alien to us. These birds have low foreheads, eyes on either side of their heads, and generally score poorly in terms of physical recognition.

But in just the last few weeks I had seen crows communicate, think long-term and strategically. Could it be that humans have more in common with crows than I had previously thought?

"Mango" is a New Caledonian crow, an all-black bird with large glistening eyes and a short, triangular beak, which is native, as the name suggests, to New Caledonia. Mango had been living a normal crow life in the jungle before being captured by curious scientists. It has been known for years that New Caledonian crows are extremely good at making and using tools. Prior to that, only humans and chimpanzees were thought capable of making tools out of several parts, without any guidance or fumbling. The ability to create complex tools to solve problems is very demanding on the brain, and takes many years to develop in human children.

Along with eight other New Caledonian crows, Mango was presented its favorite food (the researchers don't say what this was, but pieces of raw pork heart were used in other similar experiments so I imagine the same thing was used here). The problem for Mango and the other seven crows was that these tempting pieces of meat were in a cage, and well out of reach. Outside the cage there was a pile of sticks; some were large and hollow, and some were smaller in diameter. However all of them were too short to be used by the crows to fish the food out of the cage.

Although they had never seen these kinds of sticks before, Mango and three of the other crows successfully joined two of the sticks and managed to fish out the pieces of meat without much trouble.[43] When the researchers moved the food even further into the cage, Mango managed to join *four* of the sticks. He therefore won both the food and the competition to get on the short list of animals capable of making their own multi-part tools.

If you bisect a human brain, you will see a thin, gray layer that covers the underlying white matter. This is the brain's gray matter. It consists mainly of cell bodies, and the connections between neighbouring cells are made via synapses. In mammals, tasks involving complex cognition, such as decision-making and language, are primarily dealt with by an area of gray matter called the neocortex. The neocortex, the star of the story of human intelligence, comprises the largest portion of outer gray matter – and is made up of six horizontal layers. In humans, these layers are only about half a centimeter thick altogether, but are folded into hills and valleys, and therefore have a large overall surface area.[44]

The layers of gray matter in mammalian brains differ from each other mainly because they consist of different types of cells. In an interview with National Geographic, crow researcher Nicola Clayton

compares the layering found in mammalian brains with the layers of bread, tomato, cheese and lettuce you might find in a sandwich.[45] It is thought that this layered structure is important for the role that the neocortex plays.[46]

In the book *Gifts of the Crow*, the authors describe how limitations in technology led researchers to conclude that a structure as complex as the neocortex only existed in mammals.[47] In the late 1800s, the German researcher Ludwig Edinger was interested in the structure of the bird brain. He would dye pigeon brains using an early form of histological staining, a process which makes the structures of different types of tissue more visible, then cut the brains into thin slices and put them under the microscope. This enabled him to compare the brain structure of birds and mammals. Under Eddinger's microscope, the bird's brain looked almost homogeneous; it appeared to be devoid of layers, or the connections that bring different parts of the brain together. These structures, researchers believe, are among the things that make it possible to coordinate and process different sensory impressions, and which enable the more advanced mammals to reason and to learn. Eddinger therefore believed that birds have very limited cognitive abilities, and that when they demonstrated complex behavior, it was a result of pure instinct.[48]

In Eddinger's worldview, primates stood majestically alone at the top of the evolutionary ladder. However the researchers had difficulty explaining how even a pigeon, with a brain the size of a shelled peanut, has fairly advanced cognitive skills; pigeons can, for example, recognize faces and remember places, or be trained to distinguish between paintings by Monet and Picasso, even works they have never seen before.[49]

In order to compare the intelligence of birds and mammals, one must know what one is measuring. Many animals can perform complex actions based on their genetic programming. Bees, for example, will dance to show each other where food has been located, without it being a reason to ascribe them any great mental capabilities. Many animals can also be trained to perform tasks or respond in a certain way in response to stimuli.

But some animals manage to solve *new* tasks – tasks not previously part of their repertoire and are therefore neither genetic or learned. They think anew; they have a mental flexibility that enables them to behave cleverly when faced with totally new challenges. Many researchers consider this to be an important form of intelligence.[50]

Eddinger's Austrian successor, the behavioral ecologist Konrad Lorenz, spent his whole life researching ravens, and also kept them as pets. Lorenz discovered that his ravens clearly behaved instinctively – they had a set of methods for dealing with the world – but that this instinct could be modified through the experiences the birds were given. And he found that, unlike Pavlov's dogs, the ravens learned in a similar way to humans: They are creative and flexible. This, according to Lorenz, indicated that a raven’s brain had to be governed by more than instincts and acquired characteristics.[51]

Thanks to better dyes, Lorenz’s theories were soon substantiated by technology. Just as chemicals can be used to develop an image on photographic film, these new chemicals could reveal hitherto unknown structures in the cross sections of a raven's brain. Slices of raven brain tissue, when stained using this new color technology, showed that these birds’ brains were anything but uniform.

Just like mammals, the white matter in a bird brain is covered by a different kind of brain tissue.[52] However the structures are different. While the mammalian brain is layered, like a sandwich, says Nicola

Clayton in her interview with National Geographic, a bird brain might instead be compared to a pizza. All the ingredients are there, the cheese and the tomato and the ham, but they are side by side, rather than on top of each other.[53] The pizza-like structures in the bird brain can work analogously to the structures found in parts of the mammalian brain's neocortex.[54] The bird brain also appears to have the capacity for interconnection and for processing different sensory impressions.

Here lies maybe one of the keys to understanding the crows in the palace gardens. Since the crow's brain tissue is perhaps *similar enough* to the mammalian neocortex, this makes it possible for crows to have a cognitive way of dealing with reality that is comparable to the one we humans have. Evolution has allowed the bird brain and mammalian brain to follow different evolutionary paths, but they have nevertheless ended up in virtually the same street.[55] This has given some birds enough brain power to develop a form of language, and to solve tasks that human children cannot tackle until they are in the later years of kindergarten.

Neither mammals nor birds get their brain power for free. On the contrary, large brains come at a high price (anyone who has witnessed a *Homo sapiens* give birth will attest to that). A brain takes up a lot of space and is heavy, and uses a disproportionate amount of the energy absorbed by the body. So why do some animal groups develop large brains while others don't? And why do crows and humans – perhaps two of the smartest animals – meet specifically in cities?

In the article "Intelligence in Corvids and Apes: A Case of Convergent Evolution?" The article's authors look at theories which aim to explain why primates developed their large and costly brains. The authors of the article believe that many of these theories may also explain the crow's large brain capacity.[56] For example, many primates live on plants and fruits, which grow in different places and mature at different times. The landscape offers a good source food – but an individual must remember where and when this food can be found. So having a good memory is highly advantageous. According to the article's authors, the same argument can be applied to crows, which live predominantly on seasonal food.

Walnuts for example. "Typical September food," says Geir. "It's something city crows have added to their yearly calendar." Geir and I had just walked beneath a huge tree with rough bark in a garden a few hundred meters from his house. "A walnut tree," he explained. "In the autumn, crows come from all over the city to help themselves."

"They remember what time of year these walnuts get ripe."

Geir isn't someone to be content with speculation, so he and his colleagues set up an experiment to accurately test the crow's memory. A test crow was released into an area where the previous year it had found, and plundered, the eggs from several nests, and the first thing it did was check those very same places again. Only after it had gone to the places it had previously found eggs did it start to investigate the rest of the area.[57] It's no wonder so many small birds go to the trouble of building new nests every single year. Since I can barely remember where I was living a year ago – I have to tip my hat to that.

The crows here, according to Geir, have also found an ingenious way of opening the walnuts' hard shell: They drop the nuts onto the asphalt, much to the despair of the local car owners who have to expect a few dents.

Another thing that requires a degree of brain capacity is living socially. Many species of primates and crows live in groups, so it's important to be able to understand how others within the group think, and to

be able to build and understand social relationships. The crow's world is a social world, full of friends and enemies, harmless idiots and potential robbers. A crow's success depends on its ability to understand and act smart within this social environment.

Whatever the reason, evolution has given the crow an extremely large brain in proportion to its body weight.[58,59] As large, in fact, as in our closest relatives, the chimpanzees.[60] The parts of its forebrain thought to be analogous to the mammalian prefrontal cortex, namely the nidopallium and mesopallium, are especially large.

Crows can actually be even smarter than their brain size indicates. As with a number of other songbirds and parrots, crows have smaller and more densely-packed neurons in the brain than mammals[61] – perhaps because they need to be able to fly and are dependent on being as light as possible. So the crow's small brain has room for a lot more neurons and interconnections than a similarly sized mammalian brain.

So the crow is smart. And in the cities it is *street* smart. Urban environments are among the most unstable environments on Earth. Since the 1950s, between 70 and 80 percent of the green areas in Norway's cities have disappeared.[62] Buildings are demolished, they are constructed, the people living in them develop new habits and use new technology. I imagine the daily life of a crow involves a range of new problems like: How can I get under the lids of the municipal garbage bins? How can I make holes in the take-away boxes from the new Thai food place on the corner? How can I avoid getting run over by the new and eerily silent electric cars? Which of my human neighbors feed me, and which do I need to stay away from?

But what I have wondered most is, how does it feel to be a crow?

When I experience something unpleasant, I become scared and angry. If I think about the situation later, I will feel the tension rising in my body. And if I meet the person who made me angry, my body will prickle with irritation whether I want it to or not.

Had the crows on the Seattle campus felt something resembling anger, or fear, like a child encountering the school bully in the corridor, when they saw the infamous Neanderthal walking beneath the trees? Was the crow with the crooked beak happy to see Sasha arrive with the bag of cat food, like hungry restaurant guests when they see the waitress coming with their order? Do crows daydream about the summer heat in the middle of winter, when they gather in the trees, cold and hungry?

"They have feelings of course," Geir says. Our crow trip had now led us down to the beach. We had just watched three crows taunting a pug that was tied to its leash outside a shop. I had noticed that the sounds they made as they tried to pull the helpless dog's tail were short and sharp, unlike the more drawn out *craaw* sounds they made with when the dog owner chased them away.

"Like many other animals, they feel pain, fear and hunger. But emotions? That's something else."

"In the modern, Western world we see humanity as being separate from everything else. We see humanity as nature's shepherds; we are superior to it, separated from it, we believe we are created in the image of God. We find it hard to believe that creatures who don't resemble us can feel emotions the way we do. We might go as far as believing that chimpanzees can be happy and sad. But why can't crows be happy and sad?"

"At the same time, it is easy to ascribe other creatures with human emotions. We don't know. I've yet to find a technique for interviewing a crow," he said.

Geir's crow-research colleague, John Marzluff, hasn't interviewed any crows either. But he has let their brains speak directly, in a language we humans more easily understand – technology. Marzluff and his colleagues went round catching wild crows, while wearing caveman masks. The crows would therefore perceived these masks as scary. During their captivity, the crows were fed by humans wearing different masks – which the crows were to perceive as kind. The crows brains were then viewed using a PET scan during which some of them were shown humans wearing the "scary" mask, and others were shown humans wearing the "kind" mask. This would allow the researchers to see which of each crow's brain centers was active.

When the crows were shown the scary mask, it activated the brain centers in the amygdala and cerebral cortex.[63] In mammals these centers are associated with fear. However when the crows were shown the kind mask, the one used when they were given food, other brain centers became active. In mammals, similar centers are associated with motivation and hunger.

The researchers conclude that there is a strong similarity in how the crow brain and mammalian brain uses the brain areas which process things such as emotions, when we recognize, and emotionally deal with, a face. And that it's possible that the systems in the bird and mammalian brain have the same origin.

In an interview with the Norwegian newspaper *Aftenposten*, Marzluff elaborated further:

"The patterns we saw in the crow brain were exactly the same as those we would see had we scanned a human's reaction to a friend, an enemy and a neutral person, respectively.

"Although it's 300 million years since we shared ancestors, our brains still have some common traits in terms of structure and function. Both crow and human behavior is based on perception, emotional state and experience. When we see an old friend, we get a warm feeling because of the chemical reactions in the brain and hormonal system, and when we see an enemy, we experience fear and anger. Crows feel the same things."[64]

While I have been working on this book, I have heard an insane amount of crow stories. They often go along the lines of: "I don't particularly like crows. But…" I have sat in the hairdresser's chair and listed to the stylist talking about his neighbors tame crow, so enthusiastically that he totally forgot about cutting my hair. I've heard about crows taking daily walks with old ladies, crows following hedgehogs across the road, crows eating the pet goldfish of people who suddenly stop feeding them (pure mafia style), about crows that have bullied cats, and crows that have used a snowy rooftop as ski slope for no other clear reason than because it's fun.

Whether Marzluff and his fellow crow researchers have found the complete and absolute truth about the crow's strangely recognizable behavior, I cannot say. As with another two-legged city-dwelling species, the crows' way of life cannot be totally broken down into pieces of behavioral psychology and evolution.

Geir and I had by now walked through a small wood full of tall, straight-trunked pine trees, and had arrived at the sea. The snow almost reached down to the shoreline. There was a smell of rotting seaweed which, along with the ice-cold air, stung our nostrils. The sea was perfectly flat and calm, small waves lapped against the rocky beach and the giant blue-grey boulders. Geir then told me, almost tenderly, about a crow that had settled right beside a café where he had been sat enjoying his coffee. It had found a piece of white bread, but wasn't happy about the consistency.

“So the crow dipped the bread in a nearby puddle, like it was dipping a crispy French croissant into a cappuccino,” Geir said, demonstrating how the crow repeatedly turned the bread while evaluating it with a critical eye, to see whether it was soft enough.

In the end, when the crow looked clearly satisfied, it hopped up onto an available cafe chair to enjoy its food.

We stood right out by the shore and watched a crow picking through the mounds of seaweed. Its beak was a solid, beautifully functional, and well-maintained tool; powerful enough to cut through plastic nets, sensitive enough to pluck snails from their shells. The color of its wings and head was both dull and shiny, as I imagine black pearls perhaps look. Geir explained how it was now, just before the mating season, that the crow's plumage is at its best. A new and spotless crow uniform. It was the first time I had seen a crow and thought that it looked beautiful.

Geir was due to retire from his job at the university in two months, and was looking forward to what he described himself as “writing for eternity.” He was of course going to be writing about crows.

The wind blew ashore from the south. It had been picking up throughout this short January day, and now, just after sunset, had developed into a steady breeze. The horizon was an ice-cold pink. We said goodbye. I watched Geir as he strolled down the path, back to the articles waiting for him at home, while I thought about my strained relationship with the crows. Maybe some of my aversion to them stemmed from the fact that they don’t waste any time or effort on being liked. They are not set to appeal to others by having nice feathers or voices. They don’t beg for human attention or food, in the same way that mallards or cooing street pigeons do. Crows ask for nothing. They just take what they want, as if it's their absolute right to do so.

On one of the rocks sat a crow with what looked like a mussel in its beak. It then flew a few meters into the air and dropped the mussel onto the rock. The crow then landed beside the shell, and examined it. It was obviously not happy with the result, because it immediately picked up the shell with its beak, and flew back into the air again. The shell this time flew in an arc and landed a few meters away.

I went a few meters closer and raised my binoculars. The crow stared back at me, but didn’t fly away. It looked surprised. Maybe because the wind had blown the down on its forehead upwards, making the crow appear to have a pair of shocked eyebrows. It was the first time I had seen a crow with what might be described as a facial expression, although I had never really looked that closely before.

The crow bent down towards the shell, which it was holding with one foot, and with its beak tried pulling on something I couldn’t see. Then it picked the whole shell up in its beak, and flew away. I watched as it soared over the beach and into the woods. Perhaps the crow had learned, by watching other crows, that the mussel shell will crack a little if repeatedly dropped, and that if it drops it often enough it will eventually be able to get at the soft mollusk inside. Maybe it had come up with the idea itself.

That winter I started carrying binoculars everywhere. I could stand for a long time watching the crows in the huge trees downtown. They would often do things that made me want to call out to the nearest passerby:

“Look!”

One late winter day, I was waiting for a bus and witnessed two crows struggling to get a thin, 40-cm-long twig, up into a medium-sized, relatively dense rowan tree. One of the crows had the unwieldy load in its beak, and after a struggle involving several failed attempts, it finally reached the trunk at centre of

the tree. Using their beaks and claws, the crows then placed the twig in a tree fork, where it sat, rocking gently, while one of the crows guarded it. The other crow in the meantime flew down to the ground and collected a new, slightly thinner twig. And with the new twig in its beak, it then fought its way back into the tree, to the tree fork where the first twig had been put. The two crows looked almost like a couple of builders as they helped each other maneuver the second twig under the first twig. You could almost imagine them giving crow commands to each other: “Right a bit! - Up a bit!”

It was a while before the crows finally managed to get the two twigs to sit crosswise. Then, a sudden gust of wind destabilized the whole structure, and both twigs fell to the ground. The crows flew down, stood under the tree, and paced back and forth a little. Then one of them picked up a twig and flew back up into the tree, to the same tree fork as last time. Using its foot and its beak, the crow adjusted the twig's position and angle, while the other crow flew up with a new twig.

Was this the start of a crow’s nest? I had seen hundreds of crow's nests in my life, without ever considering how they get built using little more than a beak. Two buses had meanwhile come, and gone, and the crows were still struggling with branch number three, so I had to say goodbye to the house building. But I couldn’t help wondering how the crows knew where to place the first branch, to give the construction a secure foundation.

It must have been after seeing this that I began looking in amazement at the crow's nests I passed. Just by the fact that they were *there*, like huge black scribbles in the trees. Many of them had, as far as I could remember, been there for years; clinging on through strong winds and under the weight of wet spring snow.

I began treating crows and ducks equally when I fed them bread by the river. It surprised me that, although they were about the same size, the mallards had the upper hand. If there was ever a tussle between a crow and a duck over a piece of bread, the crow would back away.

Still, I had no illusions about the crows. We were not friends. I knew they would peck my eyes out given the chance. But I had started taking binoculars out with me whenever I left the house.