Introduction

Figure I.1 The author playing his concertina for Allie. (Photo credit: author's collection).

I.1 The Ape and the Mouse

A frantic voice comes over the radio. The sound startles me. I am just a few months into my new job as the Director of Chimpanzee Behavior & Care at one of the largest chimpanzee sanctuaries in the world. I am struggling in my new position, unable to really figure out what my role is here. I am sitting in a meeting. Just as the fluorescent lights, white walls, and monotone conversation begin to lull me to sleep, I hear the radio. Secretly hoping that it's for me so I can leave this room, I sit up. The frantic voice asks for me to come to one of the chimpanzee buildings and bring 'something really good'. I excuse myself from the meeting and head to the kitchen, where I find a box of strawberries.

I arrive to find a chimpanzee named Allie (Figure I.1) behind the mesh wall of her enclosure, holding a small brown mouse. Across from Allie, on the other side of the

mesh, an exacerbated care technician is looking at me and shrugging her shoulders. Allie is very gently cradling the mouse while stroking his fur. She looks at me, then down at the mouse. She slowly brings the mouse to her mouth and kisses him. The mouse, by the way, is clearly terrified.

Allie spent the first part of her life as a pet (Figure I.2). She was raised by a very loving human family who had her eating from a high chair, brushing her teeth, and being tucked into bed each night with bedtime prayers. However, as cute baby chimpanzees do, Allie grew into a very large and unpredictable adult. Despite being raised as a human, it became increasingly clear to the family that Allie was very much a chimpanzee, with chimpanzee strength, chimpanzee behaviours, chimpanzee mood swings, and chimpanzee needs. Because of this, Allie found herself being sent back to the chimpanzee breeding facility she had come from. There, she lived alone.

When Allie came to the sanctuary, she had very little experience with other chimpanzees. In fact, it is safe to assume that Allie didn't really even know that she was a chimpanzee. Since she had spent her life with humans, it is probable that Allie thought of herself as another human. This was evident the night she arrived.

I was there to greet her when she first came to the sanctuary. It was about 3:00 in the morning when she was brought into our special needs facility. Allie quickly came over to the mesh to meet me. I sat with her for the remainder of the night. As we watched 1970s Chicago videos on my phone, it was clear that Allie was more

Figure I.2 Allie with a purse. (Photo credit: author).

comfortable with me than the other chimpanzees across from her. There we sat, both of us new arrivals, thrown into a very foreign world, neither of us knowing what to expect next.

Now, months later, Allie has been moved to one of the buildings in order to be introduced to a group of other chimpanzees. However, like me, Allie has still not acclimated to this place. As Allie proceeds to create a little nest out of hay for her new pet mouse, I look over at the other chimpanzees who are acting like … well … chimpanzees. They are vocalising to each other, grooming, fighting, reconciling, and enjoying the ability to live according to their true nature. Meanwhile, Allie has placed the mouse in the bed she has made for her and covered her gently with a blanket.

As I watch this, I have an epiphany about Allie's care and about my own role at the sanctuary. Allie, as a chimpanzee, has very specific needs based on her species. Chimpanzees, by nature, are exploratory, self-aware, and extremely intelligent. In the wild, they are faced with complex choices throughout their day. They have been gifted with the ability to make decisions, not just by instinct, but by what they have learnt through social transmission with other chimpanzees. They survive by this ability. They are driven by their evolutionary need for survival to rely on socialisation, participate in learning by social transmission, and make decisions based on what they have learnt. Therefore, chimpanzees *need* a rich social environment. Chimpanzees *need* the ability for freedom of choice and self-determination. Chimpanzees *need* cognitive stimulation throughout their day.

However, Allie is also an individual with a unique individual history. This history has created severe challenges to her ability to have her needs met as a chimpanzee. Allie, who was raised as a human, and who has had no experience socialising with another chimpanzee, is not going to know how to function in a chimpanzee group. Allie, whose every movement has been either restricted or managed by a human, is going to have a difficult time acclimating to the freedom of choice that a large sanctuary habitat will grant her.

It will take a careful plan to grant Allie the life she deserves, and implicit in the definition of 'sanctuary' (Figure I.3). This plan will need to be created by those with an expertise in chimpanzee behaviour and animal husbandry. This plan will need to be executed by an experienced and educated staff. This plan will need to be consistent. Allie's welfare and progress will need to be continually monitored and assessed by both behavioural observation to ensure her psychological well-being and medical observation and examination to ensure her physiological well-being.

At the same time, the environment of this group of chimpanzees should be continually assessed and monitored, to ensure that it is meeting both the species-specific and individually specific needs of each chimpanzee. The environment should promote species-typical behaviour and movement. The environment should be cognitively stimulating. The environment should be a safe place for both the chimpanzees and the staff working within it.

As this epiphany dawns on me, I begin to realise my role within my new job. It is up to me, as the person in charge of the care of this chimpanzee, to create an

Figure I.3 Allie in a tree. (Photo credit: author).

environment for her where she can thrive, not just live. This environment must contain all of the variables that would allow her to live a social, cognitively stimulating, and self-deterministic life. These variables will be unique to Allie. I can only understand these variables by observing and assessing Allie's behaviour and indicators of welfare, while at the same time drawing on information from her veterinary examinations. This is in addition to the basic husbandry she requires – proper nutrition, a sanitary environment, and good veterinary care. The team I assemble to create and maintain this environment must operate safely. As the Director of Chimpanzee Behaviour & Care, I am mandated to both provide this environment, and ensure its continued functionality. This is not just true for Allie's care, but true for the care of every individual chimpanzee residing at the sanctuary. I smile at Allie, who has started to take an interest in the Pop-Tart in my left hand. She leaves the mouse and walks over to the mesh. The mouse seizes the opportunity and runs away. Allie enjoys her treat. She makes eye contact with another chimpanzee; a male named Spike, who is interested in what she is eating. He vocalises to her. She returns the greeting.

I.2 This Book

For whatever reason, either now or in the future, you are finding yourself in charge of a collection of animals. Perhaps you are a student studying zoo animal technology and hope to one day become a curator or director of a zoological park, aquarium, or sanctuary. Perhaps you are in charge of an animal research laboratory. Maybe you are working at an animal shelter. Maybe you are merely interested in the care of animals and the science of maintaining an animal's welfare. If so, you should find valuable information within this book that should serve you well now and in the future.

This book proceeds from the standpoint that, no matter what the mission of your facility, institution, or industry is, *your* mission as a caretaker of animals is the *welfare* of the individuals you care for and the safety of those working with you. This book should prove relevant whether you are working in a sanctuary, a zoological park, a laboratory, or any other type of facility caring for animals.

For the purposes of this book, all professional animal caretakers, whether Director of a zoological park, entry-level zoo keeper, laboratory technician, or any other job title, are considered 'care technicians'. After all, no matter the facility, the mission of the care technician should be the same. Again, this mission is the welfare of the individuals being cared for.

Supplemental to this overarching mission of animal welfare, are the roles and responsibilities of each care technician. They are as follows:

- *A care technician must offer consistent care.* Implicit in this goal is the fact that care practices must take the form of written protocols that everyone involved in the direct husbandry of an animal, or population of animals, must follow. When different care technicians are following different protocols, the welfare of the animal is compromised.
- *A care technician must make decisions based on objective evidence.* Decisions to alter, add, or subtract anything from a current care protocol must be made based on available data regarding the individual, population, or species. Data regarding an individual or population must be gleaned from assessment, observation, and examination. Data regarding a species must be gleaned from peer-reviewed published sources.
- *A care technician in charge of an animal's care must be educated and properly experienced before undertaking the responsibility.* Experience can be garnered from apprenticeships, internships, or hands-on programmes that provide relevant training. Additionally, a care technician must be educated about the species they are responsible for. Those managing a staff of care technicians must base their hiring practices on this.
- *A care technician not only promotes the welfare of the animal in their care, but also the safety of those working with them.* Providing and maintaining a culture of safety ensures that all staff are following the proper standards and practices; critical to the welfare of the population of animals being cared for.

I.3 Introduction to the Curatio Fundamentorum

Throughout this book, we will be regularly referring to certain fundamentals of care that are central to maintaining the mission of maintaining the welfare of an animal in our care. These stated fundamentals are at the foundation of all operations of animal care and should serve as mandates for all involved in the direct husbandry of an individual or population of animals. These extensive fundamentals are *The Curatio Fundamentorum*.

The Curatio consists of seven major fundamentals. They are as follows:

1. All species are unique, with unique needs, unique challenges, and unique measures of thriving.
2. An individual's welfare is directly correlated with an individual's ability to thrive in a given environment.
3. Captivity, by its definition, removes an individual from a natural ecology, displacing physiological and psychological mechanisms, and thus negatively affects an individual's ability to thrive. As such, artificial environments must compensate for what has been lost and mitigate what has been displaced.
4. An individual's environment is a combination of the following: a habitat; the degree of physical movement possible; the degree of mental stimulation present; the social dynamics with conspecifics; and the degree of intrinsic motivation afforded. The variables of these external factors determine an individual's ability to thrive in an environment.
5. Physiological and psychological mechanisms allow an individual to survive. The health of these internal factors determines an individual's ability to thrive.
6. There is an inherent risk in caring for another species. A culture of safety protects both the caretaker and the cared for.
7. The care of living things is a science and must be approached scientifically.

Complementing the seven major fundamentals are critical sub-fundamentals. All are equally crucial to the care and welfare of animals in managed populations. Each fundamental and sub-fundamental are numbered accordingly, for easy reference.

The Curatio Fundamentorum

1. **All species are unique, with unique needs, unique challenges, and unique measures of thriving.**
2. **Welfare is directly correlated with an individual's ability to thrive in a given environment.**
   - 2.1. Thriving is defined as a positive physiological, psychological, and ecological state in relation to an individual's physiological, psychological, and ecological needs.
     - 2.1.1. Measures of thriving are species-specific.

Figure I.4 Elephant at the Kansas City Zoo. (Photo credit: author).

2.1.2. Thriving is equally defined by an individual's internal factors as well as the external factors of a given environment.
  2.1.2.1. Each species have evolved methods of interacting with their external environment. These interactions are a species' ecology.
    2.1.2.1.1. A species' ecology has evolved throughout its natural history and dictates the external, or environmental, needs of the species.
    2.1.2.1.2. The ability to exhibit one's natural ecology is a measure of thriving.
  2.1.2.2. Each species has evolved internal mechanisms in order to survive their given environment. These internal mechanisms are a species physiology and psychology.
    2.1.2.2.1. A species' physiology and psychology have evolved throughout its natural history and dictate the natural behaviour and cognition of the species.
    2.1.2.2.2. The abilities to utilise one's natural physiology and stimulate one's natural psychology are measures of thriving.
  2.1.2.3. In addition to being species-specific, measures of thriving are specific to individuals.

2.1.2.3.1. Individuals of the same species can have individual challenges and barriers to thriving.
2.1.2.3.1.1. Individual challenges and barriers to thriving can be physiological and/or psychological.

3. **Captivity, by its definition, removes an individual from a natural ecology, displacing physiological and psychological mechanisms, and thus negatively affects an individual's ability to thrive. As such, artificial environments must compensate for what has been lost and mitigate what has been displaced.**
   3.1. Animal species live in artificial environments for a myriad of reasons by entities with a myriad of missions and objectives. However, the ultimate goal and top priority for those providing husbandry is the welfare of the individuals in their care.
   3.2. Positive animal welfare for animals in human care, on a species level, means that individuals are effectively compensated for the species-specific factors of thriving that have been deprived to the individual by captivity.
   3.3. Positive animal welfare for animals in human care, on an individual level, means that husbandry protocols are tailored to an individual's unique challenges and barriers to thriving; thus, an individual is provided with individualised care.
4. **An individual's environment is a combination of the following: a habitat; the degree of physical movement possible; the degree of mental stimulation present; the social dynamics with conspecifics; and the degree of intrinsic motivation afforded. The variables of these external factors determine an individual's ability to thrive in an environment.**
   4.1. The determining factors of an individual's ability to thrive in an environment are both species-specific and individually specific.
   4.2. An individual living outside of a natural environment is living in an artificial environment.
      4.2.1. All captive environments are artificial environments.
   4.3. The foundation of an environment is a habitat.
      4.3.1. In captivity, an individual lives in an artificial environment.
         4.3.1.1. In order for an individual to thrive in an artificial habitat, the habitat must provide the same ability for physical movement that is provided in a natural habitat.
            4.3.1.1.1. If the same ability for physical movement cannot be achieved in an artificial habitat as in a natural habitat, alternative methods of providing physical movement must be provided to compensate for this loss.
         4.3.1.2. In order for an individual to thrive in an artificial habitat, the opportunity to engage with the features of a habitat must mirror the opportunities for engagement that an individual would find in a natural habitat.

4.3.1.2.1. If the same opportunity for habitat engagement cannot be provided in an artificial habitat as in a natural habitat, alternative opportunities for habitat engagement must be provided.

4.4. Enrichment is a process by which artificial stimulation is introduced to an individual or group in captivity in order to compensate for natural stimuli lost to the individual through the course of living in an artificial environment.

4.4.1. In an artificial environment that promotes thriving, enrichment is regimented as part of a daily care plan.

4.4.2. In an artificial environment that promotes thriving, enrichment provides psychological stimulation that mirrors the species-specific stimulation that an individual would receive in a natural environment.

4.4.3. In an artificial environment that promotes thriving, enrichment provides physiological movement that mirrors the species-specific physiological movement that an individual would perform in a natural environment.

4.4.4. Some individuals may require unique enrichment to mitigate individual challenges to thriving. This is individualised enrichment.

4.5. The dynamics of the interactions between conspecifics are species-specific and critical to the well-being of an individual. These dynamics are an individual's social environment.

4.5.1. A rich social environment can be achieved in an artificial environment when the degree of interactions between conspecifics mirrors that of the interactions in a natural environment.

4.5.1.1. The dynamics of a rich social environment are species-specific. This specificity determines factors such as population size, sex ratio, or any other species-specific variable that defines a natural social environment.

4.5.1.2. A rich social environment is critical to thriving.

4.5.1.3. The lack of a rich social environment cannot be effectively compensated.

4.6. In an environment that promotes thriving, an individual is intrinsically motivated to interact with that environment.

4.7. Artificial environments must be constantly assessed to ensure that the physiological, psychological, and social needs of all occupying individuals are being met.

5. **Physiological and psychological mechanisms allow an individual to survive. The health of these internal factors determines an individual's ability to thrive.**

5.1. In a captive environment, an individual's psychological well-being can be monitored.

5.1.1. Psychological health can be monitored through behavioural observation and assessment of an individual.

5.1.1.1. Behavioural observation and assessments should be objective.

5.1.1.1.1. Assessments should use predefined indicators of positive and negative psychological well-being.
5.1.1.1.2. Assessments should be designed to produce statistically valid results.
5.1.1.1.3. Assessments should be used to draw a conclusion on the individual's current state of well-being.
5.1.1.1.4. Assessments should be used to craft an individualised care plan for the individual, as well as to make any changes to an artificial environment.

5.2. In a captive environment, an individual's physiological well-being can be monitored.
5.2.1. Physiological health can be monitored through observation, body condition scoring, routine physical examinations, and other methods of assessing an individual's medical health.
5.2.1.1. Medical observation should be routine and performed by a veterinarian with a working knowledge of the species being observed and used to determine an individualised medical care plan.
5.2.1.2. Body condition scoring assesses the physical appearance, weight, or other relevant indicators of medical well-being in an individual. Body condition scoring should be performed by a veterinarian with a working knowledge of the species being scored and used to determine an individualised medical care plan.
5.2.1.3. Physical examination should be done at regular intervals, performed by a veterinarian with a working knowledge of the species being examined, and used to determine an individualised medical care plan.
5.2.1.4. Novel methods of monitoring an individualised physiological health should always be objective, evidence-based, and produce statistically valid results. Results should be used to determine an individualised medical care plan.

5.3. Proper nutrition is achieved through a diet that takes into account species-specific needs as well as individually specific needs.
5.3.1. An individual's diet should provide the same nutritive elements that are found in the species natural diet.
5.3.2. An individual's diet should take into account specific health conditions and dietary needs.
5.3.3. An individual's diet should take into account current body condition.
5.3.4. An individual's diet should take into account an individual's activity level.
5.3.5. An individual's diet should be enriching.
5.3.5.1. A diet should vary.
5.3.5.2. A diet should include noted individual food preferences.

5.3.5.3. A diet can be presented in various and novel manners and forms that support enrichment.

5.4. Medical treatment, including routine treatments, triage, emergency care, and euthanasia, should proceed according to a written plan of veterinary care.

5.4.1. A plan of veterinary care should be authored by a veterinarian with a working knowledge of the captive species.

5.5. Operant conditioning is a process whereby an individual is trained to participate in their own care.

5.5.1. Operant conditioning uses reinforcers to shape and maintain behaviours that can be used for both physiological and psychological care.

5.5.1.1. Positive reinforcers are generally more effective and lasting than negative reinforcers.

5.5.2. Operant conditioning can reduce the stress and anxiety on an individual during care procedures.

5.5.3. Operant conditioning can improve the consistency of care.

5.6. The quality of the environment occupied by an individual is a critical component of psychological and physiological well-being.

5.6.1. Clean water must be provided to all individuals at all times, regardless of species.

5.6.2. Food must be dispersed and contained in a sanitary container.

5.6.3. A clean habitat must be provided to all individuals at all times, regardless of species.

5.6.3.1. Cleaning protocols must be consistent.

5.6.3.2. Cleaning protocols must include a regular disinfection schedule.

5.6.4. Individuals must be provided a habitat with substrate that effectively breaks down waste.

5.6.5. Individuals must be provided with proper bedding, relative to their species.

5.7. When providing care to another species, anthropomorphism is deleterious to maintaining and assessing an individual's physiological and psychological health.

5.7.1. Anthropomorphism seeks to assign human-specific justification to non-human behaviours and other traits.

5.7.1.1. Anthropomorphism must be recognised when it occurs.

5.7.1.2. Anthropomorphism can lead to deep misunderstandings when observing and assessing the condition of a non-human individual.

5.7.1.3. Anthropomorphism must be avoided while assessing the condition of a non-human individual.

6. **There is an inherent risk in caring for another species. A culture of safety protects both the caretaker and the cared for.**

6.1. A culture of safety promotes addressing dangerous situations before they arise.

6.1.1. A culture of safety provides staff training, emergency drills, and proper attire and equipment to all staff members working in and around an animal care facility.

6.2. A culture of safety effectively addresses emergency situations as they occur.

6.2.1. A culture of safety operates according to written emergency response protocols.

6.2.1.1. Emergency response protocols must be as inclusive as possible for any potential situation that may arise.

6.2.1.2. Emergency response protocols must address a chain of command and general procedure in the event of an unforeseen emergency situation.

6.2.2. A culture of safety provides for the evolution of protocols in the aftermath of an emergency situation.

6.2.2.1. In the aftermath of an emergency situation, an after-action review should be conducted to determine the effectiveness of the emergency response. The results should be used to amend any response that was ineffective.

6.3. At all times, in captive animal care, individuals must be recognised and respected for the species they are.

6.3.1. Captive animal care is an interspecies interaction.

6.3.1.1. Interspecies interactions are unpredictable.

6.3.1.2. Different species react to different stimuli.

6.3.1.2.1. That which provokes an individual to react can be species-specific.

6.3.1.2.2. That which provokes an individual to react can be individually specific.

6.3.1.3. Different species can have unique reactions to different stimuli.

6.3.1.3.1. The reaction to any given stimuli can be species-specific.

6.3.1.3.2. The reaction to any given stimuli can be individually specific.

6.3.1.4. The reactions of any given species, or any given individual of a species, can present risk and danger of varying degrees to human caretakers.

6.3.2. In captive animal care, a culture of safety is constructed upon a knowledge of the species, as well as the recognition that all interspecies interactions can be unpredictable.

7. **The care of living things is a science and must be approached scientifically.**

My Own Case Study: Mara

With a rag tied to his head like an old buccaneer, the guard at the defunct Puerto Rican zoo leads me to an opening in a wooden fence. Trying to make the most of my broken

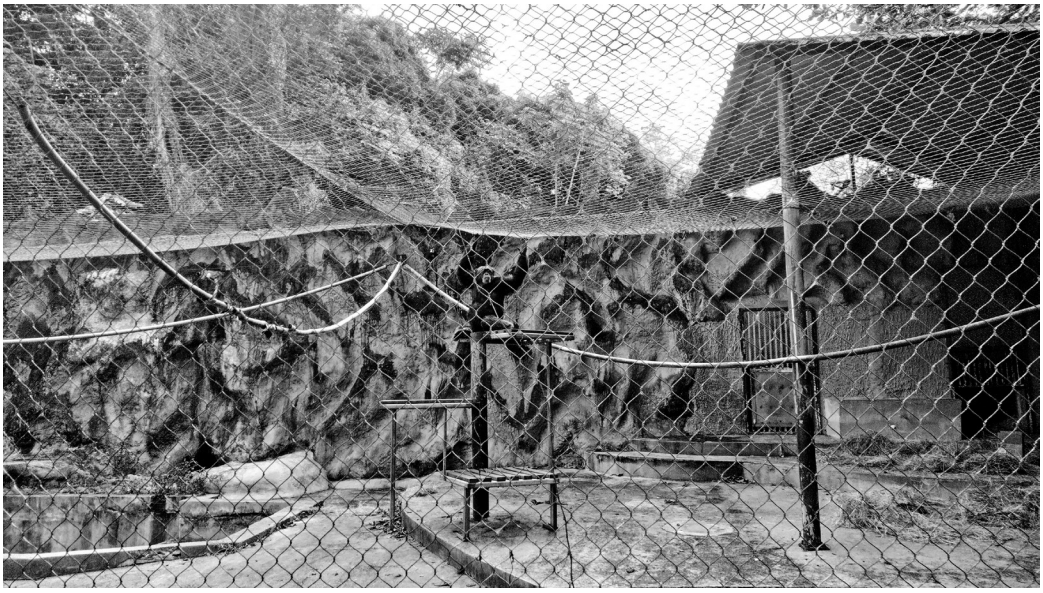

Figure I.5 Mara living alone. (Photo credit: author).

Spanish, he soon realises that I am here to see a singly housed chimpanzee named 'Mara'. He points me to a pathway and explains, as best he can, that I merely need to walk down this path, and it will eventually lead me to the chimpanzee enclosure.

The zoo has been closed for almost six years, when a major hurricane devastated the entire island of Puerto Rico. Since this time, the zoo has never reopened. However, the animals, which include lions, hippos, an African elephant, and this singly housed chimpanzee, have remained. The staff of seven zookeepers make the best of the situation and attempt to care for these animals without the benefit of electricity or running water.

Each step I take through the abandoned zoo, paints a more disturbing reality. The overturned shelters, empty corn crib cages with weeds climbing through the mesh walls, and cracked pavement, all contrast with the sounds one would normally hear in a zoo. Lions roar, exotic birds make their calls, and the melee of the buzz of other undefinable species echoes through the air. The sense of normality that these sounds provide only makes the wounded landscape more disorienting. They signal the unprovided needs that the multitude of animals housed at this zoo are being deprived.

Finally, I reach the chimpanzee enclosure. There, in the middle of the enclosure, seated atop a platform, sits Mara (Figure I.5). She looks at me, only giving the slightest hint that she recognises my presence. In her enclosure there is, what looks to have previously been, a now non-functioning pond and waterfall, It is covered with weeds that have grown up through the cracks in the pavement. Three faux stone walls surround the enclosure; thus, making Mara's only vision of the world outside her enclosure to be that either straight in front of her or directly above her. Even this vision is obstructed by the soft chain-link mesh that blankets the entire space.

Beside Mara's enclosure, there are three capuchin monkeys that Mara can only hear. If she hangs from one part of the soft mesh and peers over the wall, she can catch a glimpse of them if they are also in the right spot. Otherwise, there isn't much else for her to see – just abandoned cages and the occasional passerby staff member.

I am here representing the chimpanzee sanctuary I was working for. I am taking part in the first step of our process to determine if our sanctuary is a good fit for a chimpanzee in need. I am looking for signs that would tell me how likely it is that Mara could thrive in an environment like the sanctuary, which features large island habitats, large social groups (often over 20 individuals), daily cognitive and social enrichment, and the freedom of choice to determine how one spends their day across acres of habitat and with so many social companions. While this may seem good for every chimpanzee, many individuals have challenges to living in this type of environment. Chimpanzees that have been deprived of socialisation with other chimpanzees may not be able to be fully integrated into large social groups. Chimpanzees that are not used to large outdoor habitats may have a hard time adjusting to the environment and adjusting to their new-found relative freedom. Some chimpanzees may have had such severe trauma, that they have such anxiety as to not be able to interact with their environment and need an intensive care programme. None of these issues would preclude a chimpanzee from coming to our sanctuary, but knowledge of this helped us to determine a plan going forward of how we can help this chimpanzee thrive, and if our facility is the best place for her to thrive.

Mara is currently living in a situation that prevents her from living life to its fullest potential. Mara is a highly intelligent, highly inquisitive, and by nature, should be a highly social chimpanzee, who had the unfortunate fate of having the world of captivity thrust upon her at birth – a world where she has been deprived of the ability to realise the hallmark traits of her species and the ability to live life to its fullest as an individual. The circumstances that Mara currently finds herself in are a violation of any definition of animal welfare. Despite all of this, Mara appears resilient. She spends her day exploring the small space she has and observing the small view of the world she is given.

I, however, do not believe that captivity has to mean that individuals are deprived of being able to thrive. I do not believe that Mara's situation needs to be indicative of animals in artificial environments. I believe in the science of animal care and the evidence-based techniques of providing for animal welfare. It is the science that is fostered by a philosophy of care that emboldens this idea. I have always believed that a sanctuary's mission should rest in the notion that, while we may not be able to provide an individual with the world their species occupies in the wild, we can create an environment where, despite a captive situation, we can provide measures that allow them a life where they can exude species-typical traits in a species-typical world while providing a clean, enriching, and interactive environment with access to proper nutrition and medical care. Additionally, we can provide as much freedom of choice and self-determination that the limits of their habitat can allow. In this way, we can utilise science to ensure that every individual in our care can thrive.

I am here, watching Mara, to see if we can provide her with such an environment. I do not believe that Mara needs to be sentenced to such a life. Her life history may have created challenges to being able to currently live life to its fullest potential. However, it is our responsibility to see that she is given the tools, and the environment, to overcome these challenges. Mara deserves a chance to tap into the natural resilience of her species. The science of animal care can provide her that chance.

It is in this spirit that I have set out to write this book. It is written under my firm belief in the foundation of evidence-based, individualised animal care, with individual thriving as its priority. It is written with one prevailing ethic: that no matter the mission of an institution housing captive animals, welfare and the ability for an individual to thrive must always be the prime concern. It is written under the resolution that providing animals with self-determination, a cognitively stimulating environment, a proper social environment, a healthy environment and all in a world where they may thrive, is a science and must be treated as such.

POSTSCRIPT: Mara never came to the sanctuary. Like a lot of things in our field, various complications, politics, and finances came into play. However, I can happily report that a zoo stepped in and was able to bring her in. Mara now lives with a rich social environment, in a highly enriching setting – a place where she can truly thrive.