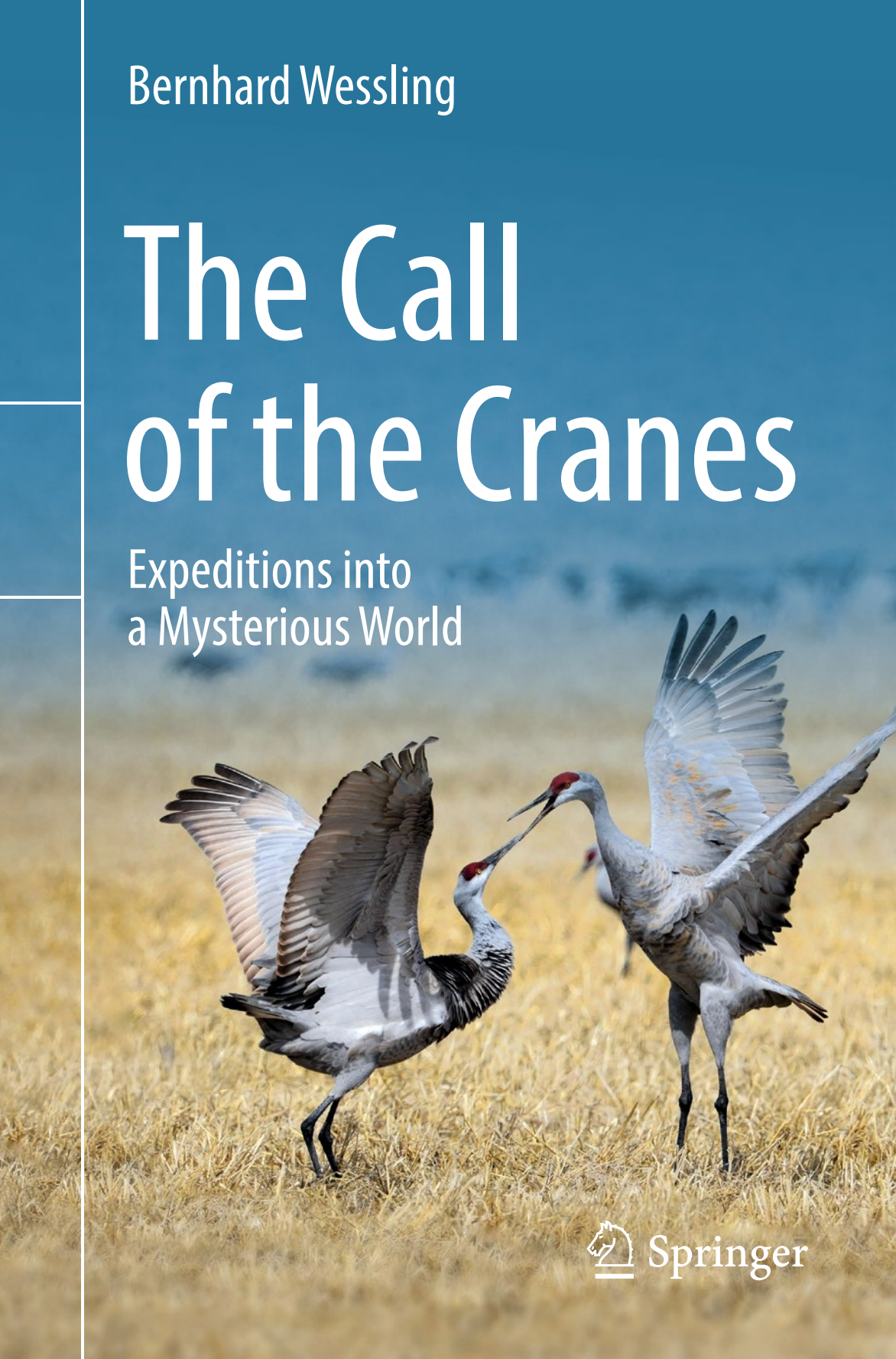
Bernhard Wessling

The Call of the Cranes

Expeditions into a Mysterious World



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For George, without whom this book wouldn't even be half as interesting;
for my grandchildren, whose inquiries prompted me to write it;
for my partner, she supports me so much.

Foreword

When a pair of Sandhill Cranes that nested in a small wetland near our home lost their 3-week-old juvenile to predators in the middle of the night, the parents called for the remainder of that night, and frequently throughout the next few days. They seemed to grieve. Those that work with captive cranes know the great variation in their personalities. The more one experiences cranes in the wild, the more fascinating they become. After all, these tallest of birds that fly have graced earth's landscapes for millions of years before humans appeared. Evolution has had plenty of time to perfect a remarkable product.

Dr. Bernhard Wessling, a nature lover and an accomplished chemist, became interested in cranes in 1981, when a pair of Eurasian Cranes established themselves in a nature preserve near Hamburg, Germany. He observed them frequently and recorded extensive notes about their behavior. In the following years, more pairs established breeding territories in the wetlands and meadows. Bernhard wanted to know more about them. To protect the cranes, a rule was created that humans were not allowed to leave footpaths. Because it was impossible to capture and color band the cranes, Bernhard recorded their calls and, through analysis of duets performed by pair members, he was able to identify every bird. Year after year, by recording the duets, he was able to peer into the lives of both individuals and pairs. This book reveals his remarkable discoveries, collected in the wild, about the behavior of these complicated creatures (Fig. 1).

At a conference about cranes in Germany in 1996, I was enthralled by Bernhard's findings, and suggested he use his techniques to learn more about the rarest of cranes, the Whooping Cranes in North America, and the Red-Crowned Cranes in the Orient—both close relatives of the abundant Eurasian Cranes. Whooping Cranes numbered in the low hundreds. Vocal

Fig. 1 Whooping and Sandhill Cranes resting at Platte River, Nebraska, during their migration to the South: It is very rare to see so many Whooping Cranes resting together during migration. Photo taken on Nov 6, 2021 (© Crane Trust by Colleen Childers)

identification avoided the risks associated with capturing cranes to band them. Dr. Wessling's recordings of wild Whooping Crane vocalizations have been used during the raising and flight training of captive-reared Whooping Cranes to communicate with them and have them follow ultralight aircrafts to learn their migration routes across the USA. Thus, he has made a significant contribution to the reintroduction of a migratory flock of Whooping Cranes east of the Mississippi River.

And I had a hunch that the non-migratory Red-Crowned Cranes in Japan were perhaps genetically distinct from their migratory cousins on mainland Asia. Perhaps their call might provide more evidence to answer an important question for conservation. Bernhard's adventures and findings in Texas, Japan, and South Korea (in the DMZ at the border to North Korea) are outstanding.

Beyond the many obvious questions that individual recognition answered, Bernhard's analytical mind ventures into the questions about the ability of cranes to reason and not simply to respond. That is where this book becomes unique and thought-provoking and brought me back to thinking about the wild Sandhills near my home.

One summer, I fed them corn every morning some distance from our house along the driveway that ran through the marsh. The cranes were standoffish and never came near us. One morning, I forgot to feed them. They walked to the house, climbed up the steps of the porch, stood beside the kitchen door, and called. As well as getting the message, I also realized that cranes not only respond, but they can also think!

Enjoy the read. And thank you, Bernhard, for your substantial contribution to our understanding of these remarkable birds that migrate across continents, dance, duet, lavish care on their young, and still survive, despite the ways in which we modern humans have impacted their ancient lives.

International Crane Foundation
Baraboo, WI, USA

George Archibald

Foreword

Sy Montgomery, naturalist and author of 31 books for both adults and children (including *The Soul of an Octopus: A Surprising Exploration into the Wonder of Consciousness*, which was featured on the *New York Times* best-seller list).

The Call of the Cranes is a mesmerizing, vivid, lyrical, and revelatory book. Full of beauty, suspense, and insight, it is not just about a beautiful and mysterious bird—though this alone makes these pages thrilling reading. But Bernhard Wessling brings us even more. He has spent many years conducting studies on the intelligence and behavior of four species of cranes in the wild, including a new method he developed to identify crane individuals and pairs in his study areas without disturbing them at all: from a distance, by analyzing their voice. This book is a testament to the joy and dedication that ignites when we deeply connect with individuals of other species, when we enter and inhabit their world. And it is also a call to arms, inspiring us to summon the courage we need to save the cranes—and all the other species threatened by us humans.

Syracuse University
Hancock, NH, USA

Sy Montgomery

Preface

It was a long way from the densely populated, ugly, and heavily polluted Ruhr region, where I grew up and studied, to the Duvenstedt Brook near Hamburg, where I saw cranes for the first time in my life. Even longer and more arduous was my expedition into the hidden, mysterious world of the cranes, their life, and their way of thinking.

I came into contact with the issues of environmental pollution and threats to nature at a very early age. As a child, I often noticed, when our family of eight's laundry was hanging outside in the garden, how a cloud of soot would rise from the chimneys of the nearby coking plant in Herne, settling in our backyard and leaving ugly black stains on the clean clothes. As a teenager, I loved the late autumn evenings, when the dense fog forced the then still small number of cars to proceed at a walking pace, while I drove my bike, to which I had attached powerful lamps so as to conjure up mighty cones of light within the fog, which was, in fact, smog.

In 1971, as a third-semester chemistry student, I responded to a blackboard notice seeking chemists to analyze illegally dumped barrels.[1] Most of these contained cyanide compounds, and, to a lesser extent, other substances, and some contained sulfuric acid. The barrels had been dumped into a specially dug hole, which had gradually filled with water. The sulfuric acid barrels rotted first, so that this "pond" was, by now, strongly acidic, a condition that, with the additional presence of the cyanide salts in the also slowly corroding barrels, had led to the release of hydrogen cyanide gas. Dead animals lay around the pond and floated on the water. It was a "doomsday" scenario. As a university student with no funds, I desperately needed money to make a

[1] cf. http://www.spiegel.de/spiegel/print/d-43144036.html

living. The difficult and dangerous job paid well. So, I found myself wearing full respiratory protective gear in sweltering heat during the semester break. Every day for weeks, often enveloped in highly toxic dust clouds, I spent 6–8 h analyzing rotting barrels to see if they contained cyanides ("to the left, to the big barrel mountain") or other less toxic waste salts ("to the right, to the other toxic waste").

The heat was suffocating. Threatening dust clouds passed over us from all directions. The full protective clothing and gas masks required were actually unbearable. This tempted some workers to work without breathing protection. One day, one of them was sitting in front of me on top of his excavator. He wanted me to examine the barrels he was excavating. When he moved his shovel, he accidentally caught a barrel of powder, the rotten barrel shattered, a dust cloud surrounded me and the excavator, and the excavator operator immediately collapsed dead before my eyes right there in the driver's seat. I frantically called for the paramedics, and the worker was rushed to the mobile emergency clinic installed on the site, injected with an antidote within seconds, which revived him, and he was additionally ventilated. The next day, he was back on the excavator, but now wearing a gas mask and full protective clothing. None of the workers refused to take the necessary protective measures from then on. The weeks-long student job shaped my attitude toward environmental protection and, later, nature conservation. A year later, in 1972, the first report of the Club of Rome, "The Limits of Growth," appeared and was hotly debated among us chemistry students. It became increasingly clear to me: We needed to treat this planet and its ecosystems with much more respect. As a chemist, I wanted to make my contribution to this through research.

By the age of about 14, I had already become intensely involved in natural sciences, including astronomy. When I looked into space through my telescope for which I had painstakingly saved up, I felt not only insatiable curiosity and boundless awe, but also a deep-seated fear of the infinity of the universe. I was then struck by severe depression: We are alone on our earth, floating in hostile space—that is how I felt, and it caused me to feel lonely. The situation was only exacerbated by the fact that I had little support within my own family, and thus I became something of a loner.

One day, as I was once again wandering aimlessly through a small forest in Herne, I found a tiny, bluish shimmering feather. I learned that it was a jay feather and put it in a small box. On further rambles, I collected more and more feathers, even including one from an eagle! I attached them to a white piece of cardboard that I hung on the wall in my basement room; I discovered that I enjoyed studying bird feathers and spending time in nature, and, in this

way, I found my way out of my fears and my deep depression. Forests and fields had become places of retreat for me, where I could relax and reflect on myself and the world. Nature—which includes those landscapes that are shaped by humans as well as the wild, rugged, hard-to-reach, and lonely areas—has since then been a regular source of relaxation and relief from professional and personal stress for me. (To determine this effect today has required elaborate research, but at least the latest studies from the USA and Japan confirm my personal experience over the past five-plus decades.)

As a young family man, I brought my children into contact with nature from the beginning. In particular, we watched birds and discovered the cranes for ourselves. Together with my growing sons, I came to understand these birds' vulnerability and how difficult it is to protect or restore their habitat, and that nature and species conservation must always go hand in hand with environmental protection. I decided to join the crane conservation program, which I would soon come to lead for about 5 years.

During my intensive observation of the cranes, I discovered that shockingly little was known about the life and behavior of these impressive birds. With their enigmatic nature, they aroused my scientifically trained curiosity and inspired me to research outside of my real profession.

There is unlikely to be another place in the world where free and wild cranes live and breed in such close proximity to humans as the Duvenstedt Brook and the Hansdorf Brook. Both are located on the northern edge of Hamburg, a city of over a million inhabitants, tens of thousands of whom visit the nature reserve every year to hike, relax, and observe nature. (Unfortunately, a not negligible minority of the visitors disturbed the nature reserve with their picnics, Easter egg hunts, and venturing off the paths to take pictures, activities that are sometimes accompanied by poaching and egg theft. This situation has since improved greatly, due to our persistent work.)

Perhaps nowhere else were crane watchers as intensely connected to "their" cranes as we were. The task of the "crane guards," as we called ourselves and were called by the visitors, was to prevent disturbances. So, we did not actually "guard" the cranes, but rather the visitors, at least those who would consciously or unconsciously become troublemakers.

During the breeding season, there were usually two crane guards in the Brook all day every day for one week. Many of us even spent the night there. We got up at the crack of dawn and did not go to sleep until after the "woodcock dash" (this is the name given to the behavior of woodcocks that "dash" at dusk along the edge of the forest or across the meadows in their territory).

From mid-February to mid-November, the cranes are "with us." Until the late 1990s, there were four to six breeding pairs of cranes and a few

"bachelors" hanging around our area each year. In the early 2000s up to around 2016, about a dozen crane pairs each occupied a territory. In 2019, in addition to the dozen territorial pairs and other pairs seeking territories, at times, more than 20 juvenile cranes, some as a large group, were in the Brook. One day in May of that year, I saw 65 cranes in a meadow in the core of the Brook, while in May 2020, there were more than 100 (which was not at all the case in 2021). By the way, the territories, in the narrower sense, are no larger than about half a square kilometer, and in some places, they are easy to look into (although most parts are not observable, to the advantage of the cranes). However, the territorial pairs defend a much larger area against other cranes, so the territories include a core zone with a breeding site and a feeding area, as well as a buffer zone.

So, for years—perhaps uniquely in the world—I was able to observe many cranes under open-air conditions just a few minutes away from my home and my workplace. In the spirit of our protection mission, we observed the animals from afar, from outside the flight distance, so that the observation itself did not have any disturbing effect.

I did not conduct behavioral experiments with cranes, but only observed them. However, this does not mean that I can observe and describe "cranes unaffected by humans." Humans restrict the breeding and feeding areas and the mobility of the animals through hiking paths, roads, or agricultural areas. The latter have adapted their behavior, and so one always also observes the birds' reactions to human influences. The behavior of animals in a cultivated landscape like the Brook is certainly not the same as in the wild, in places such as the largely undisturbed Siberian tundra, the mid-Swedish forest, or the Finnish lake landscape, although, in the meantime, some smaller areas in our nature reserve have been left to their natural development again.

It was precisely this circumstance that made the observations particularly appealing: How do cranes deal with situations that are unfamiliar to them? How do they behave when other animals, but especially humans, disturb their breeding or feeding? Those who, like me, have enjoyed observing nature from a young age, no matter in what field, will sooner or later come across strange events. I noticed that "my" cranes behaved differently than I had expected after brushing up on my knowledge of behavioral science and reading contemporary articles and books on cranes. In contrast to what I read and heard, they did not behave stereotypically, not as one would expect according to an inherited behavioral pattern, but like actual personalities, with their own plans and individual traits.

This did not come as a complete surprise to me. Again and again, I had thought about how "thinking" actually goes on, what the material basis of

memory is, and how consciousness arises. In this process, I occasionally wondered whether animals' thought processes are really so very different from our own, and it would seem perfectly normal to me if, one day, it were discovered that animals think in a fundamentally similar way to humans, merely—depending on the species—gradually differing from us and from each other. So, I am always eager to read articles or books that report research results on the thinking, intelligence, and consciousness of animals.

I had not expected that I, as a voluntary conservationist, would ever be in a position to contribute my own systematic observations on this subject. But more and more, my observations had turned into real and systematic scientific research. As a nature scientist by education, as a chemist who started during the PhD laboratory work with deep research, and as the one who continued to even perform fundamental research in combination with applied product development in the mid-size chemical company that I ran as CEO and major shareholder, I entered more and more into behavioral research. Still I did not expect that anyone would ever be interested in what I observed and concluded. But when I presented some particularly remarkable observations from my first years on the occasion of the European Crane Conference 1996 in Stralsund, one of the attendees, George Archibald, was listening, the founder of the International Crane Foundation (ICF), famous among crane experts and conservationists all over the world. He motivated me to deepen my studies and, additionally, to pursue them internationally, with crane species beyond the Common Crane (also called the "Eurasian Crane") native to our country and most of Europe in general, but also to parts of Asia. Thus, over time, I actively participated in numerous international projects, conducted crane research parallel both to my main job as a chemical researcher and to what I did as an entrepreneur for the development of my company, and published the results of my work at conferences and in specialist publications.

Since mid-May 2018, my life partner and I can hear crane calls when we wake up in the morning or sometime during the day. When I sit at my desk in my study under the roof, I look out across the landscape during thoughtful pauses. We now live in the immediate vicinity of the Hansdorf Brook on the outskirts of Hamburg. Time and again, cranes fly by at a distance of only 50 or 150 m. Even more often, I hear them calling. Shortly after we moved into the house on the edge of the Brook, I told my then nine-year-old grandson the story of "Romeo and Juliet," the crane pair that readers of this book will get to know better later. Their last nesting site is only about 300 m from our house as the crow flies. It was at that moment that I began thinking about writing this book. It was about the same time when George visited me in my

new house and reminded me of his wish from a long time ago that I should write this book. I was lucky that I had written lots of diary entries and had even drafted many raw text chapters during the years with the cranes, and also lots of systematic notes and tables (just as nature scientists do it)—otherwise I would not have been able to write the book as you can now read it. It appeared in March 2020 in German, on the very day when Germany commenced its first lockdown due to the Corona pandemic. This English edition is slightly revised and partially updated where necessary.

Here, I recreate my years-long expeditions into the enigmatic world of the cranes. I describe experiences and observations that have allowed me to solve some of the mysteries that these beautiful birds have presented to us humans for millennia. These mysteries, in turn, lead us to questions about ourselves and our consciousness: How rationally, how consciously do we humans act, and how different is this from the actions and thoughts of animals, specifically, in this instance, cranes?

After realizing that these birds are different from what has been described in the textbooks so far, it is not a long path to the conclusion that we need to think much more broadly about conservation and that we need to act more holistically—based on a deep respect for nature.

Jersbek, Germany Bernhard Wessling

Acknowledgments

I am grateful to so many people for their help in the making of this book. First, George Archibald, without whose encouragement I would have continued to watch cranes only in the Brook. He lured me into the much bigger international projects. My sons, who accompanied me on many of my early observations, especially my older son, with whom I spent a number of joint crane-watching weeks. My life partner, who read several versions of the manuscript for the German edition, gave me numerous critical suggestions, and also had endless patience with me during the final phase of constantly editing the manuscript until it was finally approved. (I am especially grateful that she has since come to share my passion for cranes and nature.) And then, she developed even more patience during the subsequent phase, when I worked with the editor at Springer Nature and their lector for this English edition. I thank the publisher Goldmann and the editorial office for seeing my book project as a suitable offering to a readership interested in nature, and for their many valuable comments and suggestions. In addition, more thanks go to Goldmann for allowing Springer Nature to publish the book in English, as well as, to be sure, to Springer Nature and its editors for accepting my proposal to publish this edition, which would have not have been in true English if Marc Beschler had not reviewed the various versions that I sent with ever ongoing changes. I would like to thank the photographers Carsten Linde, Kunikazu Momose, Colleen Childers, Ted Thousand, Tom Lynn, Larry Mattney, and Mike Endres, the crane conservation organizations ICF (International Crane Foundation) and Red-Crowned Crane Conservancy Hokkaido, as well as the chief pilot of Operation Migration, Joe Duff, for providing me with photos that complement my own and also with additional information and suggestions. Also, I am very grateful to Jennifer Ackerman

and Sy Montgomery: for your inspiring communication and your support for my book. Even more thanks have to go to you, George, for your Foreword and your various detailed suggestions after you read a preliminary version of this English edition, as well as for the initiative you showed in sending me here and there and your motivating support! (Fig. 2)

Fig. 2 I am waiting for the cranes to call (© Bernhard Wessling)

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Fig. 1 Wetland area in Duvenstedt Brook (© Bernhard Wessling)

Fig. 2 Common Cranes dancing (© Carsten Linde)

self-confidently, quietly searching for food here and there. But they could also gracefully walk around each other, looking at each other, or walk side by side with their heads up, presenting themselves to each other, either in preparation for a dance or instead of dancing. Simply beautiful (Fig. 2).

We were by far not the only ones who were captivated by these images. And almost every person who has seen migrating cranes in autumn or spring, who

Fig. 1 A Sandhill Crane pair with its freshly hatched chick (© International Crane Foundation, Tom Lynn)

intensively studied the Asian Red-Crowned Crane and the two North American species. These will be the main characters in later chapters (Fig. 1).

Cranes (i.e., the ancestors of today's species that are considered to belong to the crane family) have lived on earth for 60 million years. This means that they appeared 20–30 times earlier than some of the closer ancestors of humans (*Homo rudolfensis* and *Homo habilis*, about two million years ago). Crane ancestors have presumably been around since the dinosaurs disappeared from the earth. Of course, they have changed a lot during that long time, but they are one of the most successful species families in evolutionary history. There is growing evidence that cranes and all other birds are ultimately descended from dinosaurs—that they are actually modern dinos. Not only is the development of feathers in the evolution of dinosaurs becoming increasingly clear, the coloration of the eggs also points to a direct descent between the two: All bird eggs, regardless of their specific appearance, have only two color pigments. Those dinosaurs closely related to birds (the Maniraptora) also laid colored eggs, the coloring of which was based on the same pigments.[1] The Sandhill crane in particular seems to be closely related to the ancestors that lived about 60 million years ago.

The word "crane" has a very deep root in Indo-European languages, and it is obviously accepted among etymological experts that said root is

[1] cf. https://www.wissenschaft.de/erde-klima/schon-dinos-hatten-farbige-eier/ (German text).

Map 1 This map shows the migration pathways in the early 1990s: main migration trajectories in red, "detour" via Hamburg in green

cranes manage to "persuade" a group of 25 or 40 colleagues that the detour via Diepholz/Bremen is advantageous, especially when turning right to the east above the Brook?

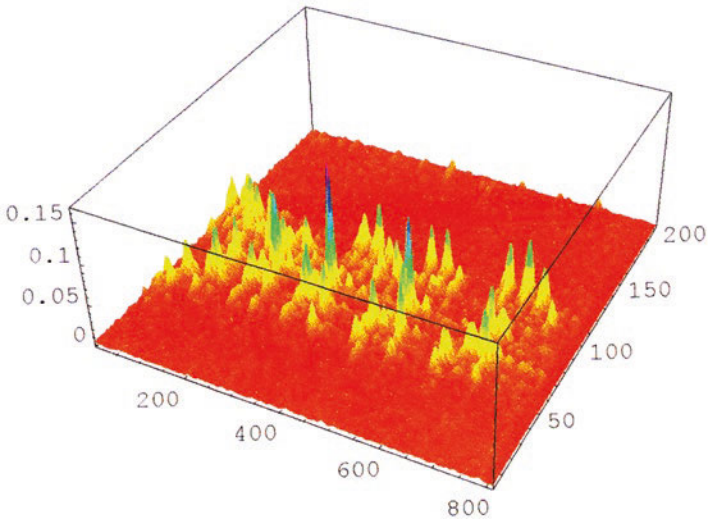
In the past years, I had already made some surprising observations, which I have described in the previous chapters. But now, I was confronted in a completely new way with the question of the communication abilities of the cranes and their emotional world. These were questions that would not let me go.

Fig. 1 A Eurasian Crane pair is unison calling while their chicks don't understand what's happening with the parents. (© Carsten Linde)

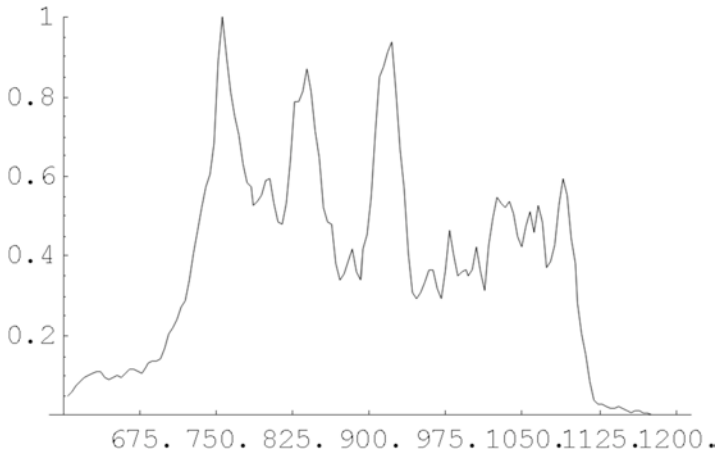
had only about 200 meters separating them, but were about a kilometre "as the crow flies" away from the others.

In the early morning, almost all of the pairs called each other. If everyone called and there was no wind, it was theoretically possible to record all pairs at around half past five/six in the morning (summer time) at the beginning of April (1 hour earlier in mid-March). In fact, however, we needed 4 weeks and 140 recordings to get recordings of sufficient quality from all pairs and to be sure that the recordings and voice analysis were reproducible.

We additionally recorded during the day, depending on where we were, and observed cranes. Sometimes, strange situations occurred. For example, I was cycling looking for the seventh pair in the south of the area with the recording equipment on hold, when Bengt informed me by radio: "If you ever want to record the 'Sly Dogs' from very close, that is, when they're only 50 meters away from you, you'll have to come to the 'Corner Pasture'." This was a spot where this pair often stood relatively close to a fence that year, pecking around in what must have been a very nutritious mud pool. Needless to say, I very much wanted to have the "Sly Dogs" toot right onto my minidisc. But first, I had to drive through the whole Brook, and by the time I arrived at the "Corner Pasture", the cranes could be long gone.



Graph 2 Illustration of the three-dimensional set of call recordings data



Graph 3 The power spectrum created therefrom by summarizing all intensity data in narrow 5 Hz frequency windows, thus eliminating the time axis

calling, too?" Yes, I hear them, I am recording them, and now that recording is ruined.

The spectrogram reveals to us the shape, the melody of the call, the "power spectrum" ("acoustic fingerprint" or "voiceprint") the characteristic frequencies. Generally, the "power spectrum" is enough for me to identify a particular

Fig. 2 A Whooping Crane forages in a pond at the International Crane Foundation's crane zoo which is open to the public. (© International Crane Foundation, "Whooping Crane Wading in Exhibit Pond," Crane Media Collective, accessed November 15, 2021, http://gallery.savingcranes.org:8082/items/show/22436)

before living there began building nests and breeding in the "open-air theatre" as early as their second season (Fig. 2).

On almost 4 km of trails, through 40 ha of forest, wetlands and prairie, visitors can get to know the original vegetation of this region, which has been actively restored on former farmland over the past 50 years. The aim is to show visitors that the preservation of habitats and biodiversity in self-regulating biotopes is important and that it is not just about the conservation of individual species. Anyone who walks through the prairie grass, some of which is taller than most men, and along the narrow mowed paths, who breathes in the smells and listens to the whispering of the grasses and the chirping of the crickets, or who watches the countless birds, will understand this message. On my first visit, I could hardly believe that a purely private initiative had created all of it.

Not open to the public is "Crane City", the approximately 30-ha facility with the breeding enclosures. There, George and his colleagues began breeding endangered crane species soon after the foundation was established. For the first time in the world, they succeeded in breeding Siberian Cranes, another extremely endangered species. There is a fascinating story behind George's success in transporting the eggs of Siberian Cranes from the (at that time) Soviet Union to the US; he personally attended to all aspects of the move himself, and somehow managed to get everything officially approved by both sides. What an achievement!

Fig. 2 A dancing Red-Crowned Crane pair. (© International Crane Foundation, Ted Thousand)

agriculture was intensified, in this case, rice cultivation. Wetlands on Honshu, the main island, began to be drained on a large scale—destroying the Crane's resting and roosting areas during migration in autumn and spring towards the South and back. At the same time, the time-honored rule that the crane could not be hunted by anyone except the emperor was increasingly ignored.

Thus, the remaining population could no longer overwinter in the south. The crane population was severely decimated and, at times, even considered extinct in Japan. A few birds survived—unnoticed for decades—near Kushiro, where a very large wetland is still located today (it has been a national park for some time, but is still, unfortunately, not secured). In 1923, the cranes were rediscovered, and in 1936, they were declared a "National Monument". A little later, they were again considered extinct, because it had been such a long time since they had been sighted. Their breeding area was not known, and it was assumed that it was outside Japan on the mainland, perhaps in Siberia (it was not until many years later that George discovered it in the wide marshes outside Kushiro). The relationship of the Japanese to the cranes seems ambivalent. Cranes play a major role in Japanese culture, representing eternal life, health, faithfulness—but few Japanese have ever been able to see free-living cranes. Thus, for most Japanese, the birds are a kind of cultural asset, a museum exhibit, but are nevertheless apparently not regarded by society as a whole as a living creature effectively worthy of protection.

Fig. 3 A Red-Crowned Crane on Hokkaido defending its food against a white-tailed eagle. (© Ciming Mei)

backwards and pointed their beaks vertically upwards, ready to pounce: A Steller's sea eagle, which is a really huge eagle, came soaring in; it wanted to check if it might be able to hunt down an unwary crane juvenile or an older weak individual (Fig. 3). This reminded me that a German crane observer had once told me that he thought cranes had a special call signal for "eagles", because, at a call, they all looked up, stretched their beaks upwards to ward off an eagle attack, and looked to see where the eagle might be coming from. They reacted completely differently to a fox, much as I had observed with the Red-Crowned Cranes. A few years later, I was also able to hear and record the eagle warning calls of the Common Cranes.[7]

After the recordings I had made at Mrs. Watanabe's house had been evaluated, I was even more convinced that the Red-Crowned Cranes could also be individually characterized on the basis of their calls. Crane research in Japan is very intensive, including the banding of about 20 birds a year in elaborate campaigns. However, the Japanese crane researchers know that they can only capture a fraction of the population with ringing and that they cause disturbance every time they do so.

In addition, the observation is often hindered by natural circumstances: Sometimes the observer is too far away, sometimes the crane is standing in tall grass or reeds so that the rings cannot be seen, sometimes the bird flies away

[7] Common Crane warning call "Attention eagle!": http://bit.ly/2WdHPtr

Every day, I added about three new pairs to my collection, one more (or: 50% more!) than I had imagined as the maximum feasible. In the mornings and evenings, I mostly waited for spontaneous calls. During the day, I always worked with the megaphone.

This way, I slowly got to know the cranes better and better. Especially on Matagorda, where I hiked through the marsh, it gradually became clear: If, from the cranes' perspective, a human like me suddenly called like a crane (i.e., if they could see me and then heard a call from my direction), they would, at most, give off a guard call, but I never heard a unison call under these circumstances. As a Whooping Crane pair, you obviously don't call a human to order by a unison call. So, I had to be invisible.

Generally speaking, if you're a Whooping Crane in Aransas National Wildlife Refuge, you don't have to worry about a human approaching you. A brief guard call is sufficient—if needed at all—but then you can keep feeding, or watch what the human is up to. He can't get too close because of the water in between. And if he does, you just fly to the next peninsula. That's how the Whooping Cranes seemed to think, because, unlike the Common Cranes as I knew them, they didn't exhibit the same kind of extreme shyness. If they took the trouble of fleeing at all, they strode away from me very leisurely, continuing their search for food (Fig. 2).

Approaching them within 100 meters was no problem if I managed it slowly. I could sit on the marsh and just watch the cranes. They had no

Fig. 2 Whooping Crane walking in tall grass, looking for food; the photo was not taken on Matagorda, but in a similar surrounding. (© International Crane Foundation, "Whooping Crane in Tall Grass," Crane Media Collective, accessed November 15, 2021, http://gallery.savingcranes.org:8082/items/show/22432)

Fig. 3 A Whooping Crane family resting during the migration from North Canada to the wintering grounds in Texas. (© Larry Mattney)

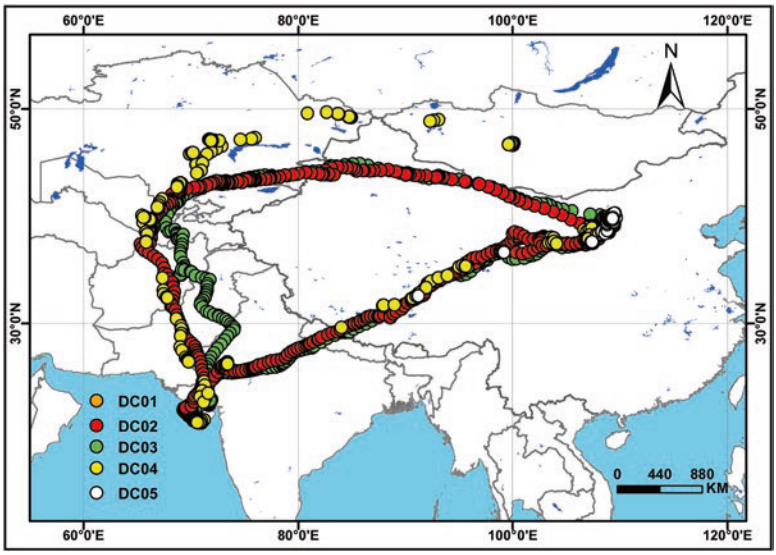
Fig. 4 Sandhill Cranes exchanging arguments with a Whooping Crane. (© Mike Endres)

not to follow the group, but rather wished to fly alone; chief pilot Joe Duff wrote in the logbook, "No. 4 again decided to make his own flight plan, but without coordinating it with the lead pilot." Most of the time, six of the seven Cranes flew together, following the first ultralight. As soon as it became apparent that one or another crane was flying slower, the second UL would take over and fly behind more slowly. Bill Lishman flew at the tail end, supervising the troop. He also reported to the "ground team" the GPS data of the location where crane #4 decided to land so that this bird could be collected. During the training phase, the birds had been in the air together for no more than 27 min; they had to get used to flying for longer periods. After a good 2 weeks, the formation flight also worked better (Fig. 4).

On the way south one night, there was a strong storm. The covered enclosure that was set up every evening for the cranes was blown away, and the cranes flew off in panic in all directions in the middle of the night. During the night, they were collected by the ground team. With the help of the portable megaphones I had provided, the cranes were coaxed out of the various dark patches of forest where they had taken refuge. One crane, however, had crashed into a power line in the dark in its panic and did not survive.

After arriving at the Chassahowitzka National Wildlife Refuge, the six remaining cranes were first housed in an enclosure so that they could get used

Fig. 4 UL aircraft-led migration of isolation reared Whooping Cranes (photo taken during the 2009 migration) (© Joe Duff)



Map 4 Here, you can see the migration route of several Demoiselle Cranes (DC01 to 05), which were equipped with radio transmitters by Professor Guo's team (China). The GPS data show the crossing of the Himalayas in the autumn migration, while the cranes flew west around the Himalayas in spring. So, they did not use the same route as on the outward flight. It is assumed that this has developed due to usual wind directions which are favouring these routes. (© Guo Yumin)

24 banded cranes have been identified, of which 19 came from Finland, four from Estonia and one from Germany.[16]

The degree to which cranes are flexible with regard to migration routes, choice of breeding sites and, finally, their choice of mates is also shown in the DNA: Cranes from Eastern, Western and Northern Europe show practically no genetic differences, and the genetic structure testifies to mixing that is both regular and very active[17]—cranes from Russia migrate to Finland and find mates there, cranes from Finland breed in Germany, and cranes fledged in Germany find mates and breeding territories in Sweden. All of this is evidence of long exploratory flights and a lot of communication, especially certain at resting sites and wintering areas. And it is a serious argument in favour of my hypothesis that migratory behaviour may be a culture that is acquired and passed on over generations.

[16] A. Salvi, presentation at the European Crane Conference 2018 in Arjuzanx/France, Proceedings of the 9e Conférence Européene Grue Cendré 03 - 07 déc 2018, Arjuzanx Nature Preserve (eds.)

[17] M. Haase, presentation at the European Crane Conference 2018 in Arjuzanx/France, Proceedings of the 9e Conférence Européene Grue Cendré 03 - 07 déc 2018, Arjuzanx Nature Preserve (eds.).

Book Cover Back side

Cranes are enigmatic birds. Only very little is known about the behaviour of these graceful dancers. The renowned naturalist and crane expert Bernhard Wessling takes us on exciting and adventurous expeditions into their hidden world and gets to the bottom of the myths surrounding these birds of happiness. With the help of a specially developed bioacoustic method, Dr. Wessling studied Eurasian, Red-Crowned, Sandhill and Whooping Cranes, all in the wild. He has researched their intelligence, social dynamics and communication and engaged in their protection. Impressively illustrated and lively narrated, this book presents his findings on their individually unique lives and relationships, their ability to adapt and solve problems, and their emotions. His observations allow us to delve deeply into the cranes' way of life and consciousness, often demonstrating the surprising similarities between humans and animals. An amazing work about the spirit of discovery, humility and respect for nature in the tradition of Alexander von Humboldt.

Cranes are among the most captivating birds on this planet. Dr. Wessling knows these birds, has accumulated a lifetime of observations on them, and has thought deeply about their abilities. In this book, he seeks to overturn old ideas about how these birds live, communicate, and think. His revelations surprise and delight and shed new light on an ancient avian family. **Jennifer Ackerman, author of the New York Times bestseller The Genius of Birds and The Bird Way**

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