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Twenty Animals, One Man

By the Same Author



DOCTOR JIMEK, I PRESUME
NO ROOM FOR WILD ANIMALS
SERENGETI SHALL NOT DIE

Twenty Animals, One Man

DR BERNHARD GRZIMEK

Translated from the German by
SIDNEY LIGHTMAN



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Foreword

ANIMALS can be made into heroes of novels and stories. Ernest Thompson Seton did this in masterly fashion. As a boy I used to stay up far into the night reading his *Bingo* and *Animal Heroes* and, later, Svend Fleuron's books. They were certainly a contributory factor in my decision to dedicate my whole life to animals – those 'citizens of the world' which, though they have a legitimate place with us in the countries of the earth, we are constantly displacing, killing and wiping out.

This is a different kind of animal book. It aims to show that animals are interesting for their own sake, and that they are at least as deserving of attention as cars, aeroplanes and engines. I know from the letters I receive every day that more and more people prefer eagles to jet planes and find elephants more interesting than lorries. Some even find them more interesting than human beings. Anyone who has anything to do with animals discovers things about them every day that nobody knew before – wonderful, amazing things. Animals are far more interesting than the objects and apparatus we make ourselves.

Each chapter of this book reflects the surprising experiences that befall me every day as a zoo director, veterinarian and animal observer. Such experiences often bring their own anxieties and sometimes sadness, but on the whole they have made my life a full and contented one and have brought me happiness. This book aims to convey some of these feelings to people who have not had the good fortune to adopt a profession connected with animals and have to work with men and machines.

BERNHARD GRZIMEK

CHAPTER 1

Our Anthropoid Ape Children

IN 460 BC, almost 2,500 years ago, an unusually large fleet set sail from Carthage under the command of Hanno, one of the rulers of that great mercantile city. There were sixty ships in the fleet, each with five banks of oarsmen ranged one above the other. Altogether, 30,000 Phoenicians from Libya had embarked for the voyage. They sailed through the Straits of Gibraltar and then turned southwards along the African coast until they reached the Cameroons – the first time that anyone had got as far as that. The fleet attempted to sail up the River Niger, but encountered rapids and was forced to turn back.

In what is probably now Gabon, the expedition came across some gigantic black creatures covered with hair, who bared their teeth, grunted and made threatening gestures. When the Carthaginians tried to capture some of them, as they had captured slaves, even the females started biting so fiercely that they had to be killed.

Hanno had these strange, hairy, anthropomorphous animals skinned and brought the skins back to Carthage, where they were hung up in the temple. There they remained on view for centuries. According to Pliny, who was killed in the eruption of Vesuvius in AD 79, they were still there fully five hundred years later and were seen by the city's Roman conquerors.

Interpreters had told Hanno that these remarkable wild creatures were called *gorillas*, but it can never be known whether they really did belong to the great anthropoid ape species or not. Some observers have assumed that they were probably baboons, but this is highly unlikely. The Phoenicians would have been well acquainted with baboons through their extensive trading journeys throughout North

Africa and would not have taken baboon skins home from the Cameroons as curiosities.

It was a long time before any further accounts of these giant animals reached the North. At the end of the sixteenth century, an English sailor, Andrew Battel, was taken prisoner by the Portuguese and held captive in West Africa for a number of years. He describes two species of anthropoid apes which we have no difficulty in recognising as gorillas and chimpanzees. He calls the gorillas 'pongos' and says that they came up to the camp fire to warm themselves after the human beings had left, although they were not intelligent enough to put fresh wood on the fire when it died down. Many more of his observations about the black giants later turned out to be correct.

The first live chimpanzees were brought to Europe as long ago as 1640, but not much was known about the other anthropoid species. In the scientific books of the period, gorillas, chimpanzees and orang-utangs were always confused with each other, and grouped with pygmies and various savage races. It was only in 1860 that the missionary, Savage, and the traveller, du Chaillu, brought skulls and skins to Europe and published more accurate descriptions.

Du Chaillu's accounts spoke of gorillas as dreadful monsters of the primeval forests, who seized any other animals they met and tore them to pieces. He describes the gorilla's fearsome aspect, its gigantic body, its terrifying bellowing, and the way it beats its chest with its fists before attacking. As a result of du Chaillu's description, Europeans for the next fifty years were convinced that the gorilla was a brutish demon of the forest, although later on the accuracy of his reports came to be doubted. Over the years, hunters and explorers became better armed and their weapons more accurate and more lethal; consequently the original image of this huge species was considerably modified, becoming steadily more pacific, until finally gorillas came to be regarded as almost likeable creatures.

Yet du Chaillu probably did not exaggerate overmuch. A man equipped with the inadequate weapons of the middle of the last century, coming face to face with a huge animal like a gorilla, would have been much more easily intimidated by its frightening, near-human face and menacing gestures than present-day hunters with their modern, dependable weapons.

That able American, Martin Johnson, who travelled by car and light aeroplane on his photographic expeditions in search of lions, rhinos and gorillas – in the end, it was a road accident, not a lion, that killed him – followed some gorillas with his camera for weeks. They often caught sight of him and sometimes showed resentment, but he always beat them off, though, actually, gorillas are not aggressive.

It was only at the end of the last century that live gorillas were brought to Europe. A Major Dominic rounded up between eight hundred and a thousand negroes, who succeeded in trapping three gorillas, using nets. Two were brought as far as Germany, to Hagenbeck's Zoo, where one died after thirteen days; the second lingered on for four days longer. According to old Hagenbeck, they died of 'homesickness,' which might not be altogether excluded in the case of older animals, though it should be remembered that the 'animal repository' of those days had hardly any of the facilities which are today taken for granted in a modern ape-house.

The Berlin Aquarium's gorilla, which lived for some time, used to be given 'a breakfast of a couple of Wiener, Frankfurter or Jauersche sausages, Hamburg smoked meat, Berlin cow's milk cheese, or sandwiches. The drink he liked best to accompany this repast was sweet pale ale.' For his midday meal he had a bowl of soup, followed by rice, green vegetables, potatoes, carrots or kohlrabi cooked with meat – in short, every type of food except what he would have eaten in his normal habitat. In contrast with chimpanzees, who choose their food for quality rather than quantity, wild gorillas eat large amounts of shoots, which are not very nutritious, although rich in cellulose, and they prefer the pith of the banana tree to the actual fruit. Today we are more advanced in the feeding of wild animals in captivity, and as a result zoos have more success with them.

Of the three species of anthropoid apes, chimpanzees are the most numerous, as well as the liveliest and most intelligent. They are also the most nearly related to man, being considerably nearer than gorillas. But of all the higher animals only the gorilla, the chimpanzee and man himself have many characteristics in common. One, for instance, is the frontal cavity of the skull. The Asiatic orang-utang is much further removed from us than the gorilla. Our basic

body proteins most closely resemble the chimpanzees's, but those of the gorilla and of the orang-utang are different, the orang-utang's being markedly so.

A fully grown or almost fully grown male gorilla in a zoo makes a deep impression on the spectator. Gorillas can grow as tall as 7 ft. 7 ins., even though their legs are short. In 1930, a scientific expedition to what was then the Belgian Congo (a special permit had been granted for it to explore the Birunga-Vulcan Mountains in the Albert National Park) killed a male gorilla that weighed 715 lbs. (almost $7\frac{1}{2}$ cwt.). It measured 73 ins. round the chest, and its outstretched arms 10 ft. from finger tip to finger tip. But there are even bigger gorillas than this, some measuring 43 ins. across the shoulders. These male gorillas make a horrendous, almost overwhelming impression, and one can well imagine the terror felt by the first white men to come up against a near-human animal of this kind.

Today, there is hardly a fully grown male gorilla to be seen in any of the world's zoos. The Chicago Zoo's Bushman died after twenty-five years' captivity, and New York's Makobo was drowned on May 13, 1951. He had recently been moved into a new enclosure designed to allow him to wander about freely. For safety's sake, the enclosure had been surrounded by a deep, water-filled ditch, and Makobo was leaning over it one day when he lost his balance, toppled in and sank like a stone.

He made no attempt to swim or grab the ropes and ladders which had been put along the edge of the ditch for emergency use. An animal trapper once told me that gorillas cannot cross even quite small rivers. Unlike the common ape, and almost all other animals except man, none of the three species of anthropoid ape is born with the ability to swim.

Some time ago, a Munich magazine published a drawing of a hare jumping into the water and a companion asking why it was doing so. 'Shrimmek, the animal psychologist, is over there', was the reply, 'and he might write an article about me and call it "Remarkable Animal Behaviour".' I wrote and told the editor that I would certainly not have submitted such an article because the fact that the hare could swim was not at all remarkable. The famous zoologist Brehm, I said, had described in his book on wild life how well hares

can swim. 'On the other hand, if you had shown a gorilla swimming, that would have been quite different' . . .

There are still some 15-20,000 gorillas in the world, a very small number compared with the human population of 3,000 million. The majority of gorillas are to be found in the primeval jungle of West Africa and in the Gulf of Guinea, and there are 3,000 or so, including mountain gorillas, in the Vulcan Mountains between Lake Edward and Lake Kivu in the eastern region of Central Africa. The Albert National Park, which I visited in 1955 covers an area of some 1,220 square miles. It was established in 1925, chiefly to protect the gorillas, some of which live 8-12,000 feet up in the mountains. There are dense mountain forests there, actually more like bush, and while I was there, there was mist and continuous cold rain. Everything was dripping wet, and the climate was so inhospitable that I almost felt sorry for the mountain gorillas having to live there - but of course this would have been attributing human feelings to them which they did not have. The Albert National Park is in what used to be the Belgian Congo, and gorillas are still to be found in nearby Uganda, where there are probably a hundred or so in the south-western part of the country.

Male gorillas are so heavy that they can seldom climb trees, and so they sleep on the ground. But female gorillas are barely half as big as males, and with their half-grown young they build their sleeping quarters among the branches twelve to eighteen feet up.

Gorillas are said to live together in family groups ten to fifteen strong, but the size of these groups, the type of food they eat, and the way they sleep varies from one area to another.

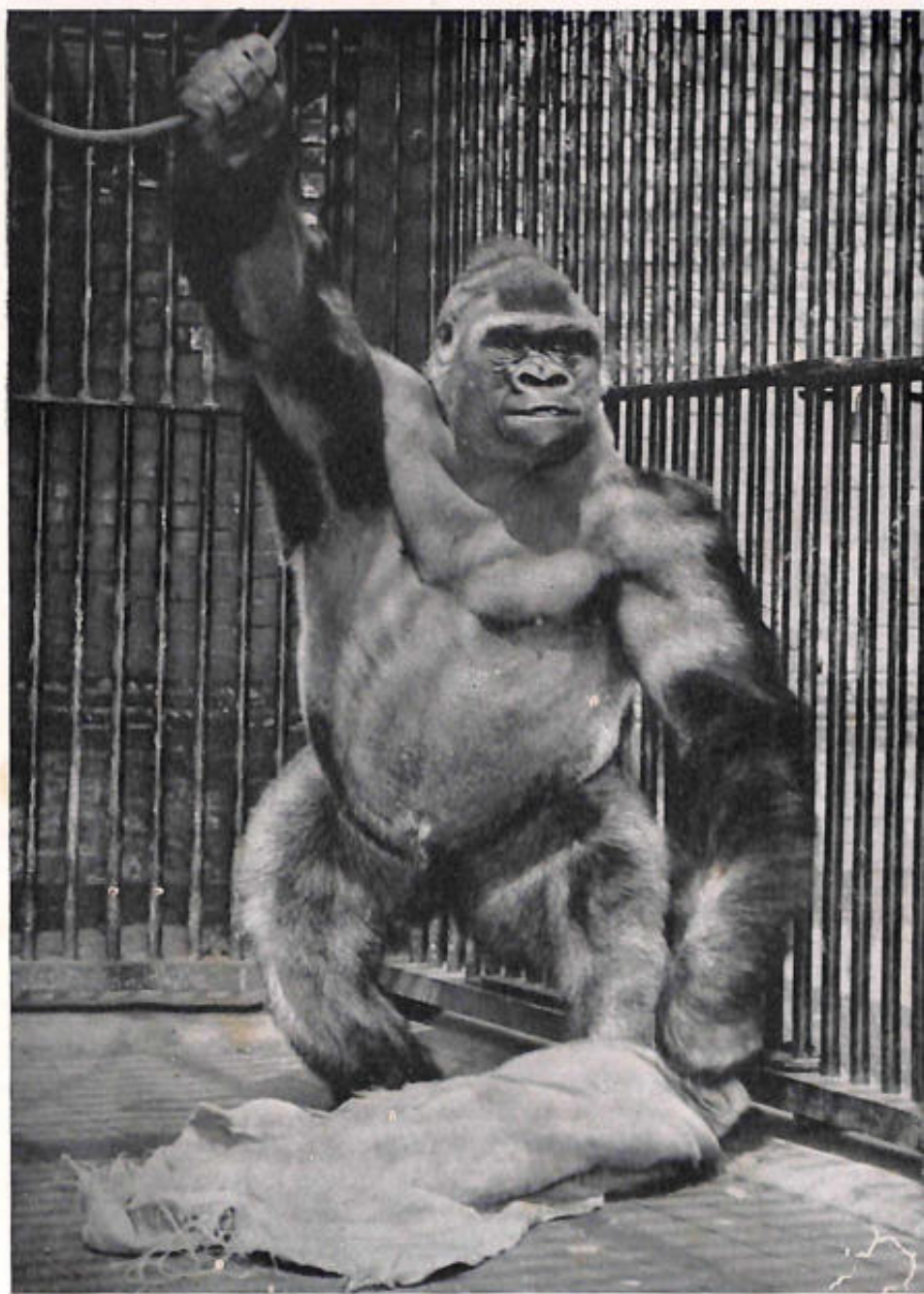
It is almost impossible to capture a fully grown gorilla, and even if this could be done, how could it be transported? Despite strict regulations, the natives often shoot female gorillas and eat them. The young that they capture usually find their way into the hands of 'trappers', which is how zoos obtain gorillas.

In 1956 I had precise information about every gorilla in the world, outside Africa, and in most cases first-hand knowledge of them. I took a 'census' of them at that time by air mail and telegram. There were exactly fifty-six, not a large number, and thirty-five of

these were males. I almost had to become a detective to track down the last one, which I finally ran to earth in Florida in the possession of a travelling showman. His wife wrote and told me that M'Jingo, who was half-grown, was a very likeable animal and lived with her husband as 'one of the family'. She added proudly that they had 'the only gorilla on show in America'. Other showmen used chimpanzees which they passed off as gorillas, 'just as we once did', she added candidly.

How did I come to be so interested in these huge anthropoid apes? Well, it all started one August. I had just returned from a trip abroad, and like all zoo directors and farmers in similar circumstances, before going home I first went to look at my animals. Our youngest trainee met me at the Lion and Tiger house and told me that three young gorillas had arrived. 'Nonsense', I said, 'you mean chimpanzees'. Every zoo trainee ought to be able to tell the difference between gorillas, chimpanzees and orang-utangs. Black-haired chimpanzees from Africa are the species most frequently found in zoos. Today they cost anything between £150 to £300 apiece. Red-haired, tree-climbing orang-utangs from East Asia are seen much less often. They cost between £600 and £1,200 each. Once in a blue moon a zoo will acquire a young African black gorilla. In Germany before the War, only the Berlin and Frankfurt Zoos were the proud possessors of gorillas. Frankfurt's Tommy held the German record for survival in captivity - nine years. Both Tommy and Berlin's Pongo died during the last days of the War.

The Frankfurt Zoo is the only one that shares with the Berlin Zoo the distinction of having reared all three species of anthropoid ape at the same time. A tradition of this kind imposes obligations, so one of the first parts of the totally destroyed zoo that I built up again after the War was the Ape House, which at the same time I modernised and extended. For years I negotiated with two foreign governments for permission to acquire some gorillas. Under the terms of a convention of November 8, 1933, to which all the African states and colonies were parties, gorillas are completely protected animals. Only in the most exceptional cases and with the prior permission of the highest authorities may they be captured or killed, and then only if it can be shown that this is necessary 'for important scientific purposes'. In recent years French Equatorial



MASSA, THE MALE GORILLA IN THE PHILADELPHIA ZOO, WEIGHED
400 LBS AT TWENTY-TWO YEARS OF AGE



A ROMP IN THE CHILDREN'S ROOM

Africa has bowed to pressure from big-game hunters and put gorillas on 'List B', which means that they are protected animals, though they may be shot in certain circumstances.

I was finally granted an export permit, but we still had no gorillas. Even if we were to come across some, I knew the price we should have to pay would be incredibly high. The first gorilla brought to Europe, in 1876, – it survived for fourteen months in the old Berlin Aquarium in Unter den Linden – had cost 20,000 gold marks, or close on £1,000, and that was when a mark *was* a mark. The small gorillas imported into the United States during the past few years had all cost anything from about £1,700 to about £7,500. It can therefore be imagined how amazed and delighted I was when we actually managed to acquire some gorillas. An old jungle hand had taken it into his head to fly three young gorillas direct from the West African jungle to Frankfurt. He did not leave them for a moment and even slept with them for the first few nights after their arrival. He knew that my wife was in the habit of taking difficult baby apes home and rearing them herself, bottle feeding them until they were old enough to go on to solid food, so he had refused much higher offers for the gorillas than we would have been able to make.

We lost no time in starting to build new cages for them, and while building was going on, we took the three hairy black youngsters into our home. This meant that our family had to live in the kitchen for ten days, but we did not mind this at all, because the three little fellows were actually as helpless as tiny babies. Whenever my wife came within reach, they would grab hold of her arm or the hem of her coat and hold on so tightly that it was impossible to prise them loose.

There are certainly very few people who have shared their home with gorillas for a whole year, as we did. Anyone who does do so continually discovers new facts about them and becomes interested in any observations he may come across here and there about the life of these 'sinister' forest creatures. And there is surprisingly little recorded, although gorillas were first mentioned a long time ago.

Having seen what likeable creatures our little black charges were, we became extremely angry whenever we heard of hunters shooting gorillas out of bravado or in 'self defence'. For in fact, everybody

connected with animals has long known, from the reports of thoroughly reliable African travellers, that in their wild state male gorillas never attack human beings unless they are cornered and utterly desperate. Gorillas are very timid and almost always take flight, even before they have been seen.

Because the gorilla is the animal most closely related to man, a study of the species could reveal a great deal of diverse information about our own pre-history. However, we know only that gorillas live a good family life. We have no exact knowledge as to whether they take only one mate or several, how they communicate with each other, whether they live in fixed areas or not, at what age they reach puberty or how old they are when they die. Facts of this kind can only be discovered in zoos, but up to now the few gorillas in captivity have unfortunately not thrived.

During the last few years, however, they have become more plentiful in zoos, though not in Europe. This is due to the fact that in Africa, as elsewhere, both the black and the white populations are increasing at an alarming rate. New villages and farms are encroaching on the gorillas' jungle home and consequently the huge apes ravage the fields and the angry settlers shoot them, leaving the young ones to be captured, despite all the laws forbidding this. There can never have been more than a few tens of thousands of apes in the whole world, and their number is almost certain to decrease in the next few decades, until they become extinct. Our only chance of preventing this happening to any wild animal is to find out what its basic requirements are.

When female gorillas are killed, their young, sometimes babies of less than a year old, are often found alive. They have a much better chance of survival today because penicillin, aureomycin and other modern drugs are available even in the heart of Africa. Still more important, dried milk and baby foods can also be obtained. In earlier times, baby gorillas orphaned in this way usually died because they could not assimilate a substitute diet, such as bananas or fruit purée, and fresh milk was, of course, unobtainable in the jungle. In the old days, partly grown gorillas often failed to survive the neglect which they had to endure on their long journey to the coast, often lasting several weeks, and the even longer sea voyage to their destinations. Many of those which did manage to survive

died soon afterwards. Today, they arrive within one or two days of being captured and are immediately given the same care and attention as a human baby in a modern maternity hospital. In Europe, as late as 1876, the infant mortality rate was 40 per cent. Today it is only 4 per cent, thanks to the progress made in modern medicine and nutrition. Baby gorillas in zoos also benefit from these advances.

Like millionaires among the human species, gorillas are much thinner on the ground in Europe than in America. They are such distinct personalities that experts the world over know them all by name. There was Alfred, for instance, a male gorilla who lived for eighteen years, and Bobby, a famous inmate of the Berlin Zoo, who lived for seven. Phil, the St Louis Zoo's gorilla, at fifteen years of age weighed almost five hundredweight. And Bushman's death in the Chicago Zoo in 1951 was reported in the German newspapers. This magnificent animal was a particularly well-grown specimen, barrel-chested and narrow-hipped, his arms covered with long black hair. Once, when he got out of his cage through a keeper's carelessness he was driven back inside with the help of a small snake and a tortoise. (All anthropoid apes have a strange fear of reptiles, as we ourselves proved with our own chimpanzees). This was a load off everyone's mind, because attempts to capture a fully grown male gorilla can cause a great deal of damage. Bamboo-Philadelphia, at one time the senior by twenty-nine years of all gorillas in captivity, bit off a keeper's finger and then his whole arm a few years ago. After Bushman's death, Chicago scientists dissected him and examined every organ minutely. They established that he was twenty-three years old and had died from a kind of beri-beri, a vitamin-deficiency disease. Apparently gorillas need particularly large amounts of vitamin B, which their bodies contain in considerable quantities.

According to the reports of hunters and explorers who have dissected the stomachs of dead gorillas, these big anthropoid apes are total vegetarians. Zoo staffs, however, have noticed that many of their gorillas develop a taste for meat. There is a simple explanation for this. In their wild state, anthropoid apes have an infinite number of multicellular organisms in their intestines, which dissolve the otherwise indigestible raw fibres of the plants that make up gorillas'

TWENTY ANIMALS, ONE MAN

and chimpanzees' normal diet and turn them into protein. As soon as a gorilla is taken out of Africa these organisms disappear, and many anthropoid apes then develop a sudden appetite for meat. As a direct consequence of the discovery that Bushman's death was caused by beri-beri, most zoos now give gorillas occasional beef steaks and boiled poultry, and almost always include eggs in their diet.

The second oldest gorilla was the Paris Zoo's Solange, who ate a steak a day for the twenty-four years of her life there. Massa, the third oldest, who belonged to the Philadelphia Zoo, was a magnificent twenty-three-year-old male. Bamboo and Massa were reared together from a very early age in the hope that they would mate, and it was not until some years later that Massa was discovered to be a male as well. An occurrence of this kind is not infrequent among gorillas because their sexual organs are small and undeveloped when they are young. The Basle Zoo's Achilla, for instance, was called Achilles during her first three years there. A few years ago, incidentally, she swallowed a keeper's four-colour ball-point pen in order to keep it safe from her playmate, a young chimpanzee. Emetics and laxatives proved useless, and after four days they had to cut open her stomach to remove the pen. The young gorilla came through the operation very well.

Most people who saw *Mogambo*, an American colour film, overlooked its most important and beautiful aspect because it was not brought to their attention. *Mogambo* includes the first colour shots ever made of an African gorilla family in its wild state – an almost incredible achievement. No scientist or documentary film maker could have done it. Only an American company making a film purely for entertainment would have the money. We have Metro-Goldwyn-Mayer to thank for the fact that the gorilla scenes were not shot in usual Hollywood manner, with men in gorilla skins and papier-mâché gorilla heads taking the place of real animals. Instead, the company got together a group of experts and hundreds of Africans to go on location in French Equatorial Africa. Their destination was a village called Oka, near the Sanga River, a tributary of the Congo. Blancou, the French scientist, described to me how the scenes were shot.

OUR ANTHROPOID APE CHILDREN

With the aid of large numbers of African tribesmen, a gorilla family was rounded up and then transferred to a small area of the jungle which had been closed off by strong wire netting. The gorillas were kept away from the boundaries of the enclosure by electrified wires and by pieces of brightly coloured rag tied to the mesh itself. Plenty of food was thrown inside for them, enabling the film makers to hold them captive for ten days.

During the fencing-in operations, incidentally, the expedition found a dead gorilla. There were no apparent signs of injury, so the expedition's French doctor performed an autopsy, but this too gave no clue as to the cause of death. The doctor's assumption was that the gorilla had been bitten by a cobra which had been seen in the neighbourhood a short time before. The gorilla had probably approached it too closely during the general confusion of the round-up. A second gorilla weighing a hundredweight or more had to be shot out of hand, when it attempted to strangle another youngster of three or four at the foot of the very tree in which the fully grown members of the family had taken refuge. The reason for the shot gorilla's savage behaviour was not clear, but it was probably also due to the general excitement.

In the film there are a number of good shots of two big males, neither of them weighing more than 270 lbs., however, who continually made as if to attack the cameramen. They had probably provoked the animals on purpose in order to add interest to the scenes and make them look more dangerous. Bristling with rage and screaming at the tops of their voices, the two gorillas would rush fiercely at the camera crews, but always halted their onrush abruptly a yard or two from the netting perimeter. They had probably touched the electrified wires the first time and were being careful not to do so again. However, we know from the reports of other observers who have had chance encounters with enraged gorillas that they often stop short of their enemies and content themselves with making threatening gestures.

A special licence had been issued for the shooting of one gorilla for the Los Angeles Museum, and the unfortunate victim was a big male. According to the people who shot him he would in any case 'soon have been dethroned and driven out by the second biggest in the troop'. There were nine gorillas altogether in the family shown

in the film, an old male, who was the leader, another fully grown male, a half-grown male, four large females and two small babies. Gorilla families are usually larger than this, so it is possible that other members of the family became separated from the rest during the round-up.

During the shooting of these scenes it was possible for the first time to observe these black anthropoid creatures for over a week, as they foraged for food, 'conversed' with each other and prepared their sleeping quarters under the trees. The old male slept the whole time, with his arms clasped round the other two fully grown gorillas, one on either side of him.

People who saw the film must have been amazed to see that these savage gorillas lived on pineapples, but this is not really surprising, because pineapples are now and again found growing wild in the jungle. At all events, the gorillas inside the wire netting preferred pineapples to the bananas thrown into the enclosure at the same time, and immediately tucked into them. They consumed enormous quantities, and mountains of pineapples were needed to keep them adequately supplied. The old male used to collect the fruit when it was thrown into the enclosure, tear off the rind, and then distribute peeled pineapples to the rest of the family. He quickly put a stop to any dispute that threatened to break out over food.

By the end of a week, however, the gorillas were becoming increasingly irritated with each other. Some of them could be seen with their ears half torn off and severe wounds on their foreheads, and they seemed to be in the greatest distress. Rampaging up and down their fifty-by-thirty-yard enclosure, they had trampled all the bushes and undergrowth flat, leaving the area almost completely bare. Only three fairly large trees were left standing, in impressive contrast to the dense surrounding jungle. The gorillas suffered a great deal from being cooped up in the denuded enclosure, especially when the sun was shining. The pineapples with which they were being so plentifully supplied, were, after all, not their natural diet, and upset them further. Everything combined to make them more and more irritable and exasperated.

One of the Americans skilfully lassoed a three- or four-year-old gorilla before the netting was removed to allow the big apes to go free. When this had been done the females stayed where they were

for almost an hour; in the end, it was the big male who made the first move towards freedom. The Africans were astonished and disappointed that animals which it had taken so much trouble and effort to catch had been allowed to go free. They simply could not understand it.

It is possible, then, to keep a group of gorillas caged up in the jungle itself for an appreciable period, although the enclosure must be surrounded day and night by a ring of guards and bonfires, and gradually extended in order to replenish the supply of plant life. But it is a complicated and expensive business.

A short time ago, my wife was at the supper table with four young chimpanzees. Supper consisted of bread and butter and fruit, including grapes, of which Irumu is passionately fond. She had gobbled up the bunch on her plate in a moment and tried to snatch some more from Yindi's plate (Yindi was her playmate) but my wife prevented her from doing so. She waited for a little while and then took my wife's hand and pulled it towards Yindi's plate. My wife refused to be cajoled by this manoeuvre, and instead put a grape in the centre of the table. Slowly and apparently purposelessly Irumu's hand moved towards the fruit she craved. She was within an ace of getting it between her fingers, when my wife cleared her throat and Irumu's hand was quickly withdrawn . . . Yindi is very fond of lettuce, though Irumu does not like it very much. A little while later, Irumu playfully took a lettuce leaf and covered the grape with it. Then, since my wife did not seem to be paying much attention to her experiment, she picked up the lettuce leaf with the grape inside it and bolted the grape.

I have decribed this little incident because I once received a letter from a teacher, asking me what he should tell his class, who had asked him whether animals could think. Of course, a question of this kind raised further questions. What is meant in this case by 'animal' - an earthworm or an anthropoid ape? Apes not only resemble man in outward appearance, but are also incomparably closer in feeling and intelligence than, say, a cockchafer, although both chimpanzees and cockchafers are 'animals'. Numerous experiments have proved that the 'higher animals', as biologists call apes in scientific terminology, are capable of calculated, deliberate

behaviour and are in many ways almost frighteningly similar to human beings. Naturally, this does not make them human. They cannot speak. It is this and not 'thinking' or their outward appearance, which constitutes the fundamental difference between us and our fellow creatures.

Nevertheless, innumerable people have proudly informed me that, in their opinion, 'monkeys' are only fit to amuse children or provide entertainment for the most superficial and thoughtless of the visitors to our zoo. Anthropologists, psychologists and philosophers, on the other hand, have gone away looking thoughtful. This was not because we have discussed the matter and they have been convinced by my arguments, but simply because they have seen for themselves how apes behave when they are living in a human environment. They are, after all, mentally the most highly developed creatures next to man himself, as may easily be judged if I describe how our gorilla babies became part of our family.

Thomas, Carlo and Rafiki came to us when they were a year or two old and weighed fourteen to eighteen pounds each. When Rafiki arrived, he had a different name. He had no hair on his body, which made him look very thin and spare, and before he left Africa he had already been christened 'Ghandhi'. As the little fellow answered to this name, I continued to call him by it and thought no more about the matter. However, the three gorillas were presented to the press one day, and there were dozens of letters to the papers afterwards, saying that it was an insult to name an ape Ghandhi. I even had a telephone call from the Indian Embassy in Bonn.

In a naturalist's eyes there is nothing wrong in naming an animal after a great man. Moreover, many Indians believe in the transmigration of souls, and apes are often regarded as holy in India. Still, we changed the little gorilla's name without further ado, and called him Rafiki, which in Swahili means 'good friend'.

Rafiki had the friendliest nature of all our three young gorillas. Even when he was very angry he never tried to bite. The other two did, as human children do occasionally. The older gorillas are, the more we prefer them to chimpanzees, although chimpanzees are the most closely related to man, resemble him most and are certainly the cleverest of the apes. However, they have many typically human characteristics: pleasure at other people's misfortunes, the desire to

tease and irritate, bad temper. Gorillas, on the other hand, are more animal, boisterous and playful, with a liking for rough jokes, but basically better natured.

Six weeks on the right kind of diet were enough to make Rafiki's hair start to grow. While it was still short and fuzzy he looked very funny, like a fluffy toy. For months his hair remained a dark golden colour with small black patches. He was, in fact, a blond gorilla. Similar deviations in colouring, even to the extent of white patches, are not unknown among wild gorillas. By the time he was four years old, however, Rafiki was indistinguishable from his companions as far as colouring went.

Soon after the gorillas arrived, we bought them a twin pram. This was not because we wanted to make babies out of them, but because my wife, who weighs barely $7\frac{1}{2}$ stone, could not carry all three of them herself. The little gorillas liked the pram, and when we wanted to take them for a walk we put them in it just like human babies. As soon as the pram started moving, however, they climbed out. It was easier for them to do so than for human babies, because they have prehensile feet and can use them as well as their hands for climbing. When they felt tired, they used to get into the pram of their own accord. Thomas, the biggest and oldest of the three, soon learnt that he could overbalance the pram by leaning over and holding on to the handle. He used to amuse himself for a quarter of an hour at a time, tipping the pram over like a see-saw and then setting it upright again and was not in the least bothered by the fact that his sleepy brothers tumbled out every time the pram rocked.

Sometimes Hilde, my wife, used to let our three foster-children loose in a field. They used to clap their hands to tease her and Carlo and Thomas played catch as catch can while she chased after them in all directions.

Carlo always wanted to be carried and for the first few months after he came to us he liked to sit on Hilde's lap and play with her fingers. The forest ranger who had brought him to us was convinced that he was suffering from some internal injury because he could not run properly. But it transpired that he was still too young to run, examination of his teeth revealing that he was less than a year old. No gorilla has yet been born in captivity, so we cannot judge

its age from its teeth as accurately as one can with chimpanzees, orang-utangs and human babies.

All three gorillas showed a touching, child-like trust in our big Boxer bitch, Assi. They slapped her gnarled, good-tempered face, cuddled her and tried to climb on to her back and even when the rowdy little creatures pulled sharply at her legs or caught her a blow in the mouth, she still played with them good-naturedly.

They all hated having their noses wiped and grew quite angry, even attempting to bite us when we tried to do this. But they soon learned that they had to have their short broad noses kept clean.

From the beginning Thomas loved boisterous jokes. Hilde would sometimes crouch down and he would give her a sudden push. When she fell over and lay apparently helpless on the floor he was overjoyed and would climb on top of her and pummel her with his fists.

Naturally, all three of them often used to quarrel and hit each other, and Hilde then had to drop whatever she was doing at once and rush off to the animal room. The noise on such occasions was deafening, because Kathrin and Ushi, our two chimpanzees, gleefully joined in the uproar.

The gorillas often presented a comical sight. Rafiki the smallest of the three, but also the most artful, would sit on the wall bars, screaming with anxiety, while fat, clumsy little Thomas stamped up and down below, waving his arms about and obviously enjoying the effect of his aggressive behaviour.

Thomas was anything but fond of people. If we had a strange visitor, he would cower in the furthest corner of the room. Whenever the chimpanzees started squabbling – the noise could be heard three houses away – the little gorillas would huddle dejectedly together with their arms round one another. For the first few months, Thomas was even afraid of my son Michael. He cried if he was left alone in the room with him, but as soon as he caught so much as a glimpse of Hilde or Else, our house guest, his attitude changed, and he would try to bite when they came within reach. During my last trip to Africa with Michael, Thomas became very truculent for a time. He stormed about all over the flat and would have nothing to do with his brothers. Then, all Hilde needed to do was to call 'Michael, Michael!' very loudly, and Thomas soon came to heel. Sometimes, even this failed to work, and then we had to telephone

the zoo office on the floor below and ask one of the officials to come upstairs and act the part of a bogeyman.

But despite their occasional brawling, the trio loved each other at heart. When Carlo was sent by car one day for an x-ray, Thomas cried for an hour and a half and his whole cage was covered with excrement; for as in man, and many of the other higher animals, an ape's 'soul' is connected in some mysterious way with the sphincter muscle. At times of intense stress or excitement, they often 'do something in their trousers.'

Our three young gorillas do not like chocolate or sweets of any kind, but they are passionately fond of lemons. They bite into them with such gusto that it makes one's mouth feel raw to watch them. They are also very partial to willow branches, garlic and onions. All three have learnt to accept trustingly any medicine offered to them in a spoon, no matter how unpleasant it smells. This voluntary acceptance of medicine is extremely important if anthropoid apes in captivity are to be kept in good health, because once they have grown to any size they can no longer be forced to take medicine.

Our three played many delightful games. Thomas likes us to hold his hands, swing him off the ground and whirl him round and round. If we do not grant his request for this particular game, he tries to bite our hands. Often, while we are playing with him he will strike us full in the face with both hands, just out of sheer high spirits. Sometimes he will playfully nip our legs with his teeth.

When they feel happy they stand up and thump their chests with their fists or bang on the wall, or anything else that will produce a drumming noise. At first, little Carlo could not make this famous gorilla noise, and it was several months before he made his first attempt, supporting himself against the wall. Even then, all he could manage to do was slap his stomach. As soon as he tried to raise his hands higher he fell flat on his face.

We always had to make sure that no one gave the impression of wanting to harm my wife, for at the slightest sign of anything untoward all three would leap at her 'assailant' and bite him. Our chimpanzees behave in exactly the same way. If something does not go as they want it to, they give a short, sharp exasperated cry which sounds something like 'eh!' This sort of ejaculation is natural to human beings too, no matter what language they learn at their

mother's knee. It is one of the many instinctive expressions that the three species of anthropoid ape have in common with man and that are immediately understood by all of them.

Rafiki was definitely odd man out, being nothing like as dark as the other two. He was more of a blond. He often preferred to play on his own, rushing about all over the place on all fours. When he was picked up and cradled on someone's arm like a baby he was ecstatically happy and closed his eyes in rapture. All three gorillas laugh when they are tickled, and although they try hard to avoid it, they really enjoy it. Thomas always wants to impress us. If I sit on the floor, he charges noisily past me brandishing an Indian club which he brings down beside me with a resounding crash. They all have their own ways of getting us to play with them. Carlo, for instance, creeps up behind Hilde and bites her bottom, thus achieving his aim of making her chase him. One winter we wanted all three of them to wear knitted pullovers, not because we considered it amusing to dress them up like human beings - we have never photographed them like that - but because we wanted to be able to take them out in cold weather. At first the little rascals flatly refused to allow us to put their pullovers on, but after a few days they came to realise that when the pullovers were produced it meant an outing in the pram, so they stretched out their hairy black arms and submitted to being dressed up in their winter woollies.

From my notes I see that, at one time, Thomas used to be afraid to run about the flat on his own. Later, this seemed almost incredible. Then he used to take our hands and pull us towards the animal room, because that was where he felt safest. When Hilde did not want to go with him he used to put his head behind her knees, wrap his arms round her legs and push her there by main force.

He had a fixed routine for his games with the swing. He climbed on to it and I had to start him off. Every time he came towards me he tried to grab a handful of my hair, and on the upswing he examined his hand to see if he had been successful. If he managed to fetch me a blow on the head or shoulders, the little scamp went into raptures. When he swung up very high so that he almost touched the wall-bars he gave them a mighty bang with his hands, or else tried to pull one of his companions off them on the downswing.

We long ago trained them not to pull the cat round the room by

OUR ANTHROPOID APE CHILDREN

its tail or take a quick bite at Assi and run away, but I did not have any success in breaking Thomas of his habit of playing the same joke on me every evening when we took him and his two brothers into the bathroom for their bedtime wash. He tore himself free, burst noisily into my study and made a quick circuit of the room, sweeping half a row of books from the bookshelf on to the floor with one quick gesture as he ran. When he refused to come out, Hilde and I went into the hall and prepared to close the door behind us. In a flash Thomas changed from a brave little hero into an anxious little coward and dashed out of the room.

We were very concerned about our little gorillas because at that time they were the only ones in Germany, and because of this my wife usually stayed with them when they are playing in the zoo. They literally hung on to her apron strings, and Thomas discovered that, by inserting one short, stubby finger inside the hem of her petticoat, he could tear it all the way round. If we just slapped them lightly or gave them a gentle reprimand, they took it as a joke and did exactly the same thing again. They were astounded, so were the chimpanzees, when one day my wife appeared in slacks which they could not tear off and there was no skirt for them to get under.

It is very difficult to restrain such high-spirited youngsters when hundreds of people are standing round watching them, all of whom naturally know how to bring up children better than you do. These know-alls are not slow to criticise or offer abundant advice and are the bane of all zoo staff.

Gorillas are not as cunning or mischievous as chimpanzees often are. Chimpanzees resemble human beings much more, in their bad as well as their good characteristics. To make up for their comparative lack of guile, nature has endowed gorillas with immense physical strength. By the time they weighed 70-80 lbs, our gorillas had muscles like steel bands and were incredibly strong. If we omitted to lock a door properly, Thomas would put his back to it, get a good grip with his hands on the metal bars on both sides of it and just push until he forced it off its hinges. It was greatly reassuring to see that he became better tempered and more trusting as his strength increased. However, we must continually be on our guard not to arouse their jealousy. If Hilde is playing with Thomas and Rafiki, Carlo will shower them with abuse and bite them. Thomas

often lashes out at Rafiki simply to provoke him, and when Rafiki becomes almost beside himself with rage, Thomas laughs all over his face with pleasure. As soon as Rafiki calms down, his tormentor bites him again. Thomas has a special brand of humour which always takes one by surprise because he usually keeps a straight face. Recently a man asked permission to be allowed inside the barrier in the children's zoo, in order to do some filming without having to aim his camera through the wire netting. Almost as if they had agreed on it beforehand, Thomas and the two chimpanzees tore over to the hapless photographer and spattered him with sand from their sand-box, which they had made all ready for the purpose.

From our flat on the fifth floor we can see a long way over the roofs and streets of Frankfurt. When dusk falls, our apes like to station themselves at the window and look out at the lights and at the reflections gliding over the pavements. We put chairs by the window for them and they sit there quite quietly. The big red Advent-wreath candle burning in our dusky room was the first Thomas had ever seen, and he sat and gazed earnestly at it for a long time.

Gorillas sleep in a different way from chimpanzees. They sit down on the floor and lean their shoulders against the wall. Then, as their eyelids grow heavy, their heads sink on to their chests and they doze off. At night every young ape is given a bed of wood shavings with a blanket draped over it, but only some of the chimpanzees cover themselves up. Thomas can only fall asleep if he has his arms round Rafiki and Rafiki's head on his shoulder. Once they have all fallen asleep Hilde quietly goes into their room again, tidies their beds, and makes sure that they all have bread and fruit beside them, ready for the morning. Whenever she straightens out Rafiki, Thomas stirs in his sleep and moves towards his bed companion. His breathing only becomes regular again when his arms are once more round Rafiki. They sleep deeply and peacefully, our anthropoid ape children.

CHAPTER 2

The Honest and Friendly Skunk

SKUNK CAUSES 1,200,000 MARKS' WORTH OF DAMAGE IN CLOTHING FACTORY, a German newspaper headline announced. In Appomatox, a small town in Virginia, somebody had thrown a skunk through the window of a strike-bound factory. In its efforts to get out again the frantic animal had squirted its vile-smelling fluid all over the stocks of finished clothing and ruined everything – according to the news stories. I do not believe they are true and I have good reason to doubt them, having kept skunks for many years. Anyone who knows the mannerly ways of skunks and is aware that they always give warning of their intentions, will find it hard to believe that a skunk would walk round a clothing factory and 'perfume' endless rows of motionless figures. The story is too good to be true.

This is how I got my first skunk. One night, an airline official rang up from the airport and asked whether I could look after a box containing two skunks. A woman passenger whose strange luggage this was had been taken ill and would have to stay in hospital for two weeks. The office staff did not know what to do with the skunks. I opened the box as carefully as a bomb-disposal expert dismantling a loudly ticking package. We are not nearly so cautious with lions or panthers as I was with those skunks.

Skunks have two tail glands, one each side of the anus, which secrete an oily fluid, consisting mainly of a substance with the harmless-sounding chemical name of Butyl Mercaptan. In moments of stress these glands swell and eject twin streams of this fluid through two small orifices, the jets merging to form a spray which has a range of twelve or thirteen feet. This foul-smelling secretion can be ejected by a skunk at quite an early age, in fact by the time

it is four weeks old. Anyone unfortunate enough to be sprayed by it would be best advised to burn his clothes. He will in any case be unable to mix with people for some days. Anyone in a room with skunks who gets sprayed is usually very sick. The fluid smells like rotten eggs, or a mixture of garlic and hydrogen sulphide. Some people recommend fumigation as a means of ridding clothes of the smell, but others consider it best to burn them straight away. Soap and water do not help much, though petrol is fairly effective in removing the foul odour. But boots that have been immersed in chlorine solution for four months have been found to be still stinking of the fluid when they were taken out. The spot where a dead skunk has been buried in a garden can still easily be found months afterwards because of the smell.

Be that as it may, our new arrivals from America were certainly not malicious. They did not come at us hindquarters first, ready to shoot out their liquid, but advanced in a friendly manner, black and white faces first. In the lid of their box I found a list of instructions in English and a note saying their glands had been removed by an operation and that they were completely tame. We had dog leads and harness close at hand, so we were able to take them for a walk.

Some time later the woman who owned the skunks told us their life story. They were the most widely travelled pair of skunks in the world. She had got them in Hollywood when they were quite tiny. They were likeable, jolly creatures, and used to scamper up and down the stairs of her home. But they would not be house-trained. They used to attend to their natural needs in every corner of every room, but their owner solved this problem by putting shallow pans there for them to use. Once, when they escaped from the house, she warned all the neighbours to keep a strict eye on the carrots in their vegetable plots because they were what the skunks liked best. As the lady was serving with the American army the skunks always travelled with her in a comfortably equipped, harmless-looking box. Once the female gave birth to a litter during a non-stop train journey. Unfortunately, the little box to which the baby skunks had quickly been transferred, was held under lock and key by the customs while the train passed through Canada on its way to Alaska, and the youngsters died.

Skunks in zoos and on skunk farms are always deodorised. The



MY WIFE'S GORILLA FAMILY



CARLO, THE LITTLE GORILLA, LIKES BEING WASHED



MISUNDERSTOOD LOVE: ASSI, THE BOXER BITCH, WANTS TO PLAY, BUT THE SIAMESE CAT SPITS AND SCRATCHES

glands are immediately beneath the skin, so while the animal is still young and the glands relatively undeveloped the veterinary surgeon removes them under a local anaesthetic. However, even skunks which have had their glands removed still sometimes adopt their threatening stance, turning their hindquarters warningly towards the enemy, with tail upraised. This behaviour is instinctive and experience hardly changes it. Human instincts are exactly the same. No matter what unfortunate experiences we may have had in the past, we always fall in love again.

It is natural for an inexperienced dog to investigate a deodorised skunk at close quarters, but a dog that has come across a skunk before will give any others a very wide berth. A group of five fully grown bears have been observed to draw back hurriedly from something they were eating when a skunk approached and wanted to share their meal. A trapper has recounted how a female skunk used to come into his tent quite freely with her playful, half-grown litter and have a good look round at everything. The baby skunks were not at all bothered if they happened to touch a human being's legs or feet during their play in the tent. But one night a big bay lynx was sitting in the bright moonlight in front of the tent, eyeing the human intruder in that deserted region. The skunks were totally indifferent to the big cat's presence, though whenever one of the little ones came too close the lynx bared his teeth. The trapper, ascribing human thoughts to an animal, one feels compelled to say, was of the opinion that the lynx could find no better way of expressing his 'unutterable contempt' for the half-grown little skunks.

Skunks are always indifferent, because nobody wants to have anything to do with them, except when driven by hunger. But skunks are not so keen to loose off their 'ammunition'. They only have four or five shots in their locker, and once these are used up, replenishment takes an appreciable time. Accordingly, a skunk will not eject its fluid until its opponent is so close that it cannot miss. The Americans say that a skunk waits until it can see 'the whites of the enemy's eyes'.

Unlike human gunmen, skunks give abundant warning of their intentions. Their dazzling white stripes are as obvious as a traffic signal, but they do not rely solely on these. Their magnificent bushy tails go straight up in the air like a Christmas-tree, they arch their

backs and beat the ground with their forepaws. These actions are highly effective, especially with puppies who want to play. But woe betide anybody who fails to understand! The little fellows direct their jets with unerring aim and always hit their opponents in the eyes. Although the fluid does no lasting damage, it stings agonisingly. Do not be lulled into a false sense of security just because a skunk approaches you head first, because he can turn round and let fly in a flash.

Tame skunks almost never squirt their fluid, even when they still have their glands. They content themselves with threatening to do so and drumming on the ground with their forepaws. A tame male skunk which acted like this, mated with a wild female and they reared a litter. The only time one of them did squirt was when a cat, herself a mother, attacked one of them. She got an eyeful. But the male did not live long after this. A big owl pounced on him and devoured him.

When skunks go out foraging for food they usually follow man-made paths or animal tracks because it is easier to do so. They often find the droppings of other animals there and feast on the dung beetles which have congregated on them. Skunks always eat large quantities of insects, and examination of their stomach contents has shown that insect pests like Colorado beetles and grasshoppers form up to seventy per cent of their diet. That is why one forgives skunks their smell. Many have been found to have the remains of a hundred and fifty bees in their stomachs and one had sixty-five stings in its throat and gullet, though of course these could have come from dead bees, which can still sting after death.

Skunks are not over-popular with bee-keepers, because of their nocturnal habit of raiding bee-hives. They scrape at the sides of the hives until the alarmed inmates venture out to investigate, fall over the edge and are eaten by the waiting skunks. Many American bee-keepers surround their hives with low wire fences topped with broad metal strips, in order to keep out the bee-loving skunks.

Skunks are so indifferent to both human beings and other animals that a camper will sometimes wake up in the morning to find one asleep on his stomach. The effect in such cases is much the same as in the famous story that appears again and again in adventure books, of the man who woke up and found a cobra on his bed.

THE HONEST AND FRIENDLY SKUNK

As far as Nature's creatures are concerned – and they are reasonable beings – the skunk's unworried behaviour pays off. It is a different story with man's blindly angry creation, the motor-car. According to the report of a Pennsylvania road construction engineer, no fewer than 17,301 animals, mainly cats and dogs, were killed on the roads there in a single year. In the wild animal category opossums headed the list and skunks came next, with 1,205 killed. Often they feast on the remains of animals which have already been run over, and themselves get run over in the process. Apart from this, however, many skunks are killed for their pelts, of which two million come on the American market every year, some from trappers, others from skunk farms.

Sometimes when it is raining hard, it may be noticed that the fur coat of a woman passing by, gives a pungent reminder of its origin. Not long ago I came across an account of some experiments in making animal feeding stuffs and sacks unpalatable to rats and mice. Butyl Mercaptan, the same fluid the skunk sprays at its enemies, proved to be the most effective of all the unpleasant substances experimented with. As long as the smell lingered, the fodder remained untouched. (I should imagine that the domestic animals who were supposed to eat it later on would also refuse to touch it.) Honey retained the unpleasant odour longest – for four months.

During the last few years, naturalists have shown increasing interest in the smelly but useful skunk. They have caught skunks, chloroformed them, drawn off their glandular secretion, and examined the animals at leisure.

Accurate censuses of skunk populations have also been made. In the United States there are about eleven skunks to the square mile – a population density the same as in Paraguay's human population and four times that of Iceland's. Making a quick calculation, I would say that there are as many skunks in the United States as there are Spaniards in Spain, some twenty-eight million. Skunks are very gregarious animals, and ten or even fifteen have often been found sharing one burrow, especially in winter, for burrows do not belong to particular skunks but are communally owned.

CHAPTER 3

Seals

IF anyone were to ask which among the world's animals is the most numerous, most people would think of the African antelope. But this has not been so for a long time. Hardly anyone would think of the seal. There are many millions of them, although they are not nearly as numerous as the world's human population.

The Russians have surveyed the whole of the White Sea area from the air, flying at 2,500 feet so as not to scare off the animals. Examination of their aerial photographs revealed hordes of saddle-backed seals and a careful and detailed count brought the total to three million. They almost invariably make their home on the vast fields of drift-ice, carefully avoiding the solid ice of the coast because, unlike the ringed seal they cannot make breathing-holes in the ice.

The powerful walrus can, however. He does so by lying on his back on the ice, with his head and hind flippers raised, and then straightening up suddenly, so that the back of his head acts as a hammer and breaks through the hard crust of ice to the water beneath. Of course, this method is only effective if the ice is not excessively thick. If it is, then the walrus has to slither along on its belly as quickly as it can until it reaches the open sea. There have been a number of reports of walruses which have covered distances of up to thirty-three miles in this manner, ravenous with hunger, and with the hide scraped off their undersides.

Ringed and bearded seals dislike having to exert themselves by breaking away the crust of ice which continually forms across the top of their breathing-holes and threatens to block them. Instead, they push up the thin ice from underneath with their snouts, making a little hummock. They then make a small hole through the top of it, and, as the hole is then directly over the surface of the water, it

SEALS

never freezes over, even if the ice around it grows thicker. Every seal has several such breathing-holes and it is difficult to imagine how they manage to find them from under the thick ice. The Eskimoes stand by them in the freezing cold for hours at a time, their spears poised, ready to plunge them into the seals' heads when they come up for air.

If the ice above its head is covered in three feet or more of snow, the ringed seal widens its breathing-hole until it can come up through it, and then digs itself a path up to thirty feet or so long with a burrow in the snow at the end of it. It is here, during the coldest part of the winter, that the female gives birth to her young, totally concealed from the outside world. The young ones born in this manner have a much snugger home than some of their fellows, because a snow-hole is always comfortably warm.

The seal's hairy coat is not much protection against the icy coldness of the sea, even in the case of sea-bears and fur-seals, which have a layer of 'under-wool' beneath their outer coat. It is these animals which provide the sealskins for women's coats. The seal's coat only comes into its own on land, when it has dried, and then it shields the seal from the icy wind. The plumage of amphibious birds is thick enough to be waterproof and keep their bodies dry by enveloping them in a pocket of air, but the seal's coat is not waterproof and becomes thoroughly soaked.

As soon as a seal comes out of the water its coat loses its uniform glossy blackness and becomes patchy. Many parts of it, particularly on the animal's underside, dry much more quickly than others and show up as brownish splotches. This phenomenon is of special interest. These splotches mark the position, deep under the skin, of the seal's cooling system. Like whales, they are insulated against the freezing cold sea by a thick layer of blubber, and when they swim at speed they become very hot. To cool off, they discharge their excess body heat into the surrounding water, by engorging certain parts of their bodies with blood, which they can do at will. It is these areas which show up as splotches on the seal's coat. A seal's cooling system, in fact, works on the same principle as an immersion heater.

A plentiful blood supply is better than the best diving equipment, and seals have several internal 'reservoirs', each holding quite a few

pints of blood. Their blood is very dark in colour, which is why seal meat always has a blackish appearance, except for the muscles of young seals caught before they have begun to swim. Inexperienced seal hunters have hardly been able to believe their eyes when they have seen the huge quantities of blood that pour out of a dead seal. Blood accounts for 15 per cent of a seal's body weight, only 6.6 per cent of a man's. A seal is said to have as much blood as an ox of the same weight, though this may be an over-estimate, because a seal's blood hardly coagulates at all, and the animal bleeds white.

On the islands in the southern hemisphere baby sea-elephants are sometimes found lying ten feet down in the packed snow, dying wretchedly of starvation because their mothers cannot reach them. This happens when they fall ill and begin to run a high temperature. The warmth of their bodies causes the snow underneath them to melt and so they gradually sink deeper and deeper into it.

Seals have a great deal in common with man. When they are transported by ship they become sea-sick – as do apes, horses and elephants. This is to be wondered at, since seals spend their lives in rough seas. Certainly, human swimmers breasting high waves and then sinking into the troughs do not become sea-sick, but being in a pitching ship is different from swimming in a rough sea, and this difference is decisive. Seals on land can also be afflicted with the same ills that plague us – sunburn, for instance. Seals and walrus have been found so badly sunburnt that they could hardly be driven into the water. When they did dive in they howled with pain and immediately struggled out again.

Seals are outstanding as natural divers. The grey seal goes as deep as fifty fathoms, and saddle-backed seals have been trawled up or caught with bait from as far as 150 fathoms down. On the other hand, at 155 fathoms, some seals suffer in the same way as human beings without diving apparatus at much shallower depths – they get the 'bends'. Unlike us, seals exhale before they dive, thus to a certain extent preventing any more nitrogen being absorbed into their body tissue because of the high pressure of the water round them. Very rapid surfacing causes this nitrogen to be reabsorbed into the bloodstream as gas, clogging the body's small blood vessels, particularly those in the lungs.

Physiologically, seals are well equipped for sustained dives. Their

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pulse rate can decrease from a hundred and fifty to a mere ten a minute. Not only do their nostrils close up under water, as one might expect, but when they want to breathe in, a definite muscular effort is required to open them. Even on land, seals breathe quite irregularly, sometimes stopping altogether for minutes on end. Often visitors at a zoo will tell keepers that a sea-lion has drowned and is lying on the bottom, when, in reality, it has merely not surfaced, preferring to stay under water. Hunted seals stay under for up to half an hour, though it is easy to over-estimate the time they remain submerged, because they often poke their nostrils up surreptitiously and snatch a quick breath or two. They not infrequently sleep vertically in the water, and their nostrils open automatically every minute or so to allow them to breathe. On land they are much more vulnerable, so they raise their heads at short intervals and blink round to see if any danger threatens.

Saddle-backed seals can swim, albeit for short periods, at a speed of twenty knots – twice as fast as a fishing vessel and faster even than the average passenger or cargo ship. Their breathing system allows them to swim submerged for distances up to nearly eight miles, as, for instance, under an icefield, but saddle-backs are rarely found more than three miles off-shore.

They are greatly helped in diving by the fact that their eyes adjust unbelievably quickly to the gloom at great depths. It takes between forty and forty-five minutes before a human being can make out anything at all when plunged into deep darkness, and a dog's eyes take twenty minutes to adjust to lack of light. A seal needs no more than a second. For this reason it sees well only in the water. Out of the water, seals' deep-set eyes are very short-sighted, and in addition, they have a poor sense of smell, which makes them easy to deceive. A seal hunter will often run quickly towards the place where seals have congregated, only to see them dive hurriedly into the sea. But before the inquisitive creatures break surface again and approach to take a closer look at him, the hunter will throw himself flat on his face and start making seal-like motions with his head and arms. In this way adult seals can be enticed to within shooting distance, and the young come so close that the hunter can catch them by hand.

It is hardly credible that mammals who spend their whole lives in the water should suffer from lice, but seals do. Lice cluster thickly not only on their heads, which emerge from the water from time to time when seals come up for air, but also on the area between their hind flippers and their tails. The chitin hairs of these lice are covered by scales which are hinged so that they can be raised to trap air bubbles. Many water beetles and water spiders similarly carry their own air supplies with them. The seals in Lake Baikal in Russia, which is landlocked, are infested with the same species of louse as the sea-going seals, even though the two louse colonies have had no contact with each other for hundreds of thousands of years. These submarine lice torment their hosts in the same way as those on land, and just as there are birds which peck the vermin off rhinos and buffaloes, so in the Arctic there is a species of thrush which performs the same service for seals. They dart all over the seal's bodies, while the seals themselves often roll about on the ice, bellowing at the intense irritation caused by their uninvited, fiercely biting guests. In the meantime, their nostrils become infested with ticks, which are spread from one animal to another by the habit many seal species have of rubbing noses briefly when they meet.

Sea-lions like to swallow stones because they suffer from worms. In the Paris Zoo they found 72 lbs of pebbles in one male sea-lion's stomach, and 22 lbs of flints in another's. Perhaps the pebbles are meant to act like millstones and crush the worms to death. This idiosyncrasy often misleads geologists into thinking that stones found in some specific area of the ocean belong there, when they have actually been brought from elsewhere by seals.

Although there are so many millions of seals in the oceans of the world, there are only some thirty different species, and these are always confused with each other by zoo visitors. As far as our visitors at Frankfurt are concerned, the animals swimming around in our pool are generally 'sea-lions'. Sea-lions can, of course, be found round our own coasts, but those in zoos usually come from off the Californian coast, and do better in captivity. Sea-lions (or 'hair' seals) and sea bears (or 'fur' seals) with the under-wool under their fur, are eared seals and can lower their fore flippers when on land and run like a land quadruped. Sea-lions are killed only for their blubber, the fur seals for their fur as well. Almost all fur seals

inhabit the southern hemisphere, the only outstanding exception being the ribbon seal, which is found between Alaska and Kamchatka.

At the time of Catherine the Great, the Russian seafarer Pribiloff was greatly exercised by the problem of where the countless seals came from that flocked northwards every year to the Aleutian Islands. He finally discovered that they came from the five mist-shrouded islands that are now called after him. The innumerable seal 'rookeries' there must have been an impressive sight.

As might have been expected they were mercilessly slaughtered, but soon reason gained the upper hand, and the Russians restricted the number of fur seals allowed to be killed in any one year.

Winter and summer, these seals stay in the open sea. As soon as the bulls go ashore they gather harems around them. Since young seals looking for mates abound, the older bulls dare not take their eyes off their harems, fifty, or even occasionally a hundred strong, for a moment. They can spare only the briefest periods for eating, drinking, sleeping or going into the water, and so for two months the old bulls live off their blubber. The females give birth to their wrinkled young within a day or two of reaching land, and almost immediately afterwards mate again.

At frequent intervals the females shuffle off to the sea to catch fish, leaving their young unattended, but they infallibly find them again among the thousands of others, never mistaking another seal's pups for their own. If a mother seal dies, her young starve to death.

The ruttish bulls take no interest in the pups, which often huddle against them for warmth when they are asleep. Sometimes, when a sleeping bull seal turns over he crushes some of the pups to death. The young of most seal species are born with a thick hairy coat, and it is only when they have lost it some weeks later that they make their first forays into the water, though at times of danger their mothers will throw them into the sea by main force.

Today only three-year-old males without attendant harems are killed, and it is their pelts, paid for so dearly, which husbands present to their wives in the form of seal-skin coats.

Actually, the fur seal species came within a hair's breadth of total extinction. When the United States bought Alaska from the Russians

in 1867, three to four million seals still used to migrate to the Pribiloff Islands. But seal hunters, like other poachers the world over, found ways of evading the restrictions designed to protect the seal herds, and slaughtered them unceasingly. Anchoring off the islands, they killed the seals indiscriminately, males and females alike, as they converged on their 'rookeries', not even bothering to set foot on shore. By 1911 the number of seals had shrunk to 123,600, then at the last moment, Russia, Japan, England and the United States negotiated a very reasonable 'seal treaty', willingly conceding that the sea areas concerned should come under the supervision of the United States. Since then the northern fur seals have steadily increased in numbers until today there are again about three million of them. In contrast, help for the seals of Guadeloupe came almost too late, for they had almost vanished from the face of the earth. No fur seals are to be found in the European areas of the northern Arctic seas.

There are only two species of walrus, one in the North Atlantic and the other in the North Pacific. There are no walruses at all in the southern hemisphere, although pictures often wrongly show them together with penguins. Walruses have become steadily rarer, and it may perhaps be that they will become completely extinct before very long.

The moustachioed walruses one sees in zoos look embarrassingly human, because in captivity they generally do not have their long tusks, having worn them away by sharpening them on the stone edges of their pools. They become very attached to their keepers, so much so that their demonstrativeness becomes almost tiresome. Despite their bristly beards, as thick as feathers, walruses take a delight in kissing their keepers. Another trick they soon learn is to squirt streams of water in the faces of unsuspecting visitors, to the amusement of everybody except the recipients.

Walruses come next after the eared seals in the seal family and are considered peculiarly unaggressive. (Remarkably enough, they are the only members of the seal family which take no notice of polar bears, even if one passes very close to them.) Alwin Pedersen, a Danish acquaintance of mine, who lived in the Arctic for many years, once told me that he and some companions were out in a

boat one day when they looked over the side and suddenly saw the huge heads and snow-white tusks of an enormous herd of walruses. For more than two hours the high-spirited herd swam and played around the boat, giving it some hard knocks. Pedersen and his companions sat perfectly still, because if a walrus is shot at or angered, the whole herd will attack and a herd of walruses can smash and capsize even a well-found boat.

Walrus families are very close-knit and their touching family relationship has often proved their undoing. Seal hunters may find an isolated youngster and attack it. Its cries of course, will be heard by the rest of the herd, which will immediately attempt to come to the rescue, and the hunters can then shoot as many as they like.

Walruses are sometimes said to feed only on mussels and small marine animals. But this is not true. Nor is it true that they use their huge tusks to prise mussels off the rocks and smash their shells to pieces. What they do is to pounce on weaker seals, clamp their two fore-flippers round their victim's ribs, tear them to pieces with their tusks and swallow them, as is shown by the fact that the flesh of other seals has often been found in walruses' stomachs. It is not surprising, therefore, that as soon as a walrus surfaces anywhere at sea, the smaller seal species make off as fast as they can.

When Heligoland was destroyed, the Royal Air Force transferred its bombing practice to a stretch of sand along the North German coast. Their falling bombs wiped out some 70,000 sheldrakes, those magnificent, brightly plumaged birds, which had gathered there during the moulting season, from all the coasts of Europe including England. Many seals were also killed in this way, for they are included among Germany's fauna too. According to fairly accurate estimates, there are some 3,200 seals there and a further 8,500 make their home in the shallows along the Dutch coast.

In contrast to their nomadic fellows, common seals never go further than seven to ten miles from the place they have chosen as their home. What could have come over the seal that swam up the River Oder as far as Frankfurt one day? Or the one that paid a visit to Breslau in 1942? As early as 1634 there was a report that a seal had been sighted in the Elbe near Dresden.

The animals one sees in circuses balancing rubber balls and lamps

on their noses, and even performing on the tight-rope, are never common seals, although many people think they are. Northern seals (the third seal family, to which the common seal belongs), slither along on their bellies like caterpillars. A fat common seal cannot even reach the ground with its side-flippers. Instead it arches its body, stretches its hind-flippers backwards and moves forward in a series of small jumps. Many species can move at a fair rate by this method and by making an extraordinary effort they can even reach a speed of seven miles an hour.

Seals' thick hairy coats, the fur of which lies backwards, help them greatly in moving about, making it easier for them to slide along. This is why skiers sometimes tie seal-skins under their skis, to prevent them from sliding backwards down the mountainside on frozen snow – a method probably discovered by the Eskimoos. (Eskimoos, incidentally, have no idea of the correct way to tan seal-skins. Usually they steep them in urine and their wives then chew on them till they become soft). But this peculiar property of seal-skin can sometimes work to our disadvantage. For a long time men's purses used to be ornamented with pieces of seal-skin, but the motion of walking often made them slide out of trouser pockets and get lost.

Northern seals are fairly adept at moving about on dry land, even though they do not use their limbs to propel themselves. In the Antarctic they are often found twenty or thirty miles from the sea and 2,200 feet above sea level. The common seal's hind-flippers are set very close together, and when the tail is folded down on them they act as a powerful means of propulsion. Only in very rare circumstances can the common seal use its hind-flippers for getting about. Dr Erna Mohr, who is held in the highest regard as a zoologist, once saw them do this at the Basle Zoo. She is an expert on seals and I have drawn heavily on her studies in this part of my book. When the water is so deep that the common seal cannot get its head more than half-way out of the water, it pushes its hind-flippers apart and downwards and waddles forward with its flippers on the bottom of the pool, which is roughly the way a man would walk if his legs were joined at the ankles.

When our fairy stories tell of sea spirits or mermaids who listen for church bells, they have surely used the common seal, with its

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round, man-like head, as a prototype. Many people have already discovered that common seals are attracted by the sound of music, particularly that of violins. Whether this proves that they are musical is a different question. They are certainly inquisitive, and whenever they see a boat they swim over to have a good look at it from all angles. However, they have not yet learnt to take man's wickedness into account.

In contrast to most seals, which give birth to their young on land or floating ice, and keep them away from water for six to eight weeks, common seals are born 'ready for immediate service', so to speak. In the shallows which form their home, at least round our coasts, no rocks remain uncovered at high tide. The pups of the common seal shed their thick fur immediately after birth and can swim from the first moment. If a pup is rejected by its mother, or gets separated from her in the maze of channels that criss-cross the shallows and is swept away by the tide, it will swim about howling and will even follow people passing along the beach. If it is not rescued by some sympathetic person and reared on the bottle, it is doomed. Incidentally, anyone who tries to bottle feed a young seal should remember that seal milk contains thirteen times as much fat as cow's milk - 43 per cent in fact.

Seals hardly ever drink sea water, although they drink fresh water in zoos or when they are being transported by ship or plane. Sea water contains 4 per cent salt, while the fish that seals live on have a salt content of only .07 per cent. Nevertheless, seals must live in salt water if they are to thrive. With a few exceptions, the only European zoo where common seals actually breed is the small one at Bremerhaven which is sited on the brackish estuary of the River Weser.

The defective vision that seals in captivity occasionally suffer from is not caused by the fresh water in their pools, because wild seals often suffer from it too. So it must be that eyes which have to see under water are particularly vulnerable.

Once seals have become accustomed to zoo life, they can live to a ripe old age. When Jakob, a male grey seal in the Stockholm Zoo, died in 1942, he was forty-three years old. An autopsy revealed that he had been suffering from an enlarged heart, vascular damage,

and many other symptoms that affect human beings as they grow old. He would not have lived to such an age outside a zoo.

Many seals can stave off hunger by living off their blubber. Sea elephants brought to Europe by ship from the Antarctic via the Equator, generally eat nothing throughout the entire eight-to-ten week voyage. Even the much smaller common seal can often go up to eight weeks without much food, and many species of seal eat nothing at all during the two-to-four weeks it takes them to learn to fend for themselves after they have been weaned.

Even in our most dreadful nightmares we could not imagine the appalling number of seals butchered each year for their skins or their blubber. According to their own statistics, the Norwegians alone killed 343,000 – mostly saddle-backed seals – in the Spitzbergen and Novaya Zemlya areas in 1925. By then they had increased their sealing fleet from forty ships in 1875 (when they killed 8,000 seals) to 170. The Russians, operating further to the east, killed even more, because they used ice-breakers and aircraft and (according to some) ignored the seal protection regulations. In the western Atlantic, near Canada and Newfoundland, 300-500,000 seals are killed every year. To these must be added those killed in the Antarctic and the Northern Pacific. This slaughter – it cannot be called hunting – is carried on without any difficulty. The fur seals are driven to the slaughter area, care being taken that they do not overheat themselves and damage their fur. They are then clubbed or killed with axes, a crude and gruesome business. It is apparent from the colour films Dr Lilie brought back to England with him in 1949, that many young seals are not dead when they are skinned, but merely stunned.

The biggest seal of all, the sea-elephant, colossus of the ocean, was earlier to be found along all the coasts and cliffs of the south Atlantic. As a male sea-elephant weighs anything from four to five tons and does not react at all when approached by human beings, seal hunters have naturally reserved their fiercest onslaughts for them. Today there are only perhaps 260,000 sea-elephants left, in South Georgia, and another 2-3,000 in the Falkland Islands area. England and Argentina, which are in dispute over the Falklands, have tried to ensure that these herds shall be preserved, but despite

this some 4-5,000 sea-elephants are killed every year. Another species of sea-elephant, which used to be found in the north, off the Californian coast was somewhat smaller, though with a longer proboscis. It was already thought to have been wiped out eighty years ago, but in 1892 a small herd was discovered on the island of Guadaloupe. The Mexican Government took them under protection and they steadily increased in numbers from less than a hundred to more than 6,000 by 1950. In this instance, at least, there has been a happy ending to the story of a species threatened with extinction.

Relying on their size and strength, sea-elephants sleep incredibly soundly. Scientists have been able to measure their anal temperature, count their heartbeats and check their breathing rate without disturbing their slumbers in the slightest. These observations showed that sea-elephants take thirty breaths a minute for five minutes, and then stop altogether for the next five or even eight minutes. This phenomenon is connected with their diving abilities.

Young sea-lions which, with the parent animals, often inhabit the same area as the sea-elephant, also take advantage of its good nature. Two- or three-year-old sea-lions can often be observed lying comfortably on a sea-elephant's back, warming themselves.

In the rutting season a bull sea-elephant gathers on an average thirteen females around him during the mating season, and gets no opportunity to eat throughout the entire period. The bulls are given no rest by their rivals. When threatening movements and bellowing fail to drive a rival away, the bull will seize it by the scruff of the neck and shake it like a terrier shaking a rat. However, its tough hide protects it from lasting harm. Bull sea-elephants are about three times as heavy as the females. Their strange proboscises, which they can inflate, apparently serve also as musical instruments. The open end is set into the widely gaping mouth and the nostrils lead right into the top of the throat. The mouth and proboscis thus act as resonance chambers, and when a bull snorts the noise can be heard nearly three-quarters of a mile away.

Why are sea-elephants so rarely seen in zoos? Well, it is not so easy to transport so huge a creature across the Equator to Europe, so our zoos generally content themselves with two, three or four seals. Otherwise it would become a very expensive business, for

TWENTY ANIMALS, ONE MAN

keeping sea-elephants costs many times more than seals. Even a sea lion eats 18-27 lbs of fresh fish a day, which must be unsalted deep-sea fish, which has to be delivered daily in refrigerated vans. Every seal therefore costs ten to fifteen marks or round about £1 a day to feed, year in, year out.

CHAPTER 4

The Flying Squirrel

WHEN I was a student I used to spend holidays (and also a whole term when I played truant) travelling around England and North America. On one occasion I was staying with a farmer. In my imagination I can still see the undulating, wide-spreading orchards, covered with a red carpet of magnificent apples which had fallen from the trees. It was not worth the farmer's while to pick them up and send them to market because prices were so cheap. One day, I went to some woods nearby, because I wanted to climb a tree in order to get a better view of the apple orchards and take some photographs. A woodpecker had bored two holes in a dead branch near the top of the tree I had chosen for my vantage point, and when I brushed against it as I was climbing the tree, several tiny faces with huge eyes appeared in the holes. Then there was a scrabbling noise and two or three small grey creatures jumped out and sailed through the air to the lower branches of the next tree. It all occurred too quickly for me to realise exactly what was happening. The farmer later told me that they were flying squirrels. I had only seen them for a fraction of a second.

Twenty-one years were to go by before I actually held a flying squirrel in my hand. At international conferences of zoo directors I had become friendly with some Americans, and we used to exchange our native animals. On one occasion, I sent off a few crows, owls and squirrels to the United States by air, and in return we received some tiny flying squirrels.

I put the first pair in a box in my bedroom. They spent the whole day curled up inside a little compartment in the box. When I took them out they were quite drunk with sleep and lay motionless in my hand for some little time. For the first few days they seemed to be consuming enormous quantities of food, particularly walnuts;

then I discovered that they were not eating the nuts at all, but storing them away in their box.

The flying squirrels became extremely lively at night, so it was a good job we were sound sleepers. There was a great deal of sawing, scratching and scraping all night, and they tumbled about, gnawed their nuts, squabbled and made so much noise, that one would have thought some sort of 'beastie' was loose in their corner of the darkened room. The signs of all this assiduous activity could easily be seen on the sides of their box the next morning.

On two occasions I happened to come home late at night, and opened the box to see how the little creatures were getting on. In a flash they got loose. What a hunt we had for them! They scurried over the floor like mice, squeezed into unbelievably narrow spaces – between the wardrobes and the wall for example – and darted in among the bed springs. It took us two hours of crawling about on hands and knees and lying on our stomachs to catch the nimble little creatures.

The first time, I managed to entice them out of their usual hiding place by throwing a jacket on to the floor nearby. They like the dark and somewhere to shelter, so they immediately slipped underneath the jacket. But one hesitates to make a grab at such tiny, fragile creatures, and as their fur is very smooth and there seems to be so much of it for such a small body, they evaded me again. It says a lot for their cunning that, try as I might, I could not get them to go anywhere near the jacket again. In the end they both disappeared.

We sat down exhausted and held a discussion about where they could be hiding. Then I remembered that there was a gap between the wall and the end of a shoe rack we had had built under the window-seat. I took some tools, carefully prised the shelves away from the wall, and there the two little animals were, squatting behind some cobwebs. I took hold of one of my wife's fur boots, held it in front of me and poked at them with a broom handle, in the expectation that they would scamper out of their corner and take shelter inside the boot.

They did just that, but burrowed down so deeply into the toe that it was impossible to get them out even though I could touch their bushy tails with my finger. My suggestion that we should

simply throw the boot into their box and leave it there until they decided to come out in their own good time did not meet with my wife's approval. After all, flying squirrels are rodents, as she was well aware, and she was afraid that they would gnaw their way to freedom through the toe of her boot. So I had to use all my patience and tenacity to coax them out.

Unfortunately they were both females, and I was not immediately successful in obtaining a male from America. The outlook was not very hopeful, because as far as I knew they were the first live flying squirrels to be brought to Europe for many years. However, as luck would have it, I found a flying squirrel on offer among a list of animals for sale by a Viennese animal dealer. I wrote to enquire whether it was a male, and wonder of wonders, it was. The dealer himself came to Germany and brought it with him in a little box.

I did not know how the male squirrel would get on with the female, so, for the first night, I put his little box into her cage so that they could pick up each other's scent and become acquainted through the wire. That night was a very disturbed one. There was so much squeaking, squabbling, rattling and scraping that the place sounded like a sawmill. In the morning I found a hole in the side of the male squirrel's box, and he was curled up in the cage with the female, both of them tired out from their night's work and fast asleep. The male had been in his little box for two or three days before that and had not made the slightest attempt to escape. Now he had managed it in two hours. Such is the power of love.

The flying squirrel is a small animal and weighs less than four ounces. Its tawny or grey furred little body with its white underside is only one and a half times the length of an index finger, and attached to it is a tail almost as long, with fur on two sides only, so that it looks for all the world like a quill. The quaint little fellow has a cartilaginous spur at each wrist, and when he jumps and spreads his arms and legs, this spur pulls taut the furry flaps of skin between his fore and hind limbs. When he squats, flying squirrel fashion, to crack a nut, the tiny creature seems to be very fat or to be wearing clothes many sizes too big for him.

Like the gnome of Cologne, whose activities were unknown to most of the city's inhabitants, these comical little flying squirrels

are nocturnal in their habits and are so retiring that people do not notice them at all. The friendly creatures often make their home in a nesting-box or under one of the upper floors of a house. They are only rarely seen in spots where birds like to feed.

Flying squirrels are even daintier and trimmer than our own species of squirrel, and, like them, can crack any kind of nut and climb about elegantly on any rough surface. In addition, they can leap off a high point and glide through the air for distances of up to fifty yards. By raising or lowering their arms they can control the height of their flight, and when they want to land on the branch of a tree they apparently use their tail as a brake. They stick it straight up in the air like a flagpole, which has the effect of making them swoop upwards. At the same time they stretch out their long arms and legs to cushion the landing, and grab hold of the branch. As soon as they have solid wood under their feet they scurry round to the other side of the tree, probably an instinctive action to escape any birds of prey which might pounce on them.

Ernest Walker, of the Washington Zoo, had some flying squirrels which were far tamer than mine. The photographs of them in this book were taken by him. He had originally acquired a tame pair which had been taken out of the nest when they were only a few days old. They were quite unafraid of human beings and in fact liked their company. They were as inquisitive and uninhibited as the friendliest dog. For the whole of the day they slept in the sleeping compartment of their cage, but at night they woke up and came to life. They had no liking for daylight, but always ran to the shadows, so a dim blue light was rigged up for them.

As soon as the cage was opened they ran to their human friends, scampered about all over them and poked and peered into everything; the linings of their jackets, their shirts and their trouser legs. Best of all, they liked to crawl into their pockets and go to sleep there. They treated human beings just as if they were tree trunks.

What these tame flying squirrels also enjoyed very much was to scale a high piece of furniture and jump off it on to their owner's body. All he had to do was tap his chest with his hand, and they would leap on to it, or any other part of his body that he indicated. Wherever he told them to land they did so, without any hesitation, a sure sign of how confident they were in their flying abilities. They

would launch themselves one after the other from a piece of furniture dozens of times, gliding happily to their objective and then going back again for another leap.

When flying squirrels want to make a jump they have not made before, they first squat down, raise themselves as far as they can on their paws and crane outwards, first to one side and then to the other, to get an exact view of the spot they want to land on. Probably this is the way they judge how far away it is.

Since Walker's flying squirrels almost invariably jumped and landed where they were told to, it was not very difficult to take flashlight photographs of them in flight, using very fast exposures - $1/5,000$ to $1/20,000$ of a second. They were the first flashlight photographs ever taken of these squirrels in flight.

Flying squirrels eat acorns, chestnuts, peanuts, all in fact nuts of any kinds, and sometimes berries as well, but no greenstuff. Like many other rodents they eagerly devour meal-worms, beetles, grasshoppers and other insects.

Walker's squirrels never bit him and often showed their affection for him. They frequently perched on his shoulder and nibbled gently at his ears, poked their little noses inside and snuffled about, or went over his hair and clothes with their paws, teeth and tongues. When they were still half asleep they liked him to hold them in his hand and stroke and tickle them. They used to hold their heads up to make it easier for him to do so. Whenever they became alarmed - and the rustling of a piece of paper was enough to scare them - they fled to the highest point they could see or took refuge with the nearest human being.

Flying squirrels are not the only nocturnal animals to have discovered the possibilities of flight. A species of tree shrew found in Borneo, a distant relative of the mole, also glides through the air from one spot to another. Some species of lizard have a framework of ribs growing out of their bodies, which is covered with skin and acts as a parachute. There are even snakes which distend their bodies in a similar way and fly through the air like arrows. In Java there is a flying frog which spreads its webbed feet like big sails before it jumps, and glides from tree to tree.

CHAPTER 5

Animal Migrants

WHAT would you say if you were out for a walk and suddenly saw large kangaroos hopping about the fields, instead of hares? Such a situation would be quite possible in Germany, because kangaroos, which are natives of Australia, can easily survive there. Some decades ago, a number of kangaroos were released in the Rhineland and Silesia. They flourished and increased in numbers from year to year, but were finally exterminated by poachers.

In the Angel district of North Schleswig, herds of graceful Japanese Sika deer, which come between the roes and the red deer in size, can be seen running free. Originally they broke out of a fenced-in area near the mouth of the River Schlier some twenty years ago. And on the swampy bank of the Amper, which is a tributary of the Isar, foresters have been known to find apparently newly-hatched Greek tortoises. The parent animals, nowhere in sight, must have burrowed unusually deep into the loose soil and so escaped our hard frosts.

During the last few centuries, hunters in Switzerland, the Rhineland, Pomerania and England have occasionally shot flamingoes, and in November, 1935, a whole flock of young ones flew off-course and scattered all over Silesia.

Lately a completely new species of animal has made a puzzling appearance here and there in Germany – the South American coypu, which is bred for its fur.* Some have escaped from breeding farms and thrive astonishingly well here. These hare-sized rodents are completely vegetarian and quite harmless.

In the countryside round Stettin there are many silver foxes. They too escaped or were set free from breeding farms at the time of

* In East Anglia, however, the prevalence and the predatory habits of the coypu have been causing concern in recent years.

Germany's capitulation, and it was not long before the Polish hunting administration reported the presence of this new species along the Baltic.

Fur farmers have many similar occurrences on their consciences. In 1942 a pair of North American mink escaped in North Sweden. By 1943 they had already increased in numbers, and hunters killed several. By 1944, there were two hundred of them, and with each succeeding year there were more and more. Now there are many thousands.

However, none of these birds or animals have caused any real harm. It was a different story in Brazil in 1930, when the anopheles mosquito, the carrier of the most virulent form of malaria, was discovered on the coast. Investigation showed that the anopheles had spread over an area extending for two hundred and twenty miles along the coast and nearly a hundred miles inland, and soon 20,000 people had died of malaria. The Brazilian Government laid in a hundred tons of arsenical preparations and six million atabrine and quinine tablets, and established an anti-mosquito corps 3,700 strong. It took them a year to wipe out the malarial mosquito, and before the last traces of this most unwelcome visitor from overseas had been eradicated, it had cost the Brazilian Government more than £85,000.

Many animal migrations proceed quite peacefully. In 1886, Lord Rothschild introduced the German dormouse to England, and today dormice are widely distributed over many areas of the British Isles, where they are highly popular. (In German they are known as 'Siebenschläfer' or 'seven-sleepers', not because they hibernate for seven months of the year, but because the little creatures like to share their nests with other dormice.)

Again, the North American grey squirrel, thirty of which were released in London in 1876, has ousted the European red squirrel from most of England.

There have been starlings in London only since the First World War. Now they are so numerous on many buildings that Londoners find their chattering very disturbing. Also, they like to perch in rows on the hands of public clocks, making them run fast.

Everywhere that aquatic frogs have been introduced in England they have largely displaced the indigenous grass frogs and toads. This would not bother anybody, were it not that the newcomers make much more noise with their croaking.

When in 1888, Tietjen, the German Consul, arrived in the Argentine city of Rosario, he hankered after the *battues* of his native Hanover. Neither rheas nor guanacos could be hunted in this fashion, so Tietjen had thirty-four hares sent over from Germany by sea. When they arrived he put them in a wire-netting enclosure, but the hares were very easily frightened and hurled themselves against the netting, so that many broke their legs or their necks, and they all died. When a fresh consignment arrived, Tietjen set them free, and (as local hares have been found to do in experiments) they stayed close to the spot where they were released. After a few years Tietjen was able to hold his first *battue*, but the hares continued gradually to increase until there were hundreds of thousands of them. None were shot because nobody wanted to eat them. Their flesh was thought to have an unpleasant taste and to be suitable only for poor people. Soon they became a pest and the big farms in the neighbourhood began to be overrun by them. Many of the farmers began to keep greyhounds which were purposely half-starved, so that they would hunt the hares for food. But this did not help. Gradually the hares spread over half the South American continent, displacing their equivalent in that area, the maras, which grew steadily fewer. Maras are short-eared rodents the size of hares. They do not hop like them, but bound along, moving their legs like small antelopes. It is probable that the European hares introduced a number of diseases against which the maras had no resistance. During the last twenty years or so the Argentines have come to value hares because the hat industry uses their fur.

In 1900, forty-eight red deer from the River Danube were brought to the Argentine, and from these small beginnings has grown a herd numbering more than 10,000. Indian antelopes introduced into the country have also increased to enormous numbers.

Today, Thuringian wild boar are to be found in many parts of North America, the descendants of animals which escaped from captivity some decades ago. For some years past capercaillies and

black grouse brought from Sweden by the American wild life service have been breeding on an island in Lake Michigan.

Believe it or not, there were herds of wild camels in the United States in the nineteenth century. In 1856 the army imported camels and dromedaries so that the troops would be more of a match for the Indians with their small, nimble horses. The soldiers kept a sharp eye on the camels, but some of them managed to escape and became wild. Indians are said to have killed and eaten the last wild one in 1899.

The reindeer introduced into Alaska from Scandinavia many decades ago have almost entirely displaced the native caribou, which resembles them. Today there are hundreds of thousands of European reindeer in northern Canada, and they are highly valued animals.

On the island of Crete, peacocks originally brought from India have acclimatised themselves and gone wild. All the pigs in South America are descended from the eight pigs brought there from an island near Tenerife by Christopher Columbus on his second voyage.

In 1955 the Scottish Ministry of Agriculture was finally prevailed on, after a long struggle, to allow twenty-five reindeer to be imported from Norway. Many countries are now extremely wary of introducing new species, because this can have unpleasant consequences. A little way from the coast of Mexico lies the island of Guadaloupe, once a small, thickly forested paradise, its shores populated by great herds of seals. From 1750 onwards, seafarers started visiting Guadaloupe regularly to hunt the seals and to use the island as a base for whaling operations. Fresh meat was a rarity on sea voyages in those days, and sailors often contracted scurvy, so it was not unreasonable for the Russian sailors to release a few goats on Guadaloupe for their future needs. Within a few years there were 40,000 goats on the island. They not only denuded the island of its vegetation, but killed all the fully grown trees by gnawing away the bark, and then turned their attention to the saplings. Today, thanks to the goats, the whole island is bare and desolate. Since there is no longer any vegetation, most of the indigenous animals have long since died out, many of them, species probably unknown to zoologists.

Goats are vicious despoilers of the countryside. When the Romans cut down the mountain forests of Italy and the Balkans to build

their ships and heat their great public baths, the numerous goats saw to it that nothing else grew there to replace the trees. The rain of centuries eroded the soil of the now bare mountainsides, and today huge tracts of the Balkan countries and Italy have been reduced to rocky wastes.

The case of the rabbit in Australia is particularly well-known. Rabbits were first introduced to the Australian continent in 1837, but it was not until twenty years later, when a farmer at Geelong released twenty-four of them on his property that they began to increase at an amazing rate. The Geelong farmer himself killed more than 20,000 wild rabbits on his own farm during the following six years, and still they grew in numbers. As long ago as last century, the Government of New South Wales was spending more than a million a year, a substantial sum in those days, on rabbit extermination operations.

The little rodents ate the bark from the trees, which died, and selected only the best pastureland for their feeding grounds, so that finally only weeds would grow there, which the sheep could not eat. In the last few decades Australia's sheep population has been outnumbered three to one by rabbits, and this means something in Australia, where there are a hundred million sheep. If Brer Rabbit had not been brought there, Australia's sheep population would be three times its present size, and the British Commonwealth's sheep population would be twenty per cent higher.

Twice attempts have been made to stop the rabbits spreading over the entire Australian continent – by fencing off thousands of square miles of land – and both times they have got through the fence. Today, of course, they are killed for their flesh and their fur. Rabbit catchers set up huge basket-shaped wire traps, especially near water holes, and drive the animals into them. Some of the catchers are so expert they can kill and skin a rabbit in a few seconds. Every year new speed records are set up. Since 1956, Australia has exported on an average rather more than £A3,800,000 worth of rabbit meat and skins a year, but this does not make up for the millions of pounds worth of damage they cause every year.

The despairing farmers tried to figure out why it was that rabbits in Europe did not cause such ravages, and came to the conclusion that their natural enemies, the fox and the cat, kept their numbers

down. These two animals were not indigenous to Australia, and the farmers decided that was why rabbits flourished there. So they imported foxes and cats. However they found that the remedy was worse than the disease. The somewhat 'primitive' marsupial animals of Australia could not withstand the assaults of the interlopers from the modern animal world, and many species have been exterminated by the foxes and the cats. Birds too have suffered. If one hears birds chirruping in Sydney or Melbourne today, they are almost always European sparrows, starlings, thrushes or goldfinches, which now share the region with Indian turtle-doves and bulbuls. The magnificent, multi-hued parakeets have fallen a prey to the wild cats; brown rats have displaced the native marsupial rats, and even the Australian earthworm is rapidly disappearing as the European species increases. Today efforts are being made to save Australia's native fauna from total destruction by turning some of the nearby islands into nature reserves.

Everything has been tried in an effort to exterminate the voracious rabbit. Water holes have been poisoned with arsenic, killing rabbits by tens of thousands, but this has not been enough. The kind of branches that they like to nibble have been smeared with strychnine, and poisoned grain has been scattered on the ground. But the animals killed off by these measures have been the native ones, whose food in any case was being eaten by the rabbits.

At one time the great French bacteriologist, Pasteur, recommended inoculating some rabbits with diseases that killed off so many of them in France. This too was tried, but the Australian wild rabbits proved to be immune.

In 1928, another bacteriologist, Aragao, suggested the introduction into Australia of a filterable virus which was known to cause myxomatosis in rabbits in South America. This horrible disease causes a rabbit's head and every bodily orifice to swell up - eyes, mouth, anus, even the openings in the teats of the female. The head of a rabbit with myxomatosis swells until the animal looks like a small lion.

A year later, White began experimenting with myxomatosis in New South Wales. He soon discovered that this shocking disease was only infectious under laboratory conditions, when the rabbits were crowded together in the experimental cages. In their natural

state the disease spread very slowly. But Australians did not give up hope so easily where public enemy number one was concerned, and they continued with their experiments. In 1938 it was discovered that myxomatosis could be spread very quickly by mosquitoes, but only in damp areas where breeding conditions were favourable for them. Attempts to infect the rabbits infesting the richest pastureland proved a failure.

During the Second World War, the Australians were too busy fighting the Japanese to have much time for fighting the rabbits, with the result that they increased again. After the war, the men in charge of anti-rabbit operations received permission to try and spread myxomatosis in the rainy areas of the continent, and artificially infected rabbits with only a fortnight to live at most were let loose in five zones of the Murray River Valley. At first, only minor outbreaks of myxomatosis occurred, but in December came the news that a major epidemic had broken out in one of the zones, and succeeding reports spoke of further major outbreaks over bigger areas.

As a result of these experiments, which showed the greatest success registered against the rabbit pest for many years, other Australian territories began to spread myxomatosis among their own rabbits. Millions died and some areas became entirely free of them. Elsewhere only very few remained, but investigation of captured animals revealed that 20-30 per cent of them had already developed immunity to the disease. It is still an open question whether the rabbit pest in Australia can be wiped out by spreading myxomatosis artificially.

In January, 1952, a doctor in Rambouillet, south-east of Paris, remembered what had happened in Australia. He had become increasingly annoyed by the destruction wrought on his extensive grounds by wild rabbits, which were eating the leafy tops of the beets he grew there. He obtained some myxomatosis vaccine from a Swiss scientist, injected two captured rabbits with the disease and set them loose in the grounds.

The results could not have been more 'gratifying'. The doctor's beets grew unmolested, and the rabbits' eyes and noses became so swollen that they could no longer find their way back to their burrows and died screaming where they fell. However, since mos-

quitos are not confined by walls, the disease soon spread beyond the limits the doctor had set, and by October, 1952 the first dead rabbits from other areas were reaching the Pasteur Veterinary Institute in Paris for investigation into the cause of death. The veterinarians there soon established that it was myxomatosis, the first time the disease had appeared in France. Experiments showed that it could easily be transmitted by a variety of means – by subcutaneous or vascular injection or inoculation of any of the bodily organs; by contaminating the food of healthy rabbits with secretions from infected ones, or by mating a healthy doe with an infected buck. The appearance of myxomatosis in France, the first time the disease had occurred in Europe, caused a stir at the Pasteur Institute, because Australia's experiences with the disease had become well-known by them.

Fortunately, it turned out not to be as infectious as had at first been feared. Rabbits kept together but in separate cages had still not caught the disease after six months. Without mosquitoes myxomatosis did not spread. Mice, fleas and bugs could also be used to transmit the disease, but it did not spread very much even when they were used. The French bacteriologists had the same experiences as their Australian colleagues. In the South of France, the warmer region of the country, the mosquitoes did their work well. In one district of the Oise Département alone 20,000 dead rabbits were found, two-fifths of the Département's rabbit population of some 50,000. Many others must have died too, and remained undiscovered. Today the entire district is free of rabbits, which used to be France's most numerous and most important fauna. Rabbit shooting used to account for ninety-two per cent of the shot-gun cartridges sold in France, and one result of the decimation of the country's wild rabbits by myxomatosis was that the largest cartridge manufacturer in France had to lay off seven hundred workers. Many other industries dependent on rabbits died out completely.

France used to export up to 8,000 tons of rabbit skins a year, worth some two thousand million francs, and local industry used to account for a further fifty million skins. The hat factories alone used to take 4-5,000 tons a year, not to mention the fur trade, millinery manufacturers and other concerns, who between them employed upwards of 10,000 workers. Thus, the doctor's ill-

considered deed caused enormous damage, and he was convicted and sentenced by the courts for what he had done. In the meantime myxomatosis has spread to most of the countries of Europe, including Germany.

It often happens that artificially introduced animals have a favourable effect on their new habitats. In California, for instance, a certain variety of weed appeared in 1900 and spread further afield with each year that passed. Not only was it inedible by cows and sheep, but it choked all the grass wherever it took root. Australian biologists had already discovered that a particular species of leaf boring beetles fed on the weed, which had been inadvertently introduced into North America from Australia. A number of these beetles were brought over from Australia, and within a year had cleared several acres. California was a paradise for them, where their favourite food grew in abundance. No time was lost in implementing a well thought-out plan to establish colonies of these diligent little beetles all over California, and in a few years' time according to the biologists, the unwanted Australian weed will have been eradicated. What will happen to the beetles then? Will they just die out? It is only by chance that they have been beneficial. Another beetle that specialises in a particular plant – the Colorado beetle that devours our potatoes – is one of man's most feared enemies.

CHAPTER 6

The Fox

THERE are countless animal stories which do not become any truer just because they are constantly retold. This category includes the tales about African elephant-cemeteries, elephants taking their revenge twenty years later on people who have tormented them by sticking needles in their trunks, rabbits mating with rats, male storks pecking unfaithful females to death, human babies being reared by wolves, and apes ravishing negro women. It is usually noted with amazement that such incidents have been described by Herodotus, Aristotle or Pliny and that they have faithfully reappeared in every animal book right through the Middle Ages and since.

Not long ago, a man reported in a hunting journal how he had spotted a fox taking a strange kind of bath. According to him, the fox scraped up a mouthful of moss, walked slowly backwards into a pond and submerged itself until only the tip of its muzzle was showing above the water. Then it spat out the moss, on which all its body fleas had congregated, jumped delightedly out of the pond and made off. This story seemed very suspicious to me, because even when a fox submerges itself in water for a considerable time, its fur retains an appreciable quantity of air, and air bubbles form round the bodies of the fleas. I therefore found it hard to imagine that they would immediately desert their host. Otherwise it would be the easiest thing in the world to rid an animal of fleas. A couple of issues later, another hunting man wrote to the journal. He said that he had found the same story almost word for word in a children's schoolbook published in 1843.

In Cambridge University library there is a beautifully illustrated manuscript book about animals written in Latin and dating from the twelfth century. I recently read a translation of it and came across a description of the way in which a fox will sham dead and

then suddenly pounce on crows that come to peck at its 'carcass'. Now, the fox is indeed a wily animal, but certainly no more so than, say, the wolf. And anyone who, like me, has reared both foxes and wolves as pets, as well as the German wild boar, will have no doubt as to which of the three is the most intelligent. It is the wild boar. I was therefore astounded when the owner of a silver fox farm in the neighbourhood of Frankfurt told me quite innocently that some of her foxes had caught several crows in the way I have just described.

Professor Otto Koehler, assuredly our most critical animal observer, watched another performance that was repeated almost daily for a considerable time. When he put a feeding bowl in front of his big sheep dog (an event the crows perched in the surrounding trees had already learnt to wait for) they used to congregate in a semi-circle behind the dog and slowly move nearer. Then one of them would peck the dog's tail, and while the angry dog chased the culprit the others would swoop on his food and make off with it.

Three hundred and fifty thousand foxes are shot in Germany every year, and their skins sold for around £600,000. Despite this we know very little about the largest beast of prey still remaining among our depleted local wildlife. My colleague, Dr Alfred Seitz, who for many years has successfully run the Nuremberg Zoo, was the first man to take the trouble to investigate the behaviour of foxes. As animal psychologists all like to do, he collected a group of cubs as soon as they were born and took them into his home. His favourite was a little red vixen called Pussi. When he came home Pussi put on her 'welcoming' expression. A human friend shake's one's hand and gives a friendly smile, a fox lays its ears right back and closes its eyes.

When Pussi was fifty-one days old, Dr Seitz put her together with a rabbit for the first time. Pussi chased it like any other fox and tried to seize it by the side of its throat - an indication that a young fox does not need to learn how to hunt from its mother. The rabbit reacted by turning on Pussi and beating her on the head with its forepaws. For some weeks after this episode Pussi lost her taste for rabbits.

Later she was mated with our platinum fox and gave birth to some most enchanting creamy coloured cubs. We had the old



THE 'NOSE BLADDER' OF THE SEA-ELEPHANT, ONE OF THE BIGGEST OF SEA



THE WIDE-LIPPED RHINOCEROS, AFTER THE ELEPHANT ONE OF THE BIGGEST LAND MAMMALS, IS AMONG THE MOST PEACEABLE OF WILD ANIMALS

platinum fox for over ten years. He was smuggled out of the French occupation zone of Germany in a box by his owner, who put him under the seat in a crowded railway compartment filled with occupation soldiers. All the animals sent to the ruined Frankfurt Zoo after the war had similar adventurous histories.

There have been many lion and tiger trainers, but only one man has so far attempted to train foxes. His name was Josef Golemann, and he was a military musician in Vienna. One day, his captain gave him a dog with a broken leg. Golemann healed it, and from then on people used to bring all kinds of sick dogs to him for treatment. Among his patients on one occasion was an injured fox. Golemann tamed it and later assembled a troupe of performing foxes, which made him famous and enabled him to recoup his fortunes, having previously lost all that he possessed in the San Francisco earthquake of 1905. The foxes used to box each other. The man who told me the story added: 'It was a strange sight, though not unamusing, because foxes are not born with the ability to box as kangaroos are to a certain extent'.

Dr Seitz discovered to his astonishment that boxing is not so alien to foxes as had been thought. Two foxes in play together often stand facing one another on their hind legs with their front paws raised, brace themselves against one another's shoulders and begin cuffing each other like two boxers in the ring.

People who keep tame foxes in their homes can learn all kinds of astonishing things. Foxes like contact with their human friends, and if they are not allowed to sit on their owner's lap will lie across his feet. If he takes a nap on a sofa, he is likely to wake up and find a fox curled up between his head and shoulder. Unlike caged foxes, those allowed to move freely about the house never smell, once they have been house trained. It is the stench of urine and droppings in fox's cages that has given them the reputation of being smelly animals. A fox keeps itself as clean as a cat, and its bodily odour is much more pleasant than a dog's.

The late Bastian Schmid, that great animal lover, gave his tame fox Caro a piece of cake one day. Caro had already had enough to eat, so he tried to bury the cake, as dogs and foxes do with food they cannot consume straight away. Of course, he could not make a hole in the floor to bury his treasure, so, to his owner's amazement,

he went over to the writing desk, snatched a sheet of paper and covered the cake with it. Professor Schmid also made the chance discovery that his tame fox was 'musical.'

'For years,' recounted Schmid, 'it had been Caro's custom to go to sleep lying on me after his midday meal. I would lean back in a deep armchair, and he would curl up on my chest. Before falling asleep he took a deep breath as dogs, cats and even small children do. This was followed as I had noticed with dogs, by a snoring sigh. One day I imitated this noise and Caro suddenly looked round at me as if in surprise. I did it again, and Caro immediately followed suit. After this successful experiment I changed the pitch, and Caro again copied it exactly. We continued in this manner for some time. After an hour he could run up and down the scale. He did not hit the exact note straight-away, but was always half a tone sharp or flat. However, he hummed away on his own ('humming' is the only correct way to describe the noise he made) until he got it right. On other occasions he would start the 'singing lessons'. They went off very well, except that he was inclined to go a quartertone over the octave and answer me with the keynote when I hummed the scale, and *vice versa*. On one occasion I ran up the whole tonic scale very quickly and he immediately did the same. This obvious musicality of Caro's, the biological significance of which I am unclear about, made a deep impression on me. I was glad of the opportunity to be able to demonstrate this unique phenomenon to a well known scientist, a psychologist at Munich University.'

Many animals have hidden abilities of this kind which are only revealed by chance happenings. The most attractive and least objectionable tricks are those which develop an animal's natural capabilities - training bears to stand on their hind legs and dance, or sea-lions to balance objects on their noses, or tigers and other big cats to jump through hoops.

Foxes which grow up together with dogs become very friendly with them, even though they are less closely related to them than wolves, from which all our dogs are descended. It is not difficult to cross dogs with wolves, and I am continually receiving enquiries from dog breeders who want to do so. The results are quite different from what one might have expected. Crossing a wolf with a dog does not produce more courageous and aggressive offspring. On the

contrary, they are shy and timid. A male fox reared together with dogs is afterwards only interested in bitches, and *vice versa*, but there have been no known cases of puppies being born as a result of such pairings. All reports of such an occurrence have proved on investigation to be unfounded. Nevertheless, dogs and foxes seem to have an affinity for each other. A trapper once made the experiment of offering his dogs fox meat. They would not touch it, even when they had been kept without other food for some time. If so much as a tiny scrap of fox meat was mixed with their food, the dogs absolutely refused to eat it.

Foxes are just as modest and subdued as dogs, and show it in the same way. They move close to the ground, hold their heads low and their ears back, and keep their tails down. When human beings behave in a similar way we call them 'dog-like' and 'fawning', but there is this difference between dogs and human beings – when a dog shows submissiveness it is genuine, and we need have no fear that he will round on us and bite a moment later. To a certain extent dogs and foxes must also understand each other's language.

The very first platinum fox was bred by chance on a Norwegian silver-fox farm in the thirties. At first the breeder wanted to destroy it as a 'faulty colour mutation', but its cubs fetched about £1000 each, and the price later rose to about £2,000. The Norwegians wanted to keep the monopoly of platinum foxes for themselves and strictly banned any export of live animals. However, as happens in such cases, the customs were outwitted – by the expedient of mating silver fox vixens with platinum foxes first and then exporting them legally. Nobody could tell from looking at them that they were already carrying a litter of platinum fox cubs.

Thanks to the fox farms, Norway has increased its yearly output of skins from 2,000 to 1,350,000.* Breeders have been able to increase the size of litters to as many as ten or twelve cubs at a time. American silver fox farms produce a million skins a year. Many other species have been saved from extermination by breeding on farms, among them sables, minlets and coypus.

The rarer a particular fur becomes, the higher the price of the raw skins, so trappers range further afield in their search for fur-bearing animals, until whole species are on the edge of extinction.

* 1956.

But as soon as skins come on to the market from the farms, prices drop and it is not worth the trappers while to hunt down the last remaining members of a species for their fur. The result is that they begin to increase again.

The fox has earned its reputation for cunning and craftiness because of its outstandingly keen sense of hearing and sight. A tame fox will stop feeding from its owner's hand if a face appears at the window of a house twenty yards away. Many hunters entice foxes to where they are lying in wait by clenching their teeth and then breathing in through almost closed lips. The slight hissing noise that results can be heard by a fox as much as a hundred or a hundred and fifty yards away. It will turn in the direction of the noise and slink slowly towards it. When it comes within gun range, the hunter has no difficulty in shooting it. The human ear could not possibly detect such a small sound from so far away. A fox hunter should never make the mistake of hissing more than once. This is enough to lure the fox within range. Mice are foxes' principal quarry, although they will occasionally eat hens, small hares, partridges or even, now and again, a goose. As much as 3½ lbs of dead mice have been found in the stomach of a shot fox. They are so well versed in mouse noises that they probably use them to identify the different species and select their prey accordingly. If a fox hears a simulated mouse squeak too often, he knows at once that something is wrong.

If there were no fox hunters the world would be a paradise for the fox, because we have wiped out nearly all its natural enemies, especially the golden eagle and the white-tailed eagle. As many as fifteen fox skulls have been found in an eagle's eyrie before now.

It is easy to realise why foxes are not large-scale goose thieves when one sees what an effort the fox has to make in order to drag off one of these large birds. Sometimes it turns its head to one side and pulls the goose alongside itself, or else it straddles its victim so that it is treading all the time on the bird's wings or stumbling over its body. During the bilberry season, foxes become vegetarians and their droppings are completely black. As is the case with many other beasts of prey, foxes do not like to change their lairs. Whole generations of wildcats, domestic cats which have reverted, badgers, and even rabbits have been known to live harmoniously in the same

THE FOX

earth with fox families for as long as seventy years. Foxes remain loyal to their home territories as well. An experiment was once carried out to discover just how far foxes do wander from their home territories. A number of cubs were trapped, marked with numbers and released again. Exact records were kept of where these marked foxes were subsequently shot, and showed that fifty per cent of them had not wandered more than three and a half miles from their dens, and another third not more than twelve miles. The furthest any of them had reached was forty-five miles.

Many foxes hate cats as much as dogs do, and some keep their territory free of them, attacking any cat that ventures into it. The fox's battle tactic is usually to spring over the cat's arched back from a short distance away and sink its teeth into the cat's neck from above. Like so many wild animals, foxes do not like to run across open country and prefer to follow their own regular paths through cornfields, bushes or marshes, where it is much easier to give pursuers the slip. They often tread a path in freshly fallen snow at the edge of a wood, and hunters know that they can safely walk on fresh ice or through a swamp by following a fox's tracks: 'If it will take a fox, it will take a hunter'. On one particular path regularly used by foxes, hunters shot twenty-three in six years.

One of the fox's most remarkable features, and one that even many hunters do not know about, is its 'identity disc'. On the upper side of a fox's tail, about two inches from where it joins the body, there is a gland in the skin underneath the fur which is marked by a triangular patch of blackish hair. This gland is called the *viola* (or *violet*), and a book printed as early as 1603, says that it exudes a smell like 'Spring violets'. Old hands at fox farming claim to be able to tell from the smell whether a cage has contained red or silver foxes. In olden times, people used to say that an injured fox would bite its *viola* in order to still the pain of its wounds.

A captive fox has been known to jump thirty feet off a balcony and escape unharmed. In the Basle Zoo, another fox jumped the nine-foot wall round its enclosure and then jumped back in again. Foxes have also been found in thirty-foot trees growing straight up from the ground. Every Spring people bring us cubs they do not know what to do with, and it is the same with all zoos. It is difficult

to find accommodation for them, and someone in the Basle Zoo got the idea of putting them in with some apes. The idea worked extraordinarily well. The animals not only tolerated each other satisfactorily, but played together, and the young foxes were soon accepted into the ape hierarchy. However, they eventually had to be separated from each other because some of the apes contracted paralysis and died, and when they were dissected it was discovered that bladder-worms from the foxes had attacked their spinal cords. Foxes at a certain stage of their development, often suffer from tape worms, sometimes known as bladder worms.

Even though foxes are hunted so assiduously by men with dogs – the record is held by a dachshund which is claimed to have killed four hundred and ten – they must sometimes be aware that there are some human beings who do not wish them harm. One case that I know of – a man was out for a walk one day when he saw a fox trapped on some mudflats by the incoming tide. As the water rose the fox managed to swim over to some wooden piles which had been driven into the mud to hold it firm at low tide. Bub cut off the fox's escape by wading over to the piles, with the water up to his waist. The fox allowed him to stroke its back, and only objected when he drew his hand towards the tip of its brush. Then the fox turned away and growled several times. When the animal reached the heaps of stones scattered near the wooden piles, it stretched out for a rest, quite untroubled by the presence of a human being only a yard away. Bub and the fox remained there for a good ten minutes. They were both tired out, although the fox was the more exhausted of the two. This happened at the end of one November, and as Bub was beginning to feel cold, he decided that the time had come to terminate the rest period. He tapped the fox lightly on its hindquarters and the animal jumped into the water with obvious reluctance and swam to dry land in a leisurely fashion. Only the lucky ones among us have experiences like that, and then only when they are out in the countryside on their own.

Can Animals Think and Count?

SOME years ago, one of my sons came home from school and told me that his nature study teacher had said that animals could not think because they could not speak. The class had then asked the teacher whether he also considered a deaf mute incapable of thinking, and the teacher had been unable to give them an answer. I should like to ask a further question – are mothers of the opinion that their children cannot think until they have learnt to talk? Our sons at any rate, knew from babyhood when their crying was going to bring results and when not.

Let us suppose that I am walking peacefully along the road, when I hear a sudden squealing of brakes and there is a dreadful accident. My quick reaction saves me from being hurt. Only later does shock set in. The whole incident has taken perhaps a quarter of a second, but afterwards I need ten minutes to describe it in words. Naturally, while it was happening my thoughts were chasing one another through my brain at a furious pace, but I can only express those thoughts in words later on. The same thing can happen to a dog on our crowded roads, and he can react in the same way as I did, but he will never be able to put his thoughts into words. That is the great difference between animals and man. Speech is not necessarily connected with thought, and even human beings leave most of their thoughts unexpressed. Animals can also think, but only man can talk.

Of course, there is also an animal 'language'. The jay gives warning of the hunter's approach; wild geese warn their young that an enemy is near, using two different cries, one for birds and one for animals; the cock uses one cry for battle and another for courting. But these are *instinctive* methods of communication. Every chicken understands them, even if it has been hatched in an incu-

bator. They express only isolated emotions, not consecutive thought. These instinctive expressions are often surprisingly accurate. As soon as a bee finds some nectar-laden blossom, it returns to its hive and starts to perform a dance on the honeycomb hanging vertically inside it. The other worker bees follow it. The bee which has found the nectar dances over the honeycomb in figures of eight, and the angle formed between the figures of eight and the honeycomb indicates the direction in which the nectar lies. The worker bees fly off to the flowers at an angle which is precisely the same number of degrees from the sun as the dancing bee's figures of eight are from the vertical honeycomb. The tempo of the dance indicates the distance in inverse proportion. If the homing bee has danced at the rate of eight figures a minute, this indicates that the nectar is two miles' flying distance away. If the rate is thirty-six figures a minute, they fly only a hundred yards. The nearer the nectar to the hive, the faster its discoverer dances. The worker bees in the hive can tell which variety of flower the nectar comes from by the fragrance clinging to the bee. The 'language' of the bees may fill us with wonder and awe, but it is still only a purely instinctive and inborn method of communication. There is no basis for comparing it with human speech.

If you say 'Mama' to a baby every time it sees its mother, it will do so itself after a while. Parrots can also be taught to say things like 'hullo' when someone comes into the room. An infant learns to say 'bye-bye' when someone goes out of the room, but only when it says 'bye-bye Mama' as its mother goes out of the room can it be said to have shown the first glimmerings of human thought. Making one sentence and creating a new thought by relating two concepts with each other, simple though they be in this instance, is in my observation, impossible for a parrot. Only humans are capable of it.

Deny it if you like, but animals can have ideas too. We can construct a maze, put a mouse in it and watch the little creature running blindly about inside it. Only when it has made numerous circuits will it learn to avoid dead ends and take the shortest possible route to the food or the cosy hideout at the end of the maze. How does the mouse do it? The explanation is not that its legs automatically begin to take the correct number of paces to the next

corner. The amount of light or resonance is not the answer either, because the mouse still runs to the right place even if the maze is suddenly made three times as big, or turned round, or if the angles at corners are made more acute or more obtuse. The mouse must have a picture, a conception, of the correct route in its head. Even if it cannot see, the mouse still goes the right way, just as a blind man can draw the route through a town on a piece of paper, even though he has never seen it, but only walked along it. The mouse and the man can both find the right route without seeing it, but they can no longer do so if the sight centre of the brain is destroyed. The image of the correct route must be built up in this part of the brain. These conceptions are also thoughts without speech.

Many years ago an animal lover wrote me a letter about a horse that always turned to watch when the cart it pulled was being loaded with sacks of coal. If more than twenty sacks were loaded on to the cart, the horse refused to move. 'This proves that horses can count,' the letter concluded. However, this does not follow at all. It is enough to assume that the horse knew from the weight of the cart that the load was too heavy. True counting involves a knowledge of numbers, one, two, three, and so on. Somewhere in *Tierleben (Animal Life)* by Brehms there is an account of how a party of hunters outwitted some crows. Four men go into a hut and three come out again. The crows, not being able to count, think that all four men have left the hut and gone away, so they fly past the window, presenting easy targets for the fourth man inside.

Whether animals can count or not is by no means an easy question to answer. Otto Koehler and his students worked on this problem for twenty-seven years and had to use miles of film for photographing their experimental animals, before they were able to find the answer. Their experiments also unravelled part of the mystery of the origins of human speech.

The whole project began simply enough. A young man - he was working for his doctorate - took a pigeon and stood two boxes in front of it. On the top of one box was a card with one dot on it, on the other box a card with two dots. If the pigeon tried to peck at the card with one dot, in order to get at the food in the box underneath it, a jet of compressed air was released and drove the

bird off. After hundreds of pleasant and unpleasant experiences, the pigeon learnt that it was only allowed to eat from the box which had the card with two dots on the top of it, and not from the boxes which had cards with one or three dots. The pigeon could only go by the number of dots, not by whether the investigator was pleased or displeased, because he sat on the other side of the wall and observed the pigeon through a tiny peep-hole. Every other means of conveying numbers was ruled out – by sound, movement or the use of strong and weak shocks. The investigator did not want to make the same mistakes as the man who had written about ‘clever Hans’ the famous horse, or the person who described a dog which apparently discussed political questions by giving a series of barks.

The pigeon learnt to distinguish between two dots and three dots, between three and four, and later between four and five. That was the limit. After months of experiments, budgerigars and jackdaws learnt to distinguish between five and six, and ravens, magpies and squirrels between six and seven. Please do not say that this was a very modest achievement compared with the complex calculations required to work out how far the sun is from the earth, or to determine the path of the stars in their courses. If human beings have to say which of two groups of dots is the larger without actually counting them, they too can only get as far as telling the difference between six and seven. Koehler projected groups of dots on the wall for his students, allowing them just long enough to estimate how many dots there were, but not long enough to count them. Only a very few students could tell whether there were six or seven dots. Others only got as far as five and six, and some could not get beyond four and five. When we want to compare bigger numbers, we have to count them, if not out loud, then mentally. Animals cannot speak and have no words for numbers, but can only estimate whether one group of objects is bigger or smaller than another. Nevertheless, ravens, which cannot count, did as well in the dot tests as human beings, who can. Without speech, human beings were unable to do better than jackdaws or squirrels. Even though animals have no words for numbers, they still have a mental concept of them, and this concept is as much an idea as human concepts.

The following experiment was made with a jackdaw. A series of boxes with different numbers of dots on their lids were put in front of the bird, which was allowed to open only those on which there were four dots. When this idea had been assimilated, the zoologists took the boxes and confronted the jackdaw with five mealworms. It was obviously confused by the change, but seeing a delicacy like mealworms, it set to and started eating them – but ate only four. It left the fifth alone. An inexperienced layman might think that this was absurdly simple, but anyone who has done any work with animals will hardly believe it, even when shown a film of the whole experiment. Ravens, well known to be exceptionally clever birds, learnt even more advanced things than the jackdaw. In one experiment with a raven, Koehler prepared five boxes, each with a different number of dots on the lid. Then, immediately in front of the raven's cage he put a disc with drawing pins stuck in it, so that the bird would have to go past the disc to get to the boxes. To make sure that it would take a good look at the disc and note the number of drawing pins, Koehler put a blob of egg yolk, to which this raven was very partial, next to the disc. The bird actually learnt to open the box with the same number of dots on the lid as there were drawing pins on the disc. The number of drawing pins was changed every time, yet every time the raven went to the right box. The shape of the dots made no difference – they could be round, square or polygonal – nor did their size.

There may well be people who will attribute the raven's amazing performance to telepathy, but those who find painstaking investigation boring always have a super-natural or occult explanation for phenomena of this kind. Koehler said that when he had been watching the bird through a peephole he had often willed the raven to peck at the correct box – and the bird had immediately chosen the wrong one.

Koehler was an examiner of candidates for the civil service. Whenever one of his own students was a candidate and could not reply to a question, Koehler would concentrate hard on the answer, but never once succeeded in passing it on by telepathy. In his experiments with the ravens, he had often set out the boxes with the dots on their lids and then gone away, forgetting about the birds for the time being. Returning two hours later, he found that

the right boxes had been opened and the others had been left untouched. As the birds had not even come into his mind during the preceding two hours, he could not have transmitted any thoughts to them. There is no other explanation than that the birds must have thought for themselves.

When we count, we say, 'One, two, three, four,' and so on. Experiments with parakeets have shown that they make a noise like '*hm, hm, hm, hm,*' inside their heads. This they do, for instance, if they are eating allotted grains of corn. Observers have suggested that perhaps the birds merely take note of the rhythm of their pecking, as we follow the beat of a piece of music, and not of the number of pecks. Koehler experimented with some pigeons by pushing some peas out of a tube on to a flat surface where they rolled about all over the place, so that the pigeons had to make as many as ten pecks before grabbing a pea with their beaks. Moreover, the peas came out of the tube at irregular intervals, which made things even more difficult. Nevertheless, they still picked up the right number of peas in their beaks, so it could not have been the rhythm of their pecking which told them how many to pick up.

A jackdaw put up the best performance of all in a test of this kind. The bird had learnt that it was supposed to eat five pieces of bait distributed among five boxes. The first box contained one, the second two, the third one, the fourth none and the fifth again one. After going to three boxes, the jackdaw gave up and went back to its cage. One of Koehler's students, named Schiemann, who was conducting this series of experiments was about to make a note: 'Wrong, ate one too few,' when the jackdaw came out of its cage again, a thing that had never occurred before. It went up to the three empty boxes and ducked its head once at the first box, twice at the second and once at the third, corresponding to the pieces of bait it had previously taken out of each box. It then went along the rest of the row to the fourth and fifth boxes, opened the fourth, which was, of course, empty and then the fifth, and ate the piece of bait it found there. The jackdaw then went back to its cage, ignoring the rest of the boxes. Schiedmann changed his notation to 'Correct'. The jackdaw had clearly realised that it had left its task unfinished the first time it had returned to its cage. 'The jackdaw

was like a child telling a story, who forgets how it goes on and starts again, finishing it the second time without a mistake. It went up to the empty boxes from which it had all ready eaten the bait and went through the motions of doing so again. It must have retained what it had done and "reconstructed" its actions. When it came to the fourth and fifth boxes, however, it carried on as if it had not stopped at the third box the first time, and completed its task.'

Koehler conducted hundreds of thousands of experiments like this in Königsberg and later in Freiburg, proving that animals are able to 'count', up to the same limit as human beings who are not using words or numbers. Animals can think, then, without being able to speak. If man had not first been able to formulate thoughts without language, just like the animals, he would never have been able to learn to speak. This is still true today and applies to every baby that smiles at its mother from the cradle for the first time.

CHAPTER 8

The Fighting Bull

IT was late afternoon when we arrived in a Spanish town in our little Volkswagen. I pulled up and in my halting Spanish asked a young passer-by the way to Fonda's Hotel. But he was in a hurry and could not spare the time to give me detailed directions. All I caught was '*corridas de toros*', which means bull-ring.

I had already decided to see some bullfights while I was in Spain. So many writers have written enthusiastically about them that I wanted to see one for myself and make up my own mind. I soon realised there was no difficulty in finding where the arena was; everybody was going in the same direction.

Two days earlier we had admired the vast 2,000-year-old Roman amphitheatre at Nîmes, in the South of France. The bullfighting arena was built in the same way - vertical perimeter walls several storeys high, with circular rows of seats all round the inside, forming an inverted cone of which the actual bull-ring was the apex. But how did one get in? The streets were crammed with people, all pushing towards the entrances. Our Volkswagen, an unfamiliar sight in Spain at that time, aroused a great deal of interest, with its small red, black and gold flag and the mountain of luggage on the roof. Everyone made way for us as I drove slowly through the crowds up to the gloomy, towering wall of the arena. A heavy door like the gate of a castle opened in front of us, as if of its own accord and we drove into an empty courtyard among the toreros.

They looked like those we had seen in paintings and films. Some even had pigtailed. They were dressed in silver embroidered costumes, knee breeches, white stockings, patent shoes and black hats - and I had no colour film in my camera!

It was six o'clock, the sun was directly overhead, and part of the arena all ready lay in shadow. Naturally, everybody made for the

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seats in the shade, and the sunny side remained almost empty. In front of the most expensive seats, between them and the sand-covered arena, runs a gangway formed by a shoulder-high wooden wall with steps leading up to it, so that the toreros can easily make their way to safety. At intervals along this wall there are exits shielded by partitions which the bulls cannot get through. The whole thing is not very fair. It is like allowing a boxer to slip through the ropes when things get too hot for him, while his opponent is not permitted to follow but must stay in the ring and take a thrashing from the man on the other side of the ropes.

I was politely but firmly ordered out of this gangway by a man who flashed a police badge at me from under his lapel. I had no choice but to run right round the arena to the other side, along the high corridors under the seats, and push my way as near to the front as possible.

When the wooden gate on one side of the arena is raised, the whole crowd of spectators becomes silent. The only sign of movement is the ceaselessly fluttering of the women's fans. A few moments later, the bull bursts into the ring, runs a few paces over the broad yellow arena and then comes to a halt and looks round. He is much smaller than we expect him to be because we are used to the huge, lumbering animals we see on farms at home. The fighting bull is nothing like as big, and a great deal more agile.

They are not like lions or tigers, these fighting bulls. They have been raised in the country and all they have ever tasted is grass, the not over-abundant grass of almost treeless Spain. Like all young animals who live in herds, they want to assert themselves and have spent their time vying with their fellows. Every young animal wants to prevail, to rise in the hierarchy of the herd, to lead the herd one day. The young bulls spar and fight with one another, but it is all done according to sporting rules. Like wild horses, mountain sheep and mountain goats, the bulls fight to prove which is the strongest. They are not killers and if a bull is defeated and acknowledges it, the winner does not gore him. Fighting bulls have horns as long as swords, but not for impaling other bulls. They use them against wolves and bears, but only in order to defend their herd.

Pity the young bulls from the sunny, grey-green meadows of

Spain! Lusty young bloods, born to fight according to the honourable rules of battle. Little do they imagine what lies before them. On this broad, golden field where no blade of grass grows, their unsporting enemy, who does not fight with their weapons, will come to meet them. There is no future for them here, no mercy.

A brightly costumed man advances towards the bull, waving a red cloth. Bulls do not hate red, that is a fairy tale. The young bull is as uninterested in the man as he would be in a cowherd in the field at home. Even though he has been provoked and enraged in his stall before coming into the arena, now he stands stock still and looks round at the buzzing, encircling sea of human faces. Lions roar, tigers spit; he just stands there, small and lost, and moos like a cow in its stall. The brightly clad man waves the cloth in front of the bull's nose and the bull runs at it, not very malevolently. The man springs aside and the bull runs under the cloth. Horses and cattle can take in the area of a whole field at a glance, but their eyesight is not as good as a man's, and the man with the red cloth has very good eyes.

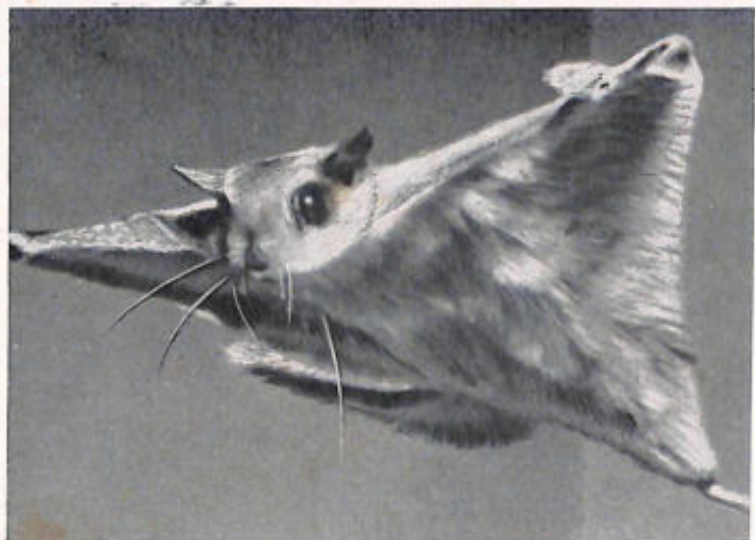
By the sporting rules of bulls and rams it is cowardly to leap aside at the last minute. The whole point of their battles is to meet the adversary head-on and withstand the frightful impact. The brave bull must not avoid any impact, but he is fighting monkeys, baboons who provoke him, make feint attacks, jump aside at the last moment and then attack from the rear.

The dressed up 'baboon' moves slowly towards the bull. In his raised hand he holds two banderillas. The bull thinks that his adversary wants to match his strength against his own, and charges him, but the man jumps to one side and plunges the banderillas' barbs deep into the bull's back, down between the shoulder blades towards the vulnerable periosteum (the membrane enveloping the spinal system). At last the bull becomes enraged, and when one is enraged one does not feel pain very much. But the brightly clad baboon who abuses the bull's knightly code is applauded.

The bull is infuriated by the gaudily dressed, jabbing, nimble 'monkeys' dancing round him, wounding and tormenting him. The hot blood runs over his black hide, the pain is piercing. Finally, one of the bullfighters loses his low-heeled patent leather shoes, and the bull impales his red cloth on its horns. The torero has to go



THE SKUNK - IN REALITY A FRIENDLY, LIKEABLE AND 'HONOURABLE' ANIMAL



THE LITTLE FLYING SQUIRREL GLIDES THROUGH THE AIR



THIS BABY FLYING SQUIRREL WAS BORN BESIDE MY DESK

THE FIGHTING BULL

bounding across the arena to the safety of the barrier. The bull catches the second torero on its forehead, lifts him high in the air and then tosses him aside. The man does not come back, which means, according to the rules when bulls fight among themselves, that he is dead, so the bull is the victor and does not molest him any more.

A torero falls and I catch my breath, because the bull can now transfix him with its long, beautiful horns. I am biased, I must admit, and would like to see this happen. But for a little while the bull just pokes about near the man lying prostrate on his stomach, and then goes away. The bull is not a killer, he merely wants to determine who is stronger. If he only knew the sort of rules that apply here!

Again and again he is provoked, wounded. New beribboned banderillas bore into his flesh, shaking with every step he takes. Their points pierce and scrape the tender periosteum. The blood drips, the fighting bull grows weak, three or four 'heroes' are dancing round him now. As soon as he comes close to catching one of them the other three leap in front, brandishing a red cloth in his face. The bull has grown weak now. He stands still and moos like a cow. It sounds so peaceful.

One of the tereros draws his gleaming sword, hiding it under the red cloth, and approaches the exhausted bull. As the animal reluctantly lowers its head to protect himself, the 'hero' strikes, running the sword down through the top of the bull's neck deep into its chest. The bull no longer tries to attack. Blood streams from his nostrils and he can no longer see the five thousand pairs of voracious eyes staring at him from all round the arena. Perhaps, for the bull they are now the peaceful daisies of its home meadows. Nature is more merciful than we, who call ourselves the jewels in creation's crown. Death can be painless when the blood is streaming from one's body, as my wife, who once nearly bled to death, has told me. The ancient Romans knew this too, and used to open their veins as they reclined in warm baths.

Now the bull does what he used to do as a calf when he had drunk his fill from his mother's udder, and what all cattle do when the bells of the village church sound the angelus and the sun sinks below the cloud on the horizon - first he bends his forelegs and

sinks his chest on the ground, then he lowers the rest of his body. Finally, he turns his head to one side. A brave bull has died, and so peacefully. Would the torero have known how to die so calmly if the bull had really used its weapons? A man appears on the scene. He is dressed, not in a silk outfit decorated with pearls, but in a butcher's coat. He approaches the dying animal from the side and stabs it expertly behind the head in the spinal canal. When this matter-of-fact killer in the butcher's jacket does his job properly, the bull jerks convulsively, tenses its limbs, and falls back dead. Then a pair of big decorated horses trot into the arena, blue-jacketed assistants tie a rope round the dead bull's horns and it is dragged out of the ring, while the music plays.

When the spectators think that a torero has given a good performance, he runs round the arena waving an ear cut from his peaceful opponent's head. The crowd showers him with oleander blossoms, sweets and bottles of wine and he bows to them like a circus artist demanding applause. If he has fought badly, run away from the bull, or had to stab it with his sword three or four times without being able to kill it, he has to carry the animal's tail round the arena and is pelted with empty bottles and abused by the audience.

More music follows, and then another unsuspecting bull from the green meadows bursts on to the yellow sand. So it goes on until the thousands of spectators have had their fill. Then the arena is filled with tables laden with wine, cooked hams, sausages, bicycles and sewing machines. Little girls, dressed in their Sunday best, run into the arena to draw numbers out of a large drum. The people whose programme number comes up have not only had a day at the bullfight, they also go home with sewing machines or bicycles as prizes.

Are bullfights cruelty to the animals? Are they a disgrace to civilisation, of which the Spaniards, the South Americans and the southern French should be ashamed? I have accustomed myself to answer such questions carefully and matter-of-factly. Soldiers wounded in a sudden attack often do not notice that they have had an arm shot off. They have felt only a dull blow and have continued advancing and only when the excitement has worn off have their wounds begun to pain them. When someone is fighting mad he can

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take anything. An upper cut to the jaw will enrage him the more, not hurt him.

Fish can see the world in colour, just as we can. Animal psychologists have established that they can not only hear sounds under water, but distinguish between the finest gradations of tone. They certainly feel pain as we do. Fishing is supposed to be a pleasurable, relaxing sport but I believe this to be so only above water level. Pain and suffering are the same whether one weighs a few ounces or pounds, like a fish, or a few hundredweight, like a bull. I accept that an enraged embattled bull feels less than a frightened fish wriggling on the end of a baited steel hook embedded in its throat. Of course, fish eat mosquito larvae, and the pike devours other fish, but they do so in order to live.

A bullfight, however, goes on for a long time. Most of the young bulls do not want to fight any more after a short while. One can see how agonising the pain is, how it racks them and torments them. The exultant toreros have to make increasingly greater efforts to force the weakening, pain-racked bulls to defend themselves. How can anyone take pleasure in this? Yet people used to be wild with enthusiasm when defeated gladiators were stabbed to death in the arenas of ancient Rome, when Christians were burnt at the stake or lions torn to pieces. People are different from animals.

I consider that fighting bulls are fairly harmless to the people concerned with them. Statistics show that severe injuries, mental damage and fatalities are more numerous in boxing and all-in wrestling than in bullfighting. Furthermore, Spaniards are chivalrous and likeable. My lack of enthusiasm for bullfights is not because they always end in the death of the bull. Nobody who eats steak or roast beef can base his attitude on such a reason. The fact is that it is unworthy for human beings to find pleasure in the sufferings of their fellow creatures. On the other hand, have we, lovers of boxing, all-in wrestling, and such dangerous sports as car and motorcycle racing, which take their toll of deaths each year, got the right to criticise those who go to bullfights?

CHAPTER 9

The Fastest Animals On Earth

A hundred years ago man had little to boast of on this earth. Ducks could swim better, seals dive deeper, birds fly faster, eagles see more keenly, kangaroos jump further, badgers dig better and almost every animal runs faster than he. In the course of a hundred years technical developments have changed all that. Aircraft today fly faster than sound, and while in the past we followed the cranes on their long southward flight with only our yearning, today we overtake them on their months'-long odyssey and get there by aeroplane in a matter of hours.

Because animals always moved faster than we, and we could only chase after them a little way like clumsy children, we always admired, envied – and over-estimated – their speed. We began to measure it accurately only a few decades ago.

When Thienemann founded the famous bird sanctuary of Rossitten on the Spit of Courland in East Prussia, he set to work timing the speed of birds in flight with a stopwatch. The site was especially suitable for this. Migrant birds used to fly along the coast from Finland and then use the narrow tongue of land as a flight lane. A bird-watcher could station himself there with a stopwatch, and when a crow came in sight he could alert a companion five hundred yards away by field telephone, so that the five hundred-yard flight could be accurately timed to a fraction of a second. Sparrowhawks were clocked at 27 m.p.h., seagulls at 32 m.p.h., crows and chaffinches slightly faster, peregrine falcons and jackdaws at 38 m.p.h., starlings at 47 m.p.h., geese at 45 to 57 m.p.h., wild duck at 43 to 60 m.p.h. and swallows at 63 to 75 m.p.h.

Many members of the Forces are peaceable fellows and follow all kinds of hobbies in civilian life. In the last War, for instance, there were a number of ornithologists in anti-aircraft units, and

they could not bear to miss the opportunity of using their expensive equipment to measure the speed of wild geese in flight and make other observations of bird life. The speeds they arrived at tallied with those observed by Thienemann many years earlier. They also discovered that the 'approaching enemy aircraft' signalled by anti-aircraft observers and subjected to a fierce barrage of flak often turned out to be flocks of migrant birds. They always hoped in such cases that the shells had burst wide of the mark.

Teal flew particularly fast – at about 75 m.p.h. – and swifts still faster, reaching 95 m.p.h. This is a speed of 130–160 feet a second, faster than an express train, which travels at less than 130 feet a second. Over short distances birds can reach even greater speeds. A cormorant that thought it was being chased by an aircraft, increased its normal flying speed from 45 m.p.h. to over 65 m.p.h. and kept it up for ten miles. When a swift is hunting for prey it can move through the air at 125 m.p.h. A peregrine falcon swooping on a pigeon reaches 160 m.p.h., approaching the speed of a modern commercial airliner. The falcon is said not to make a second attempt to seize its prey if it misses the first time, out of shame at its failure. In fact, the speed at which it pounces demands a tremendous effort which leaves it gasping for breath through its half-open beak. The falcon is only capable of maintaining such a high speed for short periods and needs time to regain its strength afterwards. This illustrates the difference in techniques. The chaffinch can fly at 35 m.p.h., but never covers more than 7–15 miles of its 315–375 mile journey in the ten hours or so of daylight. The stork takes 80–100 days over its long flight to South Africa, covering 65–75 miles in a whole day, a distance it could well fly in two hours. When birds fly southwards they do so in a leisurely manner, hunting for food on the way. They are by no means in as much of a hurry to reach their destinations as human beings often are.

The non-swimmers among migrant birds have to exert themselves when they are flying over water. From Denmark to England, for example is 280–375 miles according to the route taken, and for many birds this means eight-to-twelve hours of uninterrupted flight. When the weather is bad or they have to fly against head winds, many of them fall exhausted from the sky on to the decks of passing ships and try to regain some of their strength before flying on.

Intercontinental airliners are a big hazard for many non-swimming birds. A variety of curlew and the turnstone fly 2,500 miles over the Pacific from Alaska, and bee-eaters and falcons fly 1,875 miles non-stop over the Indian Ocean from Africa to India. Even at a speed of 63 m.p.h. they have to flap their wings for thirty hours at a stretch.

Sailors and passengers on board ship have often seen whales, sea-lions, dolphins and sharks, as well as other fish, accompanying ships, keeping pace with them, effortlessly overtaking them, or playing round them. A harpooned rorqual has been known to tow a whaling-boat along behind it at twelve knots. In considering these things, it must be borne in mind that ships travel more slowly than people suppose. The speed of a ship is reckoned in knots, and not in miles per hour, a measurement of distance with which most landlubbers are not familiar. A knot indicates the number of nautical miles travelled in an hour, and a nautical mile is 6,080 feet. I once worked out knots in terms of miles per hour. A fishing boat travels at less than 13 m.p.h., a sailing ship is somewhat faster – just under 14 m.p.h., about the same speed as cargo vessels and oil tankers. Theoretically, therefore, a man could easily keep up with a cargo ship. Even the 'United States', which holds the Blue Riband for the fastest crossing of the Atlantic, does not reach more than 35½ knots, or 40 m.p.h., on the voyage.

Human beings balance their bodies like a tower on two legs, and are anything but fast runners compared with other forms of life. The record for the 100-metres sprint was held for some twenty years by Jesse Owens, the American negro, with a time of 10.2 seconds, a speed of about 22 m.p.h. In 1942, Hägg, the Swede, set up a record of 13 mins. 58 secs. for the 5,000 metres, a speed of 13½ m.p.h., while Zatopek's 29 mins. 2 secs. for the 10,000 metres in 1950 represents an even slower speed.

We can only maintain comparatively high speeds for short periods, just like any other form of life, in contrast to machines. Even an Olympic runner could not move fast enough to get away from a black mamba, the huge, much feared African poisonous snake, whose bite is fatal to human beings within an hour and sometimes in as little as ten minutes. The black mamba rears almost as high as a man and can easily knock him over with one blow.

Today we can accurately measure the speeds at which animals

run by following them in a car and taking a speedometer reading. This was the method employed to time the Australian emu, a big, ostrich-like bird which cannot fly. It reached 38-45 m.p.h. But even our modern vehicles have proved unable to keep up with cheetahs on their home ground. They are the fastest land animals in the world and are said to be able to run at 83 m.p.h. Greyhounds which were raced with cheetahs on an English track in the twenties, could not keep up with them. The greyhounds covered a hundred yards in six seconds, a speed of 38 m.p.h. The cheetahs did it in five seconds, 45 m.p.h. That is why these big cats can catch birds like guinea-fowl so easily.

Cheetahs often become tame. Many years ago one of them in the Frankfurt Zoo astounded my predecessor with its speed. It could catch wild rabbits from forty yards away before they could cover the four or five yards to their burrows. Racing cars need a straight stretch to pick up real speed. Not so the cheetah. Its initial velocity is astounding - it shoots forward like an arrow from a bow.

The cat family holds all the speed records, even though we generally like to think more highly of dogs than of cats. Even so, if we want to overtake a greyhound we have to have a fast car and a straight road, and even then the dog will stay ahead at first because it takes a little time to get up speed. The African springbok, a kind of antelope, can run almost as fast. Hartebeestes reach 38 m.p.h., hares 31 m.p.h., gnus and zebras 38-42 m.p.h., reindeer about the same speed, riding dromedaries 32 m.p.h., rabbits 24 m.p.h. and elephants 15-20 m.p.h. Wild guinea-fowl can keep up 25 m.p.h. alongside a car for considerable distances.

Cherry Kearton has described how he once saw two enraged rhinos chase a man on horseback. A rhinoceros can run as fast as a galloping horse, though not for as long, so the angry pair soon gave up the chase, which had been extremely funny for the onlooker. Even a bear, which gives the appearance of being a fairly clumsy animal, can move faster than a man on foot. A grizzly bear on the hunt for food can run at 33 m.p.h., and in the Yellowstone National Park a black bear was once seen galloping cheerfully over the frozen snow, keeping up with a car doing 38 m.p.h. along the road for some considerable time.

Antelopes, zebras and giraffes can only run fast for short periods,

which they do to escape from leopards and lions, which pounce on their prey from a short distance and at incredible speed. Other beasts of prey, like wolves or the brightly spotted, big-eared African hyena, are nothing like as fast but have greater endurance. A pack of them will chase a hunted creature for so long that it eventually becomes exhausted and has to slow down, which is why such animals are probably more successful as hunters. Watchfulness is no protection against them. When long distances are involved, it is the animal which can keep going longest, even though it may be slower, which emerges the victor. In a contest between a horse and a riding dromedary staged for a bet in Turkey in 1942, in which both animals had to cover ninety-five miles a day for three days, it was the one-humped camel that won, even though dromedaries are by nature far slower animals. In the case of racehorses, it is not their fast-moving legs which are the special achievement of good breeding, but their strong hearts. A thoroughbred is not much faster than a wild horse, or even a zebra or a wild ass, but it can keep going much longer, even with a rider on its back. That is why we can chase and lasso giraffes, elephants, zebras and antelopes so easily on horseback. The wild animals of the prairies have been caught for zoos in this way for more than a hundred years. With the advent of light vehicles capable of traversing rough country, catching them has become easier still. The captured animals can be put straight on the vehicle and transported to hunting headquarters. The biggest danger in this method of catching wild animals is that they may suffer a heart attack, and today they are generally injected with heart-strengthening drugs as soon as they are caught.

We human beings can console ourselves with the thought that it is not only snails and earthworms which are slower than we are. The sloth can only move at two miles an hour, although he is not being slothful, but really exerting himself to do so.

Kaspar Hausers of the Animal World

ON Whit Monday in the year 1828, a young man in a tail coat, a red tie and top boots staggered unsteadily across the Unschlittplatz in Nuremberg. His feet were bleeding and he could hardly walk. A cobbler helped him along as he tried to find a certain Captain Wessenig, a cavalry officer, to whom he wanted to deliver a sealed letter. The letter was unsigned and its contents were unusual. It said: 'Captain, I am sending you a young lad who wishes to serve his king faithfully as a soldier. Somebody left him outside my door one winter's night in 1815. I have children of my own, and I am poor and can hardly manage to support myself. He is a refugee and I have been unable to find out who his mother is. I have never let him set foot outside the house; nobody knows about him; he does not know the name of my house or where it is. You may ask him, but he could not tell you even if he knew it, because he speaks very badly and with difficulty. I put him out in the middle of the night and he has no money. If you do not want to keep him, you must kill him and hang him in the chimney flue to smoke.'

The youngster in the torn boots really could not speak. All he could do was stammer his name, Kaspar Hauser. As nobody knew what to do with him, he was taken up to the castle and put in the Vesterner Tower. Day in, day out he lay on some straw on the floor, refusing everything except bread and water with disgust, shunning the daylight and unable to answer any questions about where he came from. The news of this strange arrival in the city soon spread, and many citizens of Nuremberg came up to the castle to look at him as if he were some kind of strange animal.

Eventually Professor Daumer, a grammar school teacher, took pity on the young man, received him into his home, and lavished a great deal of love on him. The professor began to try and bring him up like a human being. He proved very willing to learn, and gradually Daumer coaxed some details out of him about his previous life. Daumer used this information to compile a series of reports to the Prime Minister, Feuerbach, in Ansbach.

The boy's name was Kaspar Hauser. From his very early childhood he had always been kept in a darkened room. Bread and fresh water were put ready for him every morning. Presumably a sedative was put in the water from time to time, because sometimes he used to wake up and find that his hair and nails had been cut, that he had been washed, and that his dirty clothes had been changed for clean ones. The only thing that he had ever had to play with had been a wooden horse on wheels. One day he saw someone standing in the doorway. The man, who seemed gigantic to the captive boy, explained to him who he was, and also taught him how to stand up and walk. Then he took him to the Unschlittplatz where he had been found wandering.

What could have led anyone, however cruel, to treat a child in this way? The pale youth's strange fate roused people's sympathy, and everyone tried to find out why he had been kept shut up. Was he perhaps Napoleon's illegitimate son? In a secret report to the King of Bavaria, the Prime Minister expressed the suspicion that Kaspar was the heir to the throne of Baden and had been spirited away because of this. The ruler of Baden had three daughters, and had also had a son, the heir to the throne, who was supposed to have died in October, 1812. This son's death had cleared the way to the succession for another of the ruler's sons, by a morganatic marriage. These rumours which soon spread throughout Germany, could not be suppressed, and, fifty years later, Emperor Wilhelm I ordered the archives of the House of Baden to be thrown open and the official account of the Crown Prince's death to be published.

The talk grew even wilder when Kaspar Hauser was found unconscious and covered with blood in the cellar of Daumer's house on October 17, 1829. When he recovered he said that a stranger, dressed from head to foot in brown and with a silk handkerchief over his face, had come up to him in the garden and said

in a deep voice: 'Kaspar, you must die'. Then someone had hit him over the head and in trying to save himself, he had managed to reach the cellar steps, half-unconscious, and had then fallen down them.

One day, a rich Englishman, Lord Stanhope, chanced to arrive in Nuremberg. He made friends with Kaspar, and before he left to continue his journey, he set aside a sum of money to complete Kaspar's education. The young man moved to Ansbach and was taken into the home of a teacher called Meyer, who obtained simple work for him to do in connection with the court of appeal. On December 17, 1833, Kaspar was walking in the grounds of the Ansbach court buildings when, according to his story, he had been accosted and attacked by three strangers who had tried to stab him in the chest. However, he was barely marked and there was no sign of any blood. Meyer thought the whole story a pack of lies and abused Hauser for it. Nevertheless, after lying ill in bed for three days, the young man died of an internal haemorrhage, caused by a stab-wound from a stiletto.

Nobody has ever discovered who Kaspar Hauser really was, and it will probably remain a riddle for ever. In the Munich archives there are forty-nine thick files on him and in the one hundred and twenty-nine years since his death dozens of books, stories, plays and poems have been written about him, as well as thousands of articles. In my encyclopaedia it says: 'He was presumably a work-shy impostor'.

What we could have learnt from someone who had grown up like Kaspar Hauser! In one breath he would be able to answer countless questions about human development. If there were such a one as Kaspar Hauser, who had never known his parents, or indeed anyone at all and could therefore never have learnt, seen or imitated anything, we would be able to discover what instincts human beings are born with. Would someone like that laugh when he was happy, or frown when he was angry? Would he know how to stand upright, or walk on two legs? Would he develop special sounds for particular circumstances, scratch the back of his head when at a loss, kiss a girl, pick his way carefully when the ground was muddy, withdraw his hand if he touched something unpleasant? Any typically human

reaction he displayed would be inborn, like the colour of his hair or his eyes.

In the last few decades, scientists have reared many Kaspar Hausers, but they have been birds, not human beings. Even when a chick was hatched in an electric incubator and artificially reared, it began to crow after a while, despite its never having seen or heard a cock in its life. Next time you eat a soft boiled egg for breakfast, examine the outer surface of the unbroken yolk very carefully, and you will find a pinpoint-sized white spot at the top. During the hatching period this minute nucleus develops into the eyes, legs, viscera, kidneys, feathers and beak of a chicken. But in addition to carrying all this within its tiny compass, it also contains a chicken's knowledge of how to crow or cluck, as well as many other inborn patterns of knowledge and behaviour. We call all this instinct. Every species is born with a different kind of knowledge in its blood, handed down from its ancestors. Song thrushes and blackbirds sing their own song as soon as they are out of the fledgeling stage, without ever having heard it before. In the same way the ring-dove is born with its call and the goatsucker with its mating call. Chaffinches, pied flycatchers, and nightingales, on the other hand, cannot sing their characteristic songs unless they have first heard them from other birds of their own species.

Professor Otto Koehler in Freiburg wanted to make absolutely sure that his feathered Kaspar Hausers should never hear anything at all. Many animals communicate with each other by sounds beyond the range of the human ear, so Koehler had some sound-proof rooms built in the basement of his institute. The walls were made of layers of glass wool, brick, cork and cement faced with acoustic tiles. The observation window consisted of six thicknesses of ordinary glass and Plexiglass, with a layer of air between them. The birds were kept in these rooms from the first day they were hatched. They had a little patch of artificial grass, some leafy branches, which were changed regularly, and a bird bath. In the evenings the electric lights were gradually dimmed to give the effect of twilight, and then went out altogether. Whenever the ultra-violet lamp was switched on the birds used to sit under it with outstretched wings, even though they had never seen sunshine. The air in the rooms was changed twice a day, through pipes running into

them from the loft of the building. These feathered Kaspar Hausers were better looked after than their human namesake had been a hundred years earlier.

Special skill is needed to hatch birds' eggs artificially and then rear the delicate youngsters by hand from the first hour of their birth until they reach full, healthy maturity. When fledgelings are taken away from the parent birds at five or six days old, the task of rearing them is much easier, but although they may be blind and without feathers they may already have heard various sounds. Indeed, they may have heard them even before they hatched out of their eggshells. We know of similar phenomena with other animals, and who can prove that the same does not happen with birds? A famous Berlin man-and-wife ornithological team, the Heinroths, spent a great deal of time and trouble trying to raise a passerine bird from the egg. Finally, in 1926, they managed to produce one, a song-thrush. And the Heinroths understood birds almost as well as the birds themselves. Between 1954 and 1956 Koehler's colleagues reared a great number of blackbirds, reed warblers and red-backed shrikes from the egg. One of Koehler's team, Franz Sauer, afterwards gave an account of how some white-throats of his behaved. At the same time as the blackbirds in the sound-proof rooms were being observed, wild ones were also being studied to find out exactly how they behaved. At every hour of the day, and according to the season, the 'experimental' birds, though they had never seen the sun and did not know what summer was, behaved in exactly the same way as the wild birds, which they had never seen. In order to ensure that their birds should be given the right food, the Freiburg team used to catch female white-throats on the way to their nests with food for their young, take it from the angry birds' beaks and examine its composition minutely. They then made up the same mixture of ant larvae, wild strawberries, spittle, crumbs of earth, green grasshoppers, raspberries, dandelion leaves, leaf roller moth caterpillars and similar delicacies, and fed it to their own birds.

Like their wild counterparts, the experimental birds left their artificial nests when they were between ten and thirteen days old, perched on branches, sang plaintively and stretched their open beaks like tweezers towards the men observing them through the window.

as it sucks, and the mare gave her milk much better from then on.

The little foal grew up in complete isolation. When he was three days old he began to neigh softly whenever anyone approached him, even though he had never heard a horse neighing in his life. Neighing must, therefore, be inborn. He also twitched his hide to drive away flies, stood and urinated like an old nag, swished his tail and kicked out when he was tickled. Since his mother's milk was insufficient I added cow's milk to it, gradually increasing the quantity.

After eight days, I opened the door of the stall, but the little foal refused to come out. He stood there as if rooted to the ground. We had to shove him outside, and even then he did not want to budge from where he was standing. Puppies behave in a similar manner. Even though their mother has taught them how to walk, they revert to crawling on their stomachs if they are put on a table top. But when I started to run away from Kaspar, he galloped after me.

I prepared a life-sized oil painting of some horses on a piece of plywood, and when he was fourteen days old I confronted Kaspar with it as he came out of his stall to exercise in the sunshine. I had all ready showed the picture to a mare and a stallion, and they had behaved as horses always do when they encounter others that are strangers to them. In other words, they recognised what the painting was supposed to represent. Kaspar, however, was not in the least interested. Yet when I brought along a sheepdog he was very friendly towards it and the two of them played about together.

At this time the Russians were advancing towards Lithuania and we had to move on, so I put Kaspar in a locked horse-box and we set off. When we reached our destination, I fixed him up a magnificent stable in a burnt-out shed, where he could really let himself go. He always went up to anybody who came within range, licked their hands and nibbled gently at their skin with his teeth, but never biting. That is the way fully grown horses like to caress each other in play. When he had emptied his bowl of milk he used to paw the ground with his forelegs. This is also something all horses do when they are impatient. I was able to observe a whole list of instinctive actions, things he had been born with and needed no mother to teach him. We, who were *in loco matris*, so to speak,



A FEMALE SERVAL WITH HER CUB. SERVALS ARE AFRICAN PREDATORY CATS AND ARE RELATED TO THE LYNX



BEARS OFTEN COME RIGHT UP TO CARS IN THE AMERICAN NATIONAL PARKS

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BEARS OFTEN COME RIGHT UP TO CARS IN THE AMERICAN NATIONAL PARKS



THE FENNEC, A SMALL DESERT FOX FROM AFRICA, IS A TINY
RELATIVE OF OUR OWN FOX

never used to pull our lips upwards away from our teeth if we got cigarette smoke up our noses, for example, but Kaspar did.

Not all Kaspar's innate equine characteristics were harmless, however. I quartered a young lion with him, which had been given to us by the director of the Riga Zoo. Kaspar sniffed harmlessly at the cub, but jumped back quickly when it spat at him. Then he approached the lion again, together with me, and suddenly lashed out with his hind leg, narrowly missing my ear. So that was another thing he could do without being shown. When I brought in a cow, he ran away, but he showed some interest in a piglet. Big animals seemed dangerous to him.

When he was sixty-four days old I had to leave my bay Kaspar for good. The enemy was advancing again, but I could no longer coax him into his box. For the first time in his life I showed him another horse. We were all excited and wondering how he would react. He was just as frightened as he had been when he saw the cow and wanted to run away.

All our foal had seen in his life so far had been the four walls of the gutted shed and the blue summer sky of Lithuania overhead. When I opened the gate he did not dare step over the threshold. When I went to walk away, however, he followed me and trotted trustingly at my heels. When we reached a beautiful stretch of green meadowland, the freed captive began frisking round me and then started to gallop about like any other young foal galloping round its mother in the fields. But Kaspar followed anybody who came by, even complete strangers; he did not show any special preference for me. I walked through a large herd of cows and he followed me, noticeably anxious. He stayed close to me and did not dare to move far from my side. He behaved in the same way when I walked through some horses cropping the grass in a field. Some ten minutes after we had left them behind us, Kaspar, for the first time in his life, neighed loudly and shrilly.

The first weeks of his life had not been as wonderful for him as for a foal who has been allowed to stay with its mother in a green meadow. Still, he had enabled us to learn many things about horses that we had not known before. So I let him go back to his fellows, this bay foal who trusted men and feared horses.

CHAPTER 11

How the Goldfish Became Gold

DURING the last year of the War, a London housewife was cleaning out her fire-grate when she found what she took to be a lump of grease covered with soot. When she took a closer look, however, she saw that it was in fact a live goldfish. A bird must have found it in a pond somewhere and then dropped it down the chimney. She put it in some water and it was soon swimming about, apparently unharmed. These hardy little fish have been kept out of water for more than half a day, wrapped in damp moss, and have survived. In Holland at one time, they used to cram carp (which belong to the same family as goldfish) into hanging nets filled with damp moss and spoon-feed them with bread soaked in milk. I hope that this custom is no longer prevalent today.

The goldfish is certainly the best known and most popular of the twenty thousand different species of fish on this earth. Goldfish are so popular as pets, in fact, that we have not been tempted to discover how tasty they are. Few people eat them – in the West at least. In China and Japan, however, they have been regarded as a delicacy for centuries. They are said to have the same musty kind of taste as carp often have. Many 'artists', have earned a living by swallowing whole aquaria full of goldfish and then regurgitating them at will, still alive, a feat which was supposed to be irresistible to onlookers.

When asked about the origin of goldfish the Chinese like to tell the following legend: In the second year of the reign of the Emperor P'ing, who was a member of the Chung dynasty (769 BC), no rain had fallen for a hundred days. The desperate peasants offered up sacrifices in all the temples to placate the gods, and suddenly a spring of water burst forth from the ground, with a goldfish glittering in it. At the same time the rains began.

In reality, the Chinese first reported seeing a wild goldfish in a tributary of the River Cho in about AD 350, for their historians recorded such curiosities as meticulously as wars and other important events. Wild goldfish are greyish-green in colour, plain looking, and are sold for food in Chinese markets. Goldfish were first kept as domestic pets in China in 960. Two hundred years later it became the height of fashion for people to install goldfish ponds in their gardens, and the little fish grew steadily more resplendent, as if conscious of their starring role. By 1300 there were golden, silver, red, black and speckled varieties. They did not reach Japan until 1500, and two hundred years later the Japanese began breeding them commercially in large earthenware vats.

Goldfish breed easily and prolifically. When a female reaches the age of nine months, love enters her cold little fish-heart. To see her nuptials one has to get up very early. At four o'clock in the morning, and never later than nine, the normally equable males become raging tyrants and chase the female fish all round the little garden pond. At this time, they fall an easy prey to birds and other hostile creatures, because they are blind to any danger. The males jostle the females unceasingly in order to rouse them to lay their eggs, until the females finally sink to the bottom, exhausted. Then the males push them upwards and on to the water plants with their snouts until they are almost entirely out of the water, the female lays her eggs, anything from 500 to 3,000 of them, and the male immediately fertilises them. At this stage, fish breeders immediately catch the adult fish and transfer them elsewhere, because they are anything but good parents. In fact, they are cannibals and they readily eat their own freshly laid eggs.

Goldfish are at their best at three to four years old, and can still breed at seven. Even then, their life span is by no means over. If well looked after, they can live for as long as twenty-five years or even longer. Cases have been recorded in Europe of goldfish which have lived for thirty years, and in China for more than forty. The size they grow to depends on how much space they have to live in. A goldfish which had been kept in a small home aquarium for twenty-five years was a little over four inches long when it died. Others kept in bigger aquaria have reached as much as twelve inches in length after five years. Wild goldfish in rivers in Portugal and

South Africa, and in tributaries of the Seine, grow to fourteen inches. In the United States specimens up to two feet long have been recorded. Goldfish are highly adaptable. Although they are normally river and freshwater fish, in Bermuda they live in salt water.

Perhaps one Australian wild budgerigar in tens of thousands is blue, so the chances of its finding a mate of the same colour and rearing a brood of blue budgerigars are remote indeed. It is the same with the olive-green wild goldfish of China. Only rarely is a pure green one found. Most of them have some black pigment in their scales. A mutation like this can only be preserved if the breeder ensures that, say, an orange goldfish breeds only with another orange-coloured one. The Chinese, who have a weakness for curiosities, did just that, and for over a thousand years now they have been breeding all kinds of strange varieties of goldfish, about a hundred and twenty in all, not counting sub-species.

There are harlequins, touched here and there with brightly coloured patches, others with double tails which give them the appearance of little fishy peacocks, and others with tails three times as long as their bodies. These long-tailed fish swim much faster than the more usual varieties, in the same way that a skin diver wearing rubber flippers can move through the water much more quickly than a man without them. Veil-tailed goldfish, so called because their tails and fins really do flutter like veils, have been bred in China since the fifteenth century. The 'darkies', with bodies like black velvet, are particularly useful for indicating when the water in an aquarium is becoming stagnant; 'egg-fish', which have round bellies, seem to 'trundle' round the aquarium; telescope fish have eyes on stalks; 'celestial' fish have their eyes on top of their heads; the 'lion-heads' have big wart-like fleshy growths like manes on their heads; the 'pompom' fish have their snouts adorned with a tassel which is sucked halfway into their mouths when they breathe in. They were first bred in the unlucky city of Hiroshima.

'Sleepers' which generally stayed at the bottom of the aquarium, have been extinct since 1772, and Chinese breeding experts have been unable to revive the species. The 'pearl-fish's' scales (goldfish have about 650) are spheroid with dark coloured edges. When a

'pearl-fish' loses one of its 'pearls', the scale that grows in its place is an ordinary one, because it grows 'pearls' only once in its life. We humans should feel regret for the way we botch Nature's handiwork to produce our own 'creations', and turn lively, sportive little fish into miserable little freaks which can hardly swim. It is not only the Chinese who have done this sort of thing. Westerners have bred dogs with crippled legs and created such breeds as the bulldog and the boxer, with deformed, crumpled muzzles, the dog's most important sense organ.

The city of Plon in Holstein has ordinary goldfish in its coat of arms, so the city elders had some put in the fountain in front of the railway station. But misfortune always overtook them. In the summer of 1953 a tramp fished them out, fried them and ate them, and in 1955 nearly all the ones that had been put in to replace them were eaten by seagulls. After this, some Plon businessmen clubbed together and paid a very considerable sum for thirty goldfish to be imported from Holland. Soon, however, there were only six left. Some spiteful individuals who begrudged the people of Plon their simple pleasure, put two perch in among the goldfish. The perch made short work of them.

In the winter of 1955 a Paris court fined two adolescents 10,000 francs, then about £10 for fishing in the fountain in the Place de la Nation, hooking out the most beautiful of all the goldfish and throwing them down on a nearby bench. Two passers-by protested at this cruelty and became involved in a scuffle with the young malefactors, who had to pay 10,000 francs damages in addition to their fine.

The first goldfish were brought to Europe in 1711. One of the Duke of Richmond's ships arrived in England with a large Chinese earthenware vat full of live goldfish. Madame Pompadour, Louis xv's extravagant mistress, is said to have been presented with one of the first goldfish brought to France, but perhaps the story is just a malicious invention, an offensive play on words in order to show that the King spent a great deal of 'gold' on fish for her.

The golden emigrant from the Far East created a sensation in Europe. The first book on goldfish appeared in 1780. A short time before this, Count von Heyden, the Prussian Ambassador to

Holland, had brought the first goldfish to Berlin. Ten years later, in St. Petersburg, Prince Potemkin gave a banquet in honour of his mistress, the Tsarina Catherine, in his magnificent winter garden and decorated all the table appointments with the new, greatly admired golden fish from distant China. It is all the more astonishing that the first goldfish did not reach the United States until 1874, but then only fifteen years elapsed before the first big goldfish breeding establishment was set up there.

According to a Japanese newspaper article, breeders in the Koriyama area alone raise twelve to fourteen million goldfish a year in their ponds. The Asiatic fish breeders raise hardly any of the species with which people in the West are familiar, and which we can buy for a few coppers for the zoo. They breed only the unusual and expensive varieties. Our goldfish come in their hundreds of thousands from Italian and United States breeders.

In England there are goldfish breeding clubs which put on big exhibitions every year. Two English goldfish enthusiasts, Hervey and Hems, recently wrote a large book on goldfish, from which I was able to obtain a great deal of information. The frontispiece, incidentally, a coloured reproduction of an oil painting of goldfish, was by no less a personage than Sir Winston Churchill.

Anglers who catch fish with rod, line and steel hook try to ease their consciences with the assertion that all fish are stupid and insensitive. However, goldfish develop very good memories, and in aquaria and ponds can easily be trained to come and be fed when they hear a particular sound, such as a bell being rung. They belong to the class of fish which have well developed ears and, like humans, they have a chain of auditory bones. It is, therefore, not surprising that goldfish fairly often make noises, usually shortly before feeding time. They 'murmur'. Some years ago a fish expert in New York recorded these goldfish noises with an underwater microphone and amplified them.

An English factory owner discovered how quickly goldfish learn to take advantage of favourable circumstances. As the water used for cooling the machines in the factory grew warm, it was drawn off and fed through a pipe into the owner's big fish pond. The goldfish loved the warm water and almost always stayed close to the outflow of the pipe. On Sundays, however, the machines did

not run, so no warm water came out. As soon as the machines started up on Monday morning, however, the goldfish gathered expectantly near the pipe, even though the warm water took some time to start emptying into the pond.

Goldfish can easily be tamed and will take food from a person's hand, but they cannot be taught to distinguish the person looking after them from other people. Surprisingly enough, goldfish do not drink any of the water they take in through their mouths, which is immediately passed out again through their gills. This can be shown quite easily by dropping some blue dye through a glass tube into the water immediately in front of a fish's mouth. Goldfishes' mouths are formed in such a way that the water breathed in through their mouths is not swallowed and so does not pass into their stomachs, in much the same way as we can eat cake without its being sucked into our lungs when we breathe.

Although many people have disputed it, goldfish sleep in the same way as other animals, sometimes during the day, but mostly at night. This can be discovered by suddenly switching on a light. The goldfish will be seen to be resting peacefully on the bottom of the aquarium and it takes a little time before they become lively again.

Hundreds and sometimes thousands of marks have been paid for some goldfish. The Chinese, for instance, have bred some with markings like letters of the alphabet on their backs. Of course, the breeders are rumoured to have helped this development by tearing scales off the fishes' backs, then tattooing and branding them.

New varieties of goldfish become fashionable in the same way as new styles in women's fashions. In Napoleon III's time, incidentally, it became fashionable to put baby goldfish inside hollow glass spheres and wear them as earrings. Fish which are to be shown at an exhibition are specially groomed for weeks beforehand so that they will appear at their best. A breeder will keep his champion fish in a special little aquarium in his living-room, so that it will become used to having people around and grow accustomed to electric light. He keeps it on a meagre diet so that it will remain lively and active.

One of the most famous of all goldfish was Old Black Joe, a

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coal-black veil-tail in America, named after Stalin, who was very popular there during the war. Old Black Joe was used as the advertising symbol for the 'Liberty Bond' campaign. He is said to have changed colour several times from black to red and blue - a transformation not unknown among politicians as well.

The Misunderstood Badger

THERE have been badgers on this earth for some 500,000 years, but it was not until 1947 that hunters and naturalists succeeded in giving us a correct picture of the life, loves and activities of this black and white striped animal. The latest book by Brehm, for instance, still contains the statement that the badger is concerned with its mate only at breeding time and is a morose 'lone wolf' for the rest of the year.

Ernest Neal, a teacher who lived in a village in southern England, made detailed observations of the behaviour and habits of badgers by maintaining a long series of dusk and pre-dawn vigils outside a badger's earth near the village. He visited the earth 290 times in all, and spent a total of 341 hours there, filling in most of the gaps in our knowledge about badgers.

Badgers' earths are often as much as fifty years old and sometimes older, going back as far as people can remember. A whole network of paths radiates from them, which are so well-trodden that they are often mistaken for man-made paths, and, indeed, human beings often use them as well. But they can only have been made by small creatures because they sometimes lead under overhanging trees and through thick bramble patches, and marking the way to drinking places at the river's edge, to flat stones which are pushed aside or turned over in search of insects, to play sites, or *al fresco* sleeping places. Sometimes they just peter out, like man-made field-paths, in the countryside where the badger finds its food.

Badgers almost always spend some time playing in front of their earths before they go foraging for food. How unlike the widely held assumption that the badger is a morose animal! They chase about, jump over each other like goats, shriek with delight and make a tremendous racket for a nocturnal animal. The young are allowed

to come out at dusk, a little while after the adult badgers, and they can be heard yelping and snorting impatiently in the earth until their playtime is due. Once outside they put their paws round each other tenderly and jump up and down on tree stumps. They also make regular playgrounds for themselves where the grass and plants have been trodden flat, sometimes choosing a spot in a cornfield. It is this that has given rise to the legend that they tread down the crops in order to eat the ears of grain.

If they pass another earth on their way to their feeding grounds, they always pay the inhabitants a visit, greeting one another by rubbing noses. Badgers are probably completely colour blind and in any case cannot see very well. Consequently when Ernest Neal was making his observations he hardly needed to take cover. All he had to do was make sure that he was not silhouetted against the sky. It was most important to stand absolutely still – not very easy to do with swarms of midges dancing round him. The badgers used to come to within a foot of where he was standing. They soon grew accustomed to his presence, and eventually his scent no longer disturbed them. In any case, they could not smell him from more than nine or ten yards away.

In 1944, Neal set up his camera opposite a badger's earth among the ditches and barbed wire of a disused army training area. Soon a young badger emerged. It was perhaps a year old, and had probably never seen a human being before. When it saw Neal, it did not turn tail and run but just sat there and stared. When Neal took a flash-light picture the badger got up and made as if to go back inside its earth, but then it changed its mind and sat down again. Even when Neal wound the film on and put in a new flash bulb, the badger stayed where it was, a mere four feet away. He took another flashlight photograph and made a certain amount of noise, but instead of making off, the badger came nearer and inspected everything very thoroughly. Only when its curiosity had been completely satisfied did it set off to forage for food. I once heard of a man who, finding an unusually powerful badger lying in the bright sunshine, fast asleep and snoring loudly, threw a stone which landed near it without even causing it to stir. It slept on soundly until he went up close to it and roared 'Get up!' In another case that I know of a man came across two badger cubs at play in the woods, and

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was able to go up to them and get hold of them by their backs.

Badgers are not at all afraid, trusting to their physical strength and the terrible wounds they can inflict with powerful movements of their narrow heads. Their black and white stripes, far from acting as protective colouring, serve as a warning of their approach. Though hearing is their keenest sense, they are not at all quietly behaved themselves, putting their feet down heavily as they walk and lurching clumsily along. Every so often they stand still for a little while to listen. It is possible then to creep right up to them, even when there are no leaves on the trees, provided that the noise of one's progress is irregular. This is easiest if one moves only when the badgers themselves are making a noise.

It was difficult for Neal to determine how many badgers inhabited the five earths in the woods. There used to be an old and well tried way of doing this – by putting some sticks in front of the entrance to the earth and then checking to see whether they had been pushed aside. However, it was then discovered that badgers not only investigate any uninhabited earths they come across, and move from one earth to another when the first one is being cleaned out, but sometimes also live three families to an earth. What Neal did was to station one of his pupils at the entrance to each earth and told them to record the time each badger came out or went in. Obviously, a badger seen at one earth could not simultaneously be at another. They established that, during the first two years, there were nine badgers in the wood and in the third year eleven. The number of earths in England has increased over the last thirty years, as has the number of badgers, which are estimated at one to every $\frac{1}{4}$ sq. mile. According to this calculation, there must have been about 250,000 badgers in West Germany in 1956, and it is worth our while to learn something of the habits and behaviour of these common denizens of our truncated homeland.

Badger embryos develop in the most amazing manner. In nearly all other mammals, man included, the ovum is fertilised after leaving the ovary. It then moves away from the ovary and implants itself in the wall of the womb, where it quickly and steadily develops into the embryo and then into a fully formed baby. In the case of badgers, however, the cycle of development is different, and until this fact was discovered, nobody knew exactly when the badgers'

mating season was. Up till quite recently, some authorities thought it was January, others February, and so on right through the year. When the female badger's ova are fertilised they do not attach themselves to the wall of the womb immediately, but swim about for four to five months. Only then do they implant themselves, and it is at this stage that the three-month gestation period begins. There is thus a total of seven months between mating and birth. However, badgers can apparently prolong this period at will, so that the young are always born at the correct time. A Swede, Dr Notini, artificially extended the period of gestation in captive badgers to seventeen months by keeping them at low temperatures and frequently disturbing them.

The blind, whitish-coloured cubs are born at the end of February or the beginning of March. Probably the mother segregates herself from the male and moves to another part of the earth, although nobody has yet been able to find out exactly what happens underground. After six to eight weeks, the cubs are allowed to come out of the earth into the light of day, and at three months they play and frisk about with great energy. They do not leave their parents until the end of October, when they generally settle in another earth. The parent animals, which have been sharing the earth with their young right through the new mating season at the end of July, remain together when the young leave the earth and do so for the whole of their lives – their life span is at least fifteen years. During the mating period, badgers are in very high spirits and play and frolic. I once heard of a male badger pursuing its chosen mate in broad daylight, panting after her in full rut. Both animals stopped short less than two feet away from Schuster, but when he called out to them their only reaction was to raise their heads. When he slapped the male's hindquarters with the flat of his hand, the sole effect it had was to encourage the badger to continue his chase with renewed vigour.

In August all the badgers from the five earths in Neal's wood moved into the biggest and oldest earth together. They all played together a great deal, but also carefully cleaned out all the other earths, and partially prepared new ones with new exits. They cleared all the old leaves out of the earths and left them at the entrances. Then they scraped together a fresh lot, seized them

firmly between forepaws and lower jaw, and crawled tail first into the earth, sometimes no more than a foot away from the watching schoolmaster.

Badgers always clean out their earths before the females give birth to their litters, and once the cubs are born, the leaves on which the animals lie are replaced by fresh ones every two weeks, so that the cubs may be kept clean and dry. For this reason badgers are usually free of vermin and rarely suffer from any diseases.

They prepare little latrines close to the exits of their earths by digging six or more small holes in a patch of ground a few yards square and then excrete into them, and their young soon learn to do the same. As soon as a hole is full, a new one is brought into use. Even inside the earth itself, separate chambers are set aside for use solely as latrines.

The most fantastic stories are told about what badgers feed on. They are supposed to eat young pheasants, birds eggs, even young fawns and lambs. There is an excellent method of determining with certainty what badgers live on – microscopic examination of their droppings. An even better method is to analyse the undigested stomach contents of a newly shot animal. Notini, in Sweden, has analysed the stomach contents of 1,889 badgers in recent years. According to his findings, badgers eat big quantities of berries in the summer, and at other times beetles, cockchafer larvae and large numbers of earth worms.

Neal almost always found rabbit hair present in the droppings and in the intestines of his English badgers, which took full advantage of the proximity of some rabbit burrows to dig straight down into the rabbit breeding chambers. They never attacked adult rabbits, but only the young, although badgers would probably not be averse to eating grown rabbits if they were to catch any.

It would be reasonable to assume that an animal like the badger, which spends so much time sniffing about with its nose to the ground, would eat mainly eggs and the young of ground-nesting birds, but analysis of their stomach contents has shown that this is not so. However, they often catch moles and do not disdain hedgehogs. Hedgehog skins can often be found in the woods picked clean, and this is certainly the badgers' work. Wild badgers never eat carrion. Painstaking investigation of a hundred cases of animals

breaking into poultry houses showed that eighty-three of them were due to foxes and only two to badgers.

It is almost impossible to credit that people shoot badgers on sight or dig them out of their earths and kill them because they destroy so many vermin. Besides, unearthing a badger is no easy job, because they can dig themselves deep into the ground in a matter of minutes. While you are getting to work with a spade to reach the badger's earth three feet below ground, he is digging himself in even deeper, and doing so at a faster rate than you. That is why a dog has to be sent in. If it should get too close, however, the badger will injure it very badly and probably kill it. What the dog has to do is to nip the badger in the flank near its hind legs, so that it will have to stop digging and try to ward off further attacks. Badgers are not easy to kill. The thick, bony ridge in the centre of a badger's head, to which its powerful jaw muscles are anchored, will withstand the most crushing blow. The only way to kill a badger other than by shooting it, is to hit it hard across the snout.

Today, badgers are usually caught and then released in a neighbourhood where they are needed, since they are in fact highly beneficial animals. Every badger I have had anything to do with has always managed to escape from a sack if there has been even the tiniest hole for it to stick its snout into. A badger's head is shaped like a wedge, and despite the fact that they weigh only some 27-42 lbs badgers are incredibly strong. They just burrow their way blindly through anything, and are past masters at breaking out of captivity.

As with so many other wild animals in recent times, car head-lamps have become the worst enemy badgers have to contend with. Apparently badgers are not very bothered by the cars themselves. Recently a badger's earth was found some two hundred yards outside a village, underneath a trunk road used by heavy lorries. Big mounds of soil on both sides of the road showed how industriously they had been working, and it was feared that their burrowing would cause the road to cave in. When attempts were made to dig them out, their earth was found to run within six inches or so of the surface in a number of places. The heavy traffic thundering by overhead had obviously not disturbed them very much.

Not all badgers wear the Prussian colours (black and white). Some are almost pure black, and not infrequently pure white specimens are found, as well as yellow and white and red and white. Adult badgers are often unpleasant to keep in captivity. One must always be careful of one's fingers with them. When caught very young, however, and reared artificially, they grow into friendly, trusting animals. Because they do not gnaw at things and are spotlessly clean from the start, badgers make very pleasant pets. They play with dogs, put their heads on their owner's lap, and carefully take proffered titbits from his fingers. There have been some who have followed their owners about everywhere like dogs. Bastian Schmid, the well-known animal psychologist, had one that loved bathing. Before it jumped into the water it always gave its snout a thorough wash first. I had one when I was in the army, and it was also fond of the water. If Schmid played his guitar or flute or started the gramophone, the badger immediately identified the source of the noise and always attacked it. Tame badgers taken for a winter walk love sliding. They will take a run at a patch of ice and slither happily along it on all fours.

Dr Eibl-Eibesfeld of the Max Planck Institute, in Bavaria, had a young badger which was allowed to run in and out of a shed just as it liked, and it showed that it looked on the place as home by leaving its scent on the threshold. Badgers have a shallow pouch of skin above the root of the tail which contains a number of glands which they use for this purpose. The glands secrete a sharp, sweet-smelling substance. Badgers make a sign at the entrance to their earths in the same way as Eibl's, by pressing their hindquarters on the ground. The inmates of the Eibl house were constantly having 'visiting cards' of this kind left on their shoes by their tame badger to show that it considered them as friends. The result was that the shoes became targets for fierce attacks by all the dogs in the neighbourhood for months afterwards. This badger could distinguish very clearly who belonged to the family and who did not, and was friendly only towards the family. It always rushed at one particular man who had once struck it, as soon as it caught a whiff of his scent.

In what way does a badger die? Probably, when he feels death approaching, he withdraws into his earth, and after he has died the other badgers heap soil on the body. If later generations come

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upon the skeleton when they are digging they throw out the bones together with the loose soil, and they are often found outside badger earths. Some years ago, a naturalist named Fitzgerald made a curious observation. He chanced on a female badger emerging from its earth and uttering loud cries as it did so. The animal went over to a nearby rabbit burrow and started digging a large hole there, working at it for a long time and breaking off at intervals to return to the earth. Hours later a male badger appeared. Then both animals went back inside the earth. After a short time the male emerged again dragging a dead badger by the hind legs, while the female pushed from behind. They dragged the carcass to the hole and covered it with earth. Then the male went off and the female returned inside the earth.





CHEETAHS ARE THE EASIEST OF ALL THE BIG CATS TO TAME



THE BADGER IS OFTEN MALIGNED, HE IS NOT REALLY MOROSE

Children Reared By Animals

ONE day at the beginning of October, 1920, an Indian Christian missionary by the name of A. L. Singh arrived at the village of Godamuri, some eighty miles from Calcutta. He saw that the villagers were in a state of tension over something, and on asking what it was all about he was told that the neighbourhood was haunted by ghosts. They had first been seen three years earlier, and had been causing a great deal of trouble in the area. The villagers asked the missionary to destroy or to exorcise them. So Singh borrowed a pair of binoculars and some guns and, accompanied by two Europeans, stationed himself on top of an abandoned anthill immediately adjoining some holes in the ground where the ghosts were reputed to live.

The first creatures to emerge were some wolves – two cubs and three fully grown animals. Then one of the ‘ghosts’ appeared, ‘a hideous sight, with a human body, certainly, but with a head that was just a great round ball.’ A little while later a second, much smaller ‘ghost’ crawled out of the hole. The two Europeans wanted to shoot them out of hand, but Singh saw that they were in fact human beings, and restrained his companions.

Because he understood his fellow-countrymen, he brought help from another village some distance away, where nothing was known about the story, and with the aid of the newcomers he dug the ‘ghosts’ out of their burrow. One of the wolves tried to attack the diggers, and was killed with a bow and arrow, and the others fled. Singh and his party found the two ‘ghosts’ huddled together with two wolf-cubs in a smooth walled, completely bare underground chamber. There were not even any scraps of food or droppings anywhere. Singh’s helpers took the cubs home with them and Singh brought the two ‘ghosts’ to Godamuri where he handed them over

to somebody to look after. When he returned to Godamuri to collect them five days later, he found them alone, starving, thirsty and covered in filth. The villagers had fled, abandoning their homes and possessions, because they had learnt that the 'ghosts' had been brought there.

The missionary estimated the age of the smaller 'ghost', a little girl, at eighteen months and the other at eight years. He called them Amala and Kamala and brought them to an orphanage that he and his wife were running at Midnapur. He had the good sense not to tell anyone about the previous history of his two new charges, and the two Englishmen who had accompanied him on his 'ghost-hunting' expedition also kept quiet about it.

Neither of the girls was able to walk erect, but ran about on all fours 'with the speed of squirrels'. They could not speak, but at night they often howled. Both of them had piercing blue eyes which glittered in the dark like a wolf's. According to Singh's account, for some time after they had been brought to the orphanage, they used to drink like wolves, lapping up water with their tongues. Pigeons, cattle, many other animals and, of course, man, suck up water when they drink. When they were hot the two girls did not perspire but panted like dogs, with their tongues hanging out. They tore off the clothes that were put on them, shunned the light and during the day were very subdued, though late at night they livened up considerably. They refused the sort of food eaten by humans but could smell out raw meat and carrion even when it had been buried, and wolfed it down greedily.

After more than a year Amala, the younger child, became seriously ill, and her anxious foster parents called in a doctor. He was very curious about the child and did not want to treat her without being told all about her. The missionary and his wife swore him to secrecy, but the next morning the whole town knew the story, and then the uproar began - reporters, newsreel cameramen, inquisitive visitors. Innumerable newspaper articles and pictures of the two girls appeared in practically every German newspaper.

Everybody accepted the story and all the papers printed it unquestioningly. The journalists concerned should not be judged too harshly, because in 1942, an American anthropologist at Denver University published Singh's diary, accompanied by a learned

commentary in which he put forward the view that the two children had been reared by wolves. Our ignorance of natural phenomena has not lessened, but increased to a frightening degree during the past few decades. Museums have preserved a mass of fifteenth, sixteenth and seventeenth century broadsheets with tales of girls who lived for years without food, freaks born of unions between animals and human beings, and women who gave birth to puppies, kittens or piglets because they had been frightened by these animals during pregnancy. And even in our own day there are people in Germany who are every bit as superstitious as the negroes of darkest Africa or the Indians inhabiting the remotest areas of the great sub-continent. Cases have come before North German courts, in which evidence has been given of entire villages persecuting old women, believing them to be witches who were causing cattle to abort or making children ill. Exorcisers of witches have been as highly paid as witch doctors in the African bush, who exorcise jujus from tomtoms and meaningless gibberish.

When the Indian missionary saw what a world-wide stir the story of Amala and Kamala was causing, he began writing an account of the affair, going back to the time more than a year earlier when he had first discovered the girls. His version of their development in the first weeks and months after their capture was chronologically confused and full of contradictions. Nevertheless, we have to admire the account, for it tells of the inexhaustible patience and love, especially on the part of the missionary's wife, with which the poor, neglected, half-stupid children were treated.

Little Amala died of nephritis not much more than a year after she had been taken into the orphanage. Kamala died in 1929, at the estimated age of seventeen, without ever having learnt to speak properly. However, after twelve months at the orphanage she had learnt the meaning of a large number of Indian words and phrases, could make herself understood by making various noises, and showed a marked preference for anything red. Gradually she lost her fear of the other children and began to play with dolls. She also learnt to eat human food. She was never able to walk erect on two legs, but Mrs Singh, to whom she became very attached managed to straighten her poor misshapen knees by constant massage and immersion in warm baths, so that the unfortunate girl

could at least stand up. After a time she tolerated clothes, and also began to be afraid of the dark.

According to reports in the German newspapers in 1954, another 'wolf-child', this time a boy called Ramu, was a patient in a New Delhi hospital and could be seen by anyone 'on payment of a small entrance fee'. Like Amala and Kamala, the nine-year-old boy had also been found in the jungle, riddled with disease and covered with wounds and scars. 'Ramu cannot talk, but only cries and snarls. Sometimes he tries to bite the people looking after him. He becomes lively only when he is given raw meat, which he can smell before he sees it. He eats like a wolf, gnawing the meat straight off the bone and swallowing it unchewed. He laps water like a dog. Ramu moves about on his elbows and knees, and his hands are like talons. Later on, he will be put in a cage with a wolf in the Lucknow Zoo in order to find out how he reacts.'

These so-called wolf children are no different from the unfortunate young inmates of our mental institutions. What makes them of interest to the sensation-hungry public is only their early history, the unauthenticated stories about their having been reared by wolves. Zoological experts find these stories extremely difficult to believe because in the vast majority of cases the details are suspiciously alike.

Many animals (especially nocturnal animals), have eyes which 'glow' in the dark, for example, horses, cattle and nocturnal apes. They actually have a special, reflective coating at the back of their eyes, and this throws back any light that falls on it, thus to a certain extent enabling them to use the same light rays twice. Other animal species, most diurnal apes and man (with extremely few exceptions) do not have this anatomical equipment, so their eyes do not glitter in the dark.

A chicken reared with ducks never develops webbed feet or a broad beak, since these physical characteristics are inherited, not imitative. In the same way, it is inconceivable that a human being could develop reflective tissue at the back of his eyes just because he had grown up among wolves.

Instinctive behaviour is inherited and does not change, any more than bodily form. Dogs put their tails between their hind legs when they are disconsolate; the wren sticks its tail straight up for the

same reason, giving an impression of jauntiness, although its real feelings are just the opposite. Dogs wag their tails when they are pleased, but a cat would never do so, even if it had been reared with ten puppies. When a hen drinks, it raises its head after each beakful of water and lets it run down its gullet. Domestic and wild pigeons, on the other hand, immerse their beaks in the water and suck it up. No trainer, however able, could ever teach a hen to drink like a pigeon, or *vice versa*. Instinctive habits cannot be changed.

Dogs, wolves, foxes and many other related animal species drink by lapping up water with their long tongues. Men, horses, cattle, sheep and monkeys put their lips to the surface of the water and drink by drawing it steadily into their mouths. Now, according to all the reports about them, Kamala, Amala and other wolf-children always lapped up water with their tongues, like dogs. Anybody can prove to his own satisfaction that this is a practical impossibility. Our mouths are differently constructed from a wolf's muzzle, and our tongues are far too short for us to be able to lap up water like wolves.

When horses and human beings exert themselves for any length of time, their whole bodies perspire because they have sweat glands in every part of the skins. Dogs do not perspire. They cool themselves by breathing quickly with their mouths open, so that the air is drawn over their tongues. It is no more likely that the sweat glands of a human being reared by wolves will wither away simply because wolves do not have them, than it is that a Greek goat herd will gradually grow horns.

Children in India, especially girls and backward children, are often abandoned by their parents and left out in the open to die. They either starve to death or fall a prey to wild animals. It is improbable, though not impossible, that a child which crawls into a wolf's den when the she-wolf is rearing a litter will not be killed. Many animals do not kill in their own dens or in their immediate neighbourhood, but it is nonsense to assert that a she-wolf will rear a human child. In the first place, she is in milk for only four months and her cubs are weaned at the end of this period. Can a human child change its diet to carrion and raw meat almost overnight and survive? And what would become of such a child when two months

later, the wolf family splits up and merges with different wolf packs which are always fighting among themselves? What would happen in the mating season, when there is a new litter? A human child adopted by anthropoid apes would have a far better chance of survival. Nevertheless, there is no record of any human child being reared by any of the big apes and nobody has ever seriously claimed that such a thing has happened. Tarzan will never be anything more than a make-believe film character.

Not many newspaper stories about wild life seem as patently absurd to reasonable people as the one that appeared in the *Frankfurter Tageszeitung* in June, 1955. According to the paper, a new-born baby's life was saved by a poisonous snake. The baby had been left lying forgotten in the hot midday sun, and would surely have died of heat stroke 'had not a cobra puffed out its cheeks and raised itself over the baby, thus shading it from the heat of the sun'.

Tales of children reared by wolves have been current in North-West India for centuries, because superstitious beliefs about wolves are very strong there, as they used to be in earlier times in Russia and Germany. Germans used to believe in werewolves – people who changed into wolves, or became wolves at night and killed other human beings. All these stories are very similar and have one characteristic in common – there have never been any eye-witnesses when somebody has discovered a so-called wolf-child.

Burton, for instance, narrates that in Oudh and the North-West Provinces, the only regions where stories of children reared by wolves were current, 624 people were said to have been killed by wolves, most of them probably small children who had been left to die by their parents. In Bengal, the Punjab and the Central Provinces respectively, 152, 14 and 32 people were killed by wolves. Children were abandoned and left to die in almost every part of India, where there are a great many wolves, but only in Oudh, where superstition about them was strong, did they rear human babies instead of eating them! In India itself, these stories ceased to be taken seriously a very long time ago. It is time that they were disregarded in Europe and the United States as well.

Rabies: the Dangerous Bat

MANKIND is today possessed by constant fear of war and atom bombs, and we envy our forbears who lived in more peaceful times. However, humanity in those days had to contend with other horrors even more frightful than wars, against which neither wealth nor position were any protection. The first signs of leprosy were enough to turn the richest nobleman into an outcast and a beggar; the plague decimated towns and villages until nobody was left to care for the groaning sick or bury the dead; people bitten by mad dogs contracted rabies and then waited for weeks or months before their inevitable death in excruciating agony, fully conscious to the last.

Up to the end of the last century large areas of Europe went in fear of rabies. In Germany it was mainly wolves which suffered from it. They infected dogs and other domestic animals, as well as human beings. With other diseases, an infected person does not know that he has become infected until the symptoms appear, and these need not necessarily be fatal. As far as rabies is concerned a person may be bitten and then have to wait a month, two months or even longer – before the infection begins to take effect, fully aware the whole time of the agony he will have to endure before death's merciful release, and knowing that he will also endanger other people when the madness comes upon him. In former times, when anyone in the countryside was bitten, or even suspected of having been bitten, by a wild dog, he was immediately killed. If there was an epidemic, all that could be done was to shut the infected people up in cages or manacle them until they eventually died.

This frightful scourge was overcome by a Frenchman who deserves to be more famous as a benefactor of humanity and to have more memorials erected to him than Caesar, Alexander the

Great, Naopoleon, Genghis Khan, Frederick the Great, Gustavus Adolphus and all the other great war heroes and slayers of men. Louis Pasteur was a chemist by training, not a doctor. In the course of his researches into beer and wine fermentation he discovered that it was caused by minute organisms - bacteria. This led him to discover and then identify the microbes which caused many diseases in animals, including chicken cholera and anthrax, and develop the vaccines which gave immunity from them.

Rabies, however, was a different story. He was unable to find any bacteria at all, even with the most powerful microscope. When he tried injecting healthy dogs with the saliva of infected animals, they rarely contracted the disease. Only later was it discovered that not more than thirty to forty per cent of dogs bitten by rabid animals caught rabies. By chance, Pasteur obtained a dog which had had rabies but recovered, something which happens extremely rarely. He put the dog under an anaesthetic and injected saliva from infected dogs directly into its brain. This did not have the slightest effect. The dog was immune. This was an important discovery for Pasteur and his two assistants, all of whom were working feverishly to find an antidote for rabies. So it was possible then, to create immunity to rabies, as Pasteur had already done by vaccination in the case of chicken cholera and anthrax. What he had done then was to culture the anthrax bacteria in an emulsion and let the mixture stand for a week until the bacteria became stale and weak. Or else he had weakened them by adding chemicals. When sheep were injected with these modified cultures, the bacteria did not kill them, but stimulated the production of antibodies which made the animals immune to anthrax. At a big agricultural exhibition attended by thousands of visitors, Pasteur inoculated twenty-four sheep against anthrax and then injected them with the disease. Then he injected another twenty-four uninoculated sheep. Two days later they were dead, while the twenty-four he had inoculated were running about as if nothing had happened. This demonstration stirred all Europe.

But how to modify the rabies virus, which no one had ever seen, even under the most powerful microscope? How could the microbes be cultured? Pasteur tried all sorts of methods, using either the saliva or brain tissue of infected animals. However, when he injected

rabbits with his experimental vaccines, many of them contracted rabies. Those which did not remain unimmunised.

Finally, after years of work, the investigators found a solution to the problem. They extracted the spinal cords of infected rabbits, dried them for differing lengths of time, and then injected dogs with them. The first dog was injected with spinal cord that had been dried for fourteen days, the next with spinal cord which had been dried for thirteen days, and so on. After a series of injections the dogs were found to have been immunised. They could be put together with rabid dogs and be bitten, saliva from infected animals could be injected into their brains, but they remained totally unaffected and greeted their handlers with wagging tails every morning. These experiments were undoubtedly torture for Louis Pasteur. He loved animals and hated inflicting pain. He continually rejected suggestions by his assistants for new experiments because he thought they would cause the experimental animals too much suffering.

Rabies spread its poison through the body very slowly. It travels along the nerves until it reaches the brain, and at that point the disease erupts. The nearer the brain a victim is bitten, the shorter the time before he dies. Bites in the face are the most dangerous of all. It sometimes happens that a person's clothing or body hair will prevent the rabid animal's saliva from entering the wound made by its bite, but a person's face is not protected in any way.

Inoculation cannot help anyone who already has small-pox or yellow fever. The body does not have time to create antibodies to fight the diseases. In the case of rabies, however, inoculation after a bit from an infected animal can still cure the disease. Pasteur hit upon the idea of giving his protracted course of injections to dogs which had been bitten twenty-four hours earlier. It was literally a race between the vaccine and the virus which was spreading towards the animals' brains. Pasteur's assistants could hardly sleep for excitement, as they waited to see whether the injected dogs would indeed succumb to rabies. They did not get the disease, however, and subsequent experiments were equally successful. But the experiments had so far been confined to dogs.

Then one day, a woman came to see Pasteur in Paris with her small son, who had been frightfully bitten by a mad dog. She went down on her knees before the scientist and begged him to try and

save her child's life. Doctors know how dangerous such desperate pleas may prove to be. In the event of failure the same people who have besought them to try absolutely anything may turn on them and make the wildest accusations. Pasteur was well aware that if his insufficiently tried vaccine should prove a failure, it would strengthen his opponents and those who were jealous of him, and might set his work back by several years. Nevertheless, the man in him overcame the cautiousness of the scientist. He injected the child with rabbit spinal cord and saved his life.

Soon he was besieged by desperate people from all over France and the rest of Europe, who had been bitten by infected animals. Twenty fur-capped peasants even came to Paris from Russia for treatment. They had been so badly mauled by a rabid wolf that some of them were unable to walk and had to be carried. The journey had taken them several weeks, and the whole of France waited tensely to see whether Pasteur's vaccine would be successful in saving them. Sixteen of the twenty lived to return to Russia, and the Czar, as a reward, donated a substantial sum of money towards building a big new institute for Pasteur.

Since then rabies has been eradicated from most European countries. In Germany it has been many, many years since anyone has seen an infected dog running about the streets in the grip of a nameless fear. Such dogs usually frequent busy streets and do not lose themselves in the woods or fields. They attack mainly other dogs and animals, usually leaving human beings alone unless cornered. They remain friendly towards their owners for much longer and turn to them for help and refuge. Gradually, however, they become more and more erratic, swallowing stones, bits of wood and straw, and biting fiercely at everything they see, even red-hot iron, breaking their teeth on it. If anybody does anything at all to irritate them they become seized with paroxysms of rage. They develop a wicked squint, become partly paralysed, are no longer able to swallow or drink, and finally go into convulsions at the mere sight of water. Human beings with rabies try to bite other people, and spit at those who are looking after them in an effort to infect them as well. Today, thank God, we have sedative drugs to make them unconscious and deaden the pain. When I was in Africa, I saw the wife of a Syrian die of rabies contracted because

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a dog had licked a scratch on her hand. The saliva of rabid dogs is already infected with the poison of the disease for some days before the symptoms show themselves.

I realise that the things I have described in these pages may well work on the imagination of many people, but I have only written about them because of the increasing reports of cases of rabies in the West German press. Introduced from the East, rabies has again begun to spread, especially among foxes and badgers. As a result of these newspaper reports, veterinary surgeons have been receiving numerous calls from people who have been bitten by dogs, and from police authorities and doctors who are unfamiliar with the symptoms of rabies because it was a long time ago that the disease was eradicated in Germany.

I would like to add one thing. If there is the slightest possibility of rabies, practical steps are taken at once to prevent an outbreak. As soon as a case is confirmed anywhere, the veterinary authorities see to it that every dog within a wide radius is muzzled, as well as being put on a leash. Rabies was eradicated from West Germany scores of years ago. But in the eastern provinces – Silesia, East Prussia, Brandenburg – there had been a steady stream of animals crossing the frontiers, sometimes penetrating as far as Berlin and Saxony. The Dresden district veterinary surgeon came near to being stabbed by a crowd of angry women armed with umbrellas, because, as dog owners they objected to having had to keep their pets in quarantine for a year and a half – certainly no pleasure for their dogs or themselves.

Veterinary institutes can determine whether a dog which has bitten someone is mad or not by minute examination of certain parts of its brain. This takes time however, and it is unwise for an owner to kill his dog immediately he suspects that it may have rabies, because in doing so he might damage its brain so that it cannot be examined. It is much better to shut the dog up securely and observe its behaviour. This will indicate much more quickly than examination of its brain whether or not it is indeed rabid.

Today there is no longer any need to take people to specific hospitals for inoculation against rabies, nor is a long course of injections necessary. Dogs, as well as human beings, can be inocu-

lated against rabies and immunised, and in many countries this has been routine for a considerable time now and has been very successful. It has made possible the abolition of the necessity to keep dogs off the streets and affords better protection against the spread of the disease.

Professor Dr Haupt, of the Giessen Institute of Veterinary Hygiene, once told me how he was once sent to the well-known German colony of Blumenau in Brazil many years ago to investigate a mysterious epidemic that had broken out among the settlers' cattle there. It did not take the veterinarians long to discover that not only the cattle but sheep and horses as well, had become infected with rabies. Their symptoms were the same as in humans and dogs, although in many cases they were not so prone to bite. In any case, their blunt, short teeth usually only nipped the flesh and did not make very deep wounds, so that even when they did bite it was often not infectious. As soon as the disease had been identified as rabies, orders went out to kill all dogs. Groups of men went from settlement to settlement shooting every dog in sight or feeding them with poisoned bait. A few children also got hold of the bait and ate it, dying of poison as a result. In the end, the settlers became so angry that they started shooting at the dog-killers. The disease was not being spread by dogs at all, they said, because there had not been a single case of rabies in any of their dogs. The only animals to have contracted rabies were their farm animals.

When Professor Hapt arrived he started trying to find out what was transmitting the disease. There were other reasons why it could not be dogs. In Blumenau the settlements all lay in the fertile valley of the Itayahiassu River and its tributaries. The settlers had cleared long strips of jungle along the river banks and built their homes and farms there, between the edge of the thick jungle and the river. It appeared that rabies had broken out simultaneously in two parallel valleys separated from each other by densely forested, almost impassable mountain ranges. No dog would have attempted to traverse country like that or swim the broad swift-flowing river. Nevertheless, the disease continued to spread on both banks. Since wild animals had been almost entirely wiped out in Blumenau, the carrier of the diseases could only be an airborne creature.

People are generally unaware of the important part played by

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bats in the life of this planet of ours. There are about 6,000 species of mammals, from the mouse to the elephant and the ape to the whale. A thousand of these species are bats. In other words, every sixth mammal species is a bat species. Most bats live on insects, fruit or the nectar of flowers, but the diet of some South American species is blood – both human and animal. To obtain it, they land lightly on the bodies of sleeping humans or animals, making long shallow incisions in their victims' skin with their razor-sharp teeth, and then suck the blood welling out of the wounds until they become completely bloated and as round as footballs. In the case of cattle, horses and sheep these bats attack the neck. In human beings they go for the thin skin under the toes, and their victims often wake up to find their feet in pools of blood. Dr Haupt discovered that it was these vampire bats which were infecting the Blumenau cattle with rabies. In recent years there have also been rabies epidemics among the inhabitants or certain South American islands where there has never been so much as one rabid dog.

It is extremely difficult to combat these airborne disease carriers. Many German bat species, for example, make long flights in the summertime, migrating from Dresden to places as far away as Lithuania.

CHAPTER 15

Our Dogs

THE Watussi tribe in Central Africa occasionally draw off some of their cattle's blood and use it to make black pudding, though they eat beef as infrequently as goat meat, mutton or chicken. They even turn away from eggs in disgust because 'they are a kind of excrement'. On one occasion a traveller in Africa was killed by some horrified natives because he unthinkingly ate some eggs in their presence. Ignorance of strange customs and languages can sometimes be fatal – and this is especially true where animals are concerned.

Nearly every German newspaper carried reports of a distressing incident that happened one day in Schnelsen, near Hamburg. While a family had been indoors drinking coffee, their terrier Seppel had jumped into the pram in the garden and killed their six-week-old daughter. The child's grandmother had gone out to see if everything was all right, and had found the baby badly injured. The dog, which was normally a friendly animal, was still in the pram. In a similar incident, some people had given a small dog a great deal of alcohol. It jumped into the three-week-old baby's cot and bit him so badly in the head that his brain was injured. The child survived, but will probably bear the marks of the dog's attack for the rest of his life.

That same year a sheep-dog called Axel had the whole of Frankfurt in an uproar. The dog had torn the clothes off the dead body of a woman in a street in Eckenheim, and had also inflicted terrible wounds on her legs. The animal would not let anyone near the body, and eventually the police had had to shoot it. The dog had belonged to a man who had been the dead woman's sub-tenant for seven years. He had always kept it chained up during the day, and although on the savage side, it had been very attached to every member of the family, as well as to the dead woman, and often

used to whine until someone came over and stroked it. The dead woman, who was very fat and also suffered from heart trouble, had felt sorry for the dog, and this occasion as on many previous ones, she had taken it for a walk.

It was at first assumed, as it often is in such cases, that the dog had been suffering from rabies, but closer examination showed that this was not so. An animal does not get rabies out of the blue; it can only become infected if there has already been an outbreak in the neighbourhood. Furthermore, a dog with rabies behaves so strangely that its owner would certainly notice that something was wrong, even if no one else did. In the case of Axel people assumed that the woman had had a heart attack and that the faithful dog, in its efforts to help her, must first have torn off her clothes and then bitten her in its frenzy. They felt sorry for the dog, which had had its loyalty rewarded by a bullet through the heart. A post-mortem revealed, however, that the woman had still been alive, although almost unconscious, when the dog savaged her. It will never be known whether the dog's behaviour caused her heart attack, or *vice versa*.

I have given a great deal of thought to this incident, and in the course of my researches have come across several similar instances. I remember, for example, a story I heard when I was a young boy, about a man who woke up during the night to find his Great Dane, with its teeth bared, standing over him at his bedside. He managed to move his hand gradually towards the revolver on his bedside table without the animal noticing, and then shot it dead. In August, 1954 a Dobermann attacked its owner when she fell down, and injured her so badly that she had to be taken to hospital. Some years ago, two Boxers which had been chained up by their owner before he went away, killed a woman who had come to feed them. Two other Boxers, a dog and a bitch, killed a dog breeder when he tried to put them into their cage. Professor Günther has described how two Great Danes killed their owner on the beach at Riga seventy years ago. He had stripped for a swim, and as he made his way down to the water he had cut his foot on something.

In the case of the little terrier, Seppel, which had killed a baby in its pram, my researches led me to a startling conclusion. Most

of the newspapers had assumed that the dog, which had not been at all vicious, had become jealous of the baby. The assumption was that before the child was born, everybody had spoilt the dog, but that afterwards it had been ignored. In reality, however, the parents had bought the pram before the birth of the baby and had been in the habit of letting the dog sleep in it. The animal therefore regarded the pram as its own property. At the first opportunity, when the family were having coffee and paying no attention, the dog tried to regain possession of its former sleeping quarters. It leapt on to the pram, found a stranger lying there, and tried to push it out with its paws. It would have done the same thing if it had found a stone or some other strange object in the pram. Actually, the baby had not been bitten, but scratched by the animal's claws. Seppel's owners had shown no more understanding of their dog's behaviour than had the Africans of the man they killed for eating eggs.

A friend of mine who is today a busy veterinary surgeon in Berlin, carried out some experiments when he was writing a thesis for his doctorate, which must have astonished the people who took part in them. In order to test dogs' powers of recognition, my friend enlisted the help of some police dog-handlers and their dogs. The men stripped naked and sat on the ground with their heads averted. When their dogs were brought over to them, very few were able to recognise their handlers. They only knew them by the scent of their clothes, not of their bodies. Only the dogs which had worked with their handlers for a long time and lived closely with them were able to recognise their own handlers. When the handlers exchanged clothes with each other, most of the dogs went to the wrong men, following the scent of their clothes.

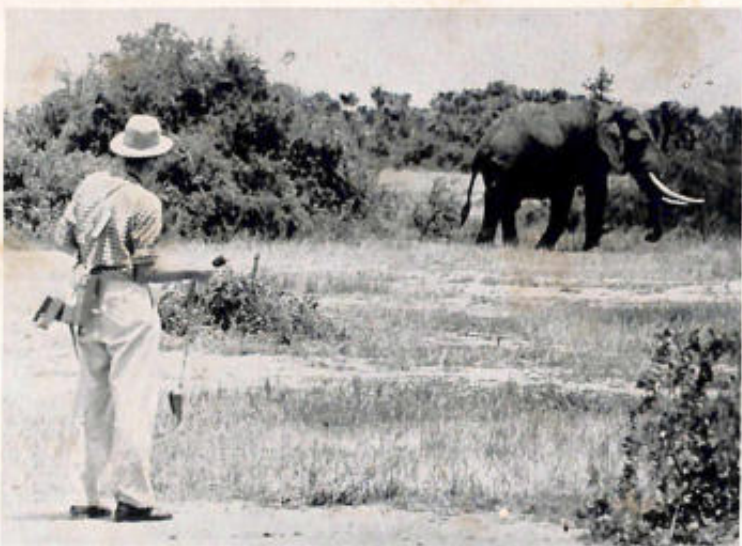
Dogs cannot see well. Most of them cannot recognise their master's face from more than thirty yards away, and they rely on their sense of smell. To a dog's highly sensitive nose, a man's clothes, which retain the smell of his body, of tobacco smoke, of food and of dust, smell totally different from his skin. Axel, the sheep-dog, which the friendly fat woman used to take for a walk now and again, only saw her – or rather smelt her – occasionally. When she had a heart attack, the dog must have tried to pull her to her feet by tugging at her clothes with his teeth. Since she was a



NOVAYA, THE FEMALE POLAR BEAR CUB, JUST THREE MONTHS OLD. SHE WAS REARED ON THE BOTTLE IN THE FRANKFURT ZOO



HIPPOTAMUSES ARE PEACEFUL ANIMALS. THEY TAKE NO NOTICE OF THE CORMORANTS AND PELICANS ALL ROUND THEM



MY SON MICHAEL RECORDS WILD ELEPHANT NOISES ON TAPE

heavy woman, the only effect the dog's efforts had was to tear her clothes off. The immediate result was that the dog suddenly caught the scent of her body, which was totally unfamiliar and turned the unfortunate woman from someone the animal knew into a complete stranger. A similar thing must have happened with the man and his Great Dane on the beach at Riga.

I once spent several months finding out to what extent horses are right- or left-footed. One of the experiments I performed was to stand a mare in a narrow stall and then place a bowl of oats just beyond her reach. In a situation of this kind, a horse behaves much as a human being in similar circumstances – it becomes vexed and impatient. It wants to reach the fragrant oats and begins to paw the ground with its forefoot. This does not bring the oats any nearer, of course, but the horse has to give vent to its vexation somehow, and since it cannot do anything effective to change the situation, diverts its feelings into an entirely different channel. Thus, its instinctive reactions are unrelated to their cause. Animal psychologists are well acquainted with this type of behaviour and can cite numerous examples of it. A roebuck which wants to attack another buck but is frightened to do so, will suddenly start tearing up blades of grass and chewing them, although it does not swallow them. Cocks in a similar situation peck up crumbs of earth haphazardly, while other birds clean their plumage or temporarily adopt a sleeping posture. People who thoughtlessly judge animal behaviour in human terms will say that the roebuck wants to show its contempt for its adversary by continuing to feed on the actual battlefield. But the roebuck's rage is not translated into aggressive action because it is held in check by fear. Its aggressiveness is diverted into another channel, and an entirely different pattern of instinctive behaviour manifests itself. A small finch which has just managed to escape from a bird of prey by flying into a bush, immediately begins to sing. Human beings scratch behind their ears or blow their noses when embarrassed, which means that the urge to do something about a situation expresses itself in an instinctive preoccupation with bodily needs. It is possible that when Axel's efforts to help the woman taking him for a walk were ineffective, his agitation suddenly changed into aggressive behaviour quite

inappropriate to the circumstances. An autopsy revealed portions of the woman's flesh in the dog's stomach.

Dogs are descended from wolves. Wolf packs do not live in amity or on equal terms. The pack leader tyrannises the whole pack and there is a definite hierarchy from the leader downwards. It is the same with chickens, as was first discovered more than forty years ago. Every chicken knows which members of its flock are allowed to peck it and which it may itself peck. This strict order of precedence is evident on every poultry farm, and one could make a complete list of who is who in the chicken hierarchy if one wanted to. The situation has gradually been found to be the same in almost every species of animals living in groups. I myself discovered that even horses have their own system of seniority. A young lion always wants to move up in the hierarchy of the pride, gradually gaining higher and higher ranking until it eventually becomes leader. The bigger and stronger it becomes, the more often it picks fights with lions next above, biding its time until they are sick, wounded or feeling low. Man himself has the same instinct as all other mammals, even if it is unconscious, and it manifests itself when people live together in groups for any length of time. Every school class knows within six weeks of the beginning of term which boy is the 'boss', which the second, and so on.

To a dog, the family it lives with is its pack, and it endows people with canine qualities in the same way as we tend to see human qualities in dogs. If a dog is small and submissive, it will always assume the lowest rank in its 'pack' and never rebel.

Self-confident dogs with strong characters, especially if they are big as well, are quite different. They have the urge to move up in the hierarchy of the pack and become its leader, if they can. They are always rebellious, and submit only when one proves to them that one is stronger than they. I have known dogs which have growled viciously whenever anyone approached a sofa on which they were sprawled, and a dachshund which bit through a person's shoe when he inadvertently touched the dog with his foot under the table.

I often receive letters from disappointed dog owners. The dog obeys a woman and not her husband; it bites him. The wife immediately gives it a thrashing, but to no effect. The dog becomes even

more aggressive towards her husband. Of course it does, because it is the husband who should thrash the dog, which would then be in no doubt about the order of precedence within the pack. The dog cannot be expected to understand that behaviour which appears natural to him is a crime by human standards.

The dogs involved in the attacks described earlier in this chapter, as well as in other cases I have heard of, had always been kept chained up or caged – at least, this was so in every instance where details of how the dogs were kept were available. A dog which lives with a family, perhaps sleeps in their bedroom, sits under the table during meals and is taken for a run in the evening, comes to know the members of the family down to the last detail. It will recognise them whether they are in the bath, put on a different overcoat, take to using lavender water, wash with different soap, or appear in a new outfit.

On the other hand, a caged dog may only see its master for short periods during the day, for a few minutes, perhaps, or an hour, when he will usually be wearing the same clothes. It will never get to know the other people living in the house very well. As a consequence it has no idea of where it stands in the hierarchy in relation to them. A house dog which does not accept that it is the lowest member of the group is got rid of as dangerous and liable to bite, but a dog which is kept on a chain does not realise that it has no seniority in the 'pack'. It is burning to fight the matter out with everyone, but does not get the opportunity. How many opportunities to let off steam does a sheepdog in a small cage have? No wonder it throws itself against the wire netting and barks furiously at anyone who approaches. This excitement builds up in the animal for days and weeks, and can easily turn into the urge to attack somebody when an opportunity presents itself.

Have you ever seen a dead dog lying on the pavement after a dog-fight? When amorous tom-cats squabble over a she-cat on a roof somewhere, none of them is actually killed. A raven cannot actually peck out the eye of another raven it may have set out to attack. If a dog feels that it is losing a fight it adopts a passive attitude, leaving its throat unprotected or rolling on to its back so that its opponent can bite it in the chest or abdomen. The moment the losing dog does this, its opponent's rage dies down and it cannot

bring itself to take advantage of the opportunity it has been offered. Animals do not kill their own kind. Lions do not kill other lions. It is only men who kill their fellows. Animals merely fight in a sporting manner to see which is stronger.

A dog looks on human beings as fellow dogs and members of the same 'pack', but we do not learn to speak the dog's language, as it were, and do not understand its inborn behaviour and habits. A man attacked by an enraged dog does not know that he can stem its fury by adopting an attitude of surrender. He will fight to the last, enraging the dog still further. We still cannot trust canine customs and behaviour.

Many animal lovers will ask how anyone can dare to have a dog in the house after all the hair-raising incidents described here. All the same, there are 30,000 dogs in Stuttgart alone, and the number of licences issued in the whole of West Germany runs into several million. How few 'violent criminals' there are among them, compared with the number of inmates of our prisons and mental institutions! No, human being's worst enemies are other human beings and what they have created – motor-cars – which cause more bloodshed every hour than all the dogs, lions, tigers and wolves put together have caused in several decades. The more we like dogs, the more we treat them as friends, the more they can be trusted.

CHAPTER 16

The Zebu

ONE day, our zoo's big bull zebu, or humped ox was out of sorts. Even coarse-ground corn and turnips, the best fodder, did not tempt him. He chewed half-heartedly and stood there with bowed back and outstretched head. The zoo's veterinary surgeon, Dr Klöppel, diagnosed foreign bodies in its stomach. The zebu's predecessor had died from inflammation of the pericardium, caused by a piece of wire in its reticulum (its second stomach) which had pierced its diaphragm. This is a not infrequent occurrence among cattle. In Switzerland twelve per cent die from it, and the farmers receive compensation under their insurance policies. In the old, undivided Germany, some 40,000 head of cattle a year died from swallowing foreign bodies, causing losses running into many millions of marks.

It so happens that cattle have hard, insensitive tongues. The papillae on the mucous membrane inside their cheeks are inclined backwards, and this, together with their unyielding tongues, make it extremely difficult for them to spit out any object they may have picked up in their mouths by mistake. Sand, stones, pieces of wire, nails, even bits of umbrella frame are swallowed together with their fodder and find their way into the animals' stomachs. Even a raw egg with its shell unbroken has even been found in a cow's stomach. Veterinary surgeons know that they are particularly liable to be called out on such cases, which usually prove fatal, when cattle are kept in the neighbourhood of big cities, where there is a great deal of metal lying about. This finds its way into greenstuff and hay. Cow girls lose hair clips, workers building a fence drop bits of wire and nails, and so on.

Horses, which have much more sensitive lips and tongues, hardly ever swallow such things. When human beings swallow strange

objects, they are found in the stomach, the duodenum, or elsewhere in the digestive system, but in cattle they almost invariably end up in one particular spot—the reticulum. As is generally known, ruminants, in addition to their actual stomach, the ‘rennet sack’, which dissolves the food and digests it like the human stomach, have three big sacs in which the fodder is merely macerated.

In front is the reticulum, to which is joined at the rear the paunch or first stomach, which can hold fodder by the hundredweight. More or less in between them is the psalterium, or third stomach.

The reticulum, usually of considerable size, contracts periodically until it is no bigger than a child’s head or even a man’s fist, and forces its contents back into the paunch. The paunch in turn pushes it into the reticulum again. In this way the fodder is thoroughly mixed.

When cattle want to chew the cud, they draw air into their lungs, setting up an area of low pressure in the chest. Simultaneously with this the rear end of the gullet opens and expands, sucking in a quantity of fodder, which has by that time been reduced to the consistency of a thin liquid. Then the gullet closes where it joins the stomach and the food is regurgitated into the mouth, there to be chewed again some forty to sixty times.

All ruminants chew the cud for five to seven hours a day, and because of this they eat much more quickly at the beginning. A cow chews each mouthful only fifteen to thirty times and swallows it within fifteen to twenty-five seconds, whereas a horse chews its food thirty to fifty times, taking half to three-quarters of a minute before swallowing it.

This could also be why so many things which have no business to be there often get into the stomachs of cattle. If such things are made of iron they usually remain in the reticulum, which is lined with folds of mucous membrane like a honeycomb or the mesh of a net. When the reticulum contracts and empties itself the foreign bodies are forced against the honeycombs, pierce them and are pushed through into the diaphragm. If they do not embed themselves there, they travel as far as the pericardium itself. Animals with an internal injury of this kind suffer great pain. They moan with agony and hardly dare eat or drink.

We did not want to lose our bull zebu. We had only had him for

two months and his three cows were not yet pregnant. If domestic cows swallow strange objects, they are operated on by skilled veterinary surgeons, and between eighty and ninety per cent of the operations performed in the early stages are successful. It must not be forgotten, however, that cows on farms are used to being tied up and having instructions shouted at them and being touched by human beings. Our zebu was a very powerful animal and had never been tied up in his life. We held out some fresh carrots to him through the bars, and as he reached for them with his tongue we got a rope round his horns. Then we brought up more ropes and some planks of wood and shoved and heaved him into a corner of his enclosure. He could not be put under a full anaesthetic because he would have to be operated on standing up, so that his intestines would not be displaced. The foreign body was seated deep inside his thoracic cavity close to the heart, and the most direct way of getting at it would have been by cutting through his ribs. However, veterinary surgeons have devised a means of avoiding this and have developed an operating technique which involves making an incision right through the epigastrium (that part of the abdomen immediately over the stomach) on the flank behind the lowest rib and into the paunch. The veterinary surgeon then puts his hand right inside, and through into the reticulum, where his fingers can feel the heart beating through its thin walls.

Our zebu was injected with an anaesthetic, and half an hour later, when it had taken full effect, Dr Klöppel made a long incision in the animal's hide, laying bare the abdominal muscles. He cut through these until the peritoneum was visible. When he cut it open, the gas-filled paunch bellied out through the opening like a huge balloon. Every time the animal moved, the ballooning paunch, the size of a child's head, had to be held in with both hands. Cutting open the paunch is the critical part of the operation. It is smooth and slippery and very difficult to hold in position opposite the incision in the hide. If it were to slip, its contents – dirty and with a very high bacteria content – would gush straight into the abdominal cavity, causing peritonitis and death. More than thirty years ago, however, a veterinary surgeon called Götze perfected a method of preventing this, and today all veterinary surgeons use it.

Before he opens up the paunch, the veterinary surgeon sews the

edges of the incision he has made in the peritoneum securely to it. This leaves a circular patch of paunch showing through, and he makes his next cut in the centre of this patch. The sutures all round the edges prevent the mush in the paunch from entering the abdominal cavity.

When he had cut open our zebu's paunch, our veterinary surgeon began to take out large quantities of mush with his hands so that he would be able to move his arm about inside. Having previously introduced a rubber sleeve into the opening to protect the edges of the incision from becoming dirty, he put his bare, sterilised arm right inside the animal. He stood on tiptoe and we pushed against his shoulders so that he could penetrate as deeply as possible. In cases where the veterinary surgeon's arm is too short to reach or the animal is too big, he often has to cut away part of the bottom rib. In this instance, however, Dr Klöppel's arm was long enough to enable him to feel about in the reticulum with his fingers, and he brought out bits of wire, coins, stones and nails in rapid succession. Four or five of them had already become deeply embedded in the walls of the reticulum and in the diaphragm and had caused festering and inflammation.

The operation was performed in the open in four degrees of frost, because we had been unable to move the struggling animal under cover, and since Dr Klöppel had had to operate very nearly stripped to the waist it was almost worse for him than for his patient. We had had to massage him briskly at intervals during the proceedings, and as soon as he had finished we hurriedly brought him some brandy.

When all the deadly, pointed objects had been removed, the paunch was pushed back inside and cleanly sutured with strong silk thread. Then came the turn of the peritoneum, then the abdominal muscles and finally the hide.

Human beings who have had a stomach operation are immediately confined to bed, and care is taken to ensure that they do not move about or talk too much, but a zebu does not have a great deal of understanding for such reasonable precautions. We slackened off the ropes, carefully climbed back over the railings out of range, and then removed the rope from round his horns. Naturally, the first thing the patient did was to gallop madly round the enclosure,

overjoyed at having been untied. We looked anxiously to see if the stitches had held, and saw that they had, thank goodness. The effect of the local anaesthetic would wear off after a few hours, and when the zebu began to feel a certain amount of pain he would quieten down. So, you see, even pain is necessary and natural.

During the following few days we had to rope the bull, which became steadily more mistrustful of us, in order to administer penicillin injections. These were necessary to heal the inflammation and festering caused by the foreign bodies removed during the operation, which could otherwise have caused a fatal relapse. The zebu had to be put on a diet for a few days. At feeding times, he was given no more than a quarter of a bucketful of water in which bran had been steeped, and some soft fodder. Only ten days later he mated with a cow, and since then has sired many calves.

Even though zebras are regarded as holy in India, you may say, they must nevertheless be stupid animals to swallow nails and bits of wire. But we human beings are not much more intelligent. Foreign bodies removed from human stomachs are not a rare phenomenon in clinics. Housewives often hold darning needles in their mouths and swallow them when something startles them; children are constantly putting things in their mouths and swallowing them; artisans often hold nails in their teeth; and prisoners often swallow things, either because they have no better method of committing suicide, or because they want to relieve the monotony of existence in their cells by a spell in hospital, where life is more interesting. One prisoner in France even managed to escape from hospital, where supervision was not so strict. It has also happened that elderly men have forgotten to take out their dentures at night, have swallowed them and had them stick in their gullets. The operation to remove them may have been performed too late and they have died as a result.

During the decade that followed the end of the War, Frankfurt University's surgical clinic has had forty-six cases of people who have swallowed extraneous objects. A good half of these passed through the body naturally, because the patients were given plenty of mashed potatoes and flour to eat. It is possible to trace the course of a swallowed object through the body by means of x-rays,

and an operation only becomes necessary if the situation begins to look dangerous. Even though veterinary institutes are equipped with the biggest x-ray apparatus that exists, they can still only penetrate the head and limbs of horses and cattle, not their thick bodies.

Coins and round objects which have been swallowed almost always pass through the body in four to eight days, but such things as nails, bits of wire, needles, nail files, brooches, spoons or knives usually get caught up somewhere, as a rule in the narrow, twisting, practically motionless duodenum. In hernias too, where the coils of the intestine protrude, the foreign body often does not move on. Then it causes injuries to the intestinal wall, eruption into the abdominal cavity, fatal inflammations and festering. If an operation is performed within the first eight hours, prospects are favourable, but they grow steadily less so with each hour that passes. In a Frankfurt clinic a convict was operated on twelve times to remove objects he had swallowed. Another man made his living by swallowing nails and similar objects at fairs. He had already had six operations, and when he was operated on the seventh time, thirteen nails were found inside him. People also swallow things for silly, drunken wagers.

It is fortunate that we live in an age when superstition is confined to astrology, clairvoyance, the secret influences of invisible rays and similar matters. A hundred and sixty years ago, the situation would have looked very bad if nails had been found in the stomach of a cow or a young man. The last thing people would have thought of would have been that they had been swallowed. In the eighteenth century the hysterical daughter of a Glarn doctor called Tschudi, swallowed pins, nails and stones and then vomited them up. The maid was accused of having introduced them into the girl's body by witchcraft. After being submitted to interrogation under torture she was publicly beheaded in 1782—six years after Goethe had written *Werther*! There are masses of published accounts of similar instances. They give complicated descriptions of how extraneous objects were supposed to have been introduced into people's bodies. A 'wicked enemy' opened up a person's body at night, inserted the objects and then healed the wound by artificial means. Others asserted that it was done through 'open pores'. 'There are also people who believed that a magician could reduce any object to

powder, introduce it into a person's body and then reconstitute it. Satan can do whatever he likes, because his tricks and artifices remain totally unrevealed to us.'

Thus, a story was told of an eighteen-year-old girl 'who was making her way home late at night when a man dressed in black (Satan himself, of course) came up behind her and seized her by the hair. He pulled her head back and pinched her nostrils shut. When she opened her mouth to scream he forced something into it. Eight days later she was seized by agonizing pains and vomited up needles, nails, tufts of hair, eggshells, knives and similar objects.' Today, we know from dozens of other cases, that the girl had in fact swallowed all these things herself and then invented the story about the devil.

Just how much can be accomplished in the way of swallowing things was demonstrated some twenty-five years ago by a man in a sideshow at a fair. He called himself 'the living aquarium' and used to swallow half a bucketful of water full of goldfish and frogs, then bring it all up a little later, with the fish and frogs still alive. Other people have swallowed mice and brought them up again still alive. So, compared with human beings, our bull zebu is not so very stupid after all.

CHAPTER 17

The Bear

BEARS, especially black bears, are still plentiful in North America. Among the exhibits at the 1948 hunting and game exhibition in the United States were the skull and pelt of a gigantic Alaskan bear that had been shot at Cold Bay that year. The skull was 19½ ins long, and the skin 11 ft and the animal weighed 16 cwts.

In the north-east United States and in Canada bears are not protected animals. When I was in the Yellowstone National Park, on the other hand, I was able to take photographs of bears feeding out of the visitors' hands. Though bears searching for titbits have often torn the upholstery to pieces in unattended cars, they have completely lost all their wild characteristics through being indiscriminately fed by the public.

As recently as September, 1961, some bears were seen in the streets of a city in Minnesota, probably driven there by hunger through a shortage of fungi, berries and other wild food because of a drought. At first nobody took much notice, but when the bears began to appear in packs, thirty-five and forty strong, people came from far and wide to shoot them. The hunting association reacted very slowly and without much success. Finally, they set up a big feeding area outside the city, to which the bears withdrew and where a constant watch could be kept on them. Despite this, at least five hundred bears were shot in the course of three months. In another district, on a farm where the animals were fed on horse-meat and fish, the bears had hung around all day and all night, so that an armed guard had to be posted to keep them off until a hunt could be organised. Eventually, sixty-two bears of all sizes were stored in the refrigeration chambers of a nearby farm.

Bears in Europe are by no means restricted to Russia. Seven hours' drive south from Munich brings one to the Brenta and

THE BEAR

Presanella Alps, where there are eighty to a hundred wild bears in the valleys round the Ortler and Adamello. Between 1855 and 1933, a hundred and ninety bears were reported to have been killed, apart from those shot by poachers and over-anxious shepherds. Today the bears are fully protected. In the North Tyrol, bears unfortunately became extinct in the last century. The last one in the Stubai Valley died in 1835, the last on the Welterstein in 1864 and in Switzerland in 1904. On the French side of the Pyrenees round about forty bears were counted in 1952, and although in September, 1956, hunting was freely permitted, fortunately none of the poor animals were shot. In the forests of the Sierra de Grados and in Asturia in Spain, not very far to the west of Madrid, there are thirty-five to forty-five bear families numbering about a hundred and forty animals in all.

The last time a bear was shot in Germany was in 1943, when some forest workers came to the forestry commission's offices in Gardinen, near Mühlhausen and complained that a brown bear had chased them away from their camp site, eaten their breakfast and followed them to the edge of the forest. This same bear had flattened crops on a railway allotment and stolen honey from the beehives. Even when all the dogs were set loose, the bear remained undeterred, so a big hunt was organised and the bear was finally shot and killed. A few weeks later, another one was shot in the same neighbourhood.

Everybody was extremely puzzled as to where these bears had come from. None was missing from the Königsberg Zoo, there had been no circuses in the area, and bears had long been extinct in the neighbouring Baltic countries. Probably they had come from the famous Bialowieza Forest in Poland, south-east of Bialystok, about a hundred and ninety miles away. At one time there were no bears in the forest (where the last European bison had long survived) the last one having been killed in 1870. However, in 1937 some Polish game wardens released some in the area. Once again events showed that it is not so easy to re-populate a region with its native animals once they have been wiped out. The forestry commission later obtained some bear cubs from the Posnan Zoo and from some Russian zoos and set them free in the forest. However, their life in captivity had made them so used to people that they always found

their way to inhabited areas. One was killed by a peasant and the others had to be returned to the zoos.

The forestry commission then tried a different method. They put a she-bear, which was in cub, into a cage in the thickest part of the forest. The bear gave birth to a litter of four cubs, which found no difficulty in getting in and out of the cage, because the bars had deliberately been set very wide apart. Nobody was allowed near the cage except to feed the bears, so the cubs did not become accustomed to human beings, grew up completely wild and finally left the mother bear altogether. The German occupation during the War did not disturb this little bear colony, and by the time the Germans withdrew in 1943 there were five bears in the forest.

When one of the last bears was shot in Livonia in the last century the man who had staged the hunt, a certain Count D., posted beaters and guards, but did not carry a gun himself because he wanted his guests to have all the shooting. As soon as the hunting horn sounded, the hounds drove the bear towards the very spot where the Count was quietly waiting for his guests, with only his walking stick to protect him. Suddenly, the bear rushed straight at the Count. All he could do was throw his stick at its head, but as he did so he tripped and fell, almost at the feet of the bear, which kept the hounds at bay by lashing out with its paws and growling. One of the guards saw what had happened and took a shot at the bear from some distance away, but missed. Finally someone shot the bear in the head at short range with a pistol. The Count was lying on the ground with the dead bear half covering him. His companions helped him to his feet and asked whether the bear had injured him. 'No,' he said dryly, 'the bear hasn't, but someone has put a bullet through my thigh'.

Zoologists are continually having to warn people that bears in zoos are not the good-humoured blusterers they are made out to be in Grimm's fairy tales and the fable of Reynard the Fox. They are at least as dangerous as lions or tigers. At the Frankfurt Zoo, my wife once came on the scene just as a mother was lifting her three-year-old child over the barrier to feed our stud bear, Marasch, through the bars. Marasch stood over six foot. My wife was alarmed and told the woman what a risk she was taking. Her impudent answer was simply: 'It's none of your business. It's my child.'

A year later, an eight-year-old boy climbed over the barrier at the same place and carefully put his hand through the bars to stroke the bear. His arm was so badly mutilated that it had to be amputated.

It is not difficult to imagine what a shock it was for a certain circus manager called Kludsky to discover on one occasion that all his trained bears had broken out of their cages at Olmutz in Czechoslovakia. He was sitting comfortably in his caravan, eating his supper, when the door opened and two of his brown bears walked in. Kludsky worked with these animals every day, so he managed to catch them quickly, but worse news was in store. A man ran up to him and told him that the other bears had invaded the Crown Hotel in the market place and had eaten two women cooks. However, things were not quite so bad as that, although the kitchen was completely wrecked. The two bears, called Max and Moritz, were on the rampage in the cellars opposite, opening bottles of champagne and pouring them down their throats. This sounds a little far-fetched, but in fact bears can learn to drink from a bottle very easily. Bear trainers usually give their bears bottles of sugar-water because the audience love to see a bear stand up on its hind-legs, hold a bottle between its forepaws and take a swig from it. Max and Moritz, having done this every night in the circus ring, knew what to do with full bottles. It was not very difficult for them to tear off the wire and uncork the champagne with their teeth.

They were very drunk by the time Kludsky got there, and as soon as they saw him, they did what they were used to doing in the ring every night after drinking their sugar water – fell flat on their backs like a man who has had several over the eight. Kludsky put his arms round their necks and led them back to the circus.

It is very easy to teach bears this trick with bottles, because even when they are still cubs they love to suck things. When you play with them they always suck at your finger or part of your clothing. We once had a 'bear christening' in the zoo, and when an important personage took the cute little teddy bear on his arm while he was making a speech, it sucked hard at his ears and then at his nose. As might have been expected, the press photographers got through a lot of flash-bulbs.

There are still bears in the Carpathians today. Hunters drag dead

horses into the forest as bait, and when the bears approach, shoot them from their tree-top hideouts. Count Hoenbroech tells a story about a powerful bear locked in combat with a wild boar that also had a fancy for horseflesh. The bear dealt its opponent a series of smashing blows on the head and back with its paws, each blow powerful enough to kill a calf. But after an hour's fighting it was the bear that withdrew, badly wounded in the chest and abdomen by the boar's powerful tusks. On another occasion, a bear climbed on to the roof of a hunting stand, so the huntsman could not shoot it. This was an unpleasant situation, particularly as this same bear had earlier been seen playfully ripping heavy timber from a packing case to which it had been fastened with long nails in order to keep wolves, foxes and wild cats away from the horsemeat inside.

Bears are not very bloodthirsty animals. On the Kamchatka Peninsula, which has a large bear population, they live for weeks on willow catkins, for as long, in fact, as there is snow on the ground. As soon as the salmon start moving up the rivers, however, the bears wade into the water and catch them with their teeth or claws. It is not uncommon to see a bear sitting in a river with only its head showing above water. They sometimes become so sated that they eat only the head and some of the guts of the salmon. They will also seize dwarf pine cones in their mouths and skilfully extract the seeds with their teeth and tongues, spitting the husks out of the side of their mouths.

Bears, big though they are, can move with incredible speed. A sparrow that flew into the bear-pit at the Berne Zoo was once caught by a bear. On another occasion a bear cornered a rat, but had to let it go when it got bitten on the lip. A cat, and even a cow, which had jumped into the Berne bear-pit managed to defend themselves successfully against the bears, although any human beings who ventured inside were almost always killed.

Pictures showing gypsies with performing bears still exist. Old Hagenbeck, the famous zoo proprietor, used to relate with horror the story of how his father sold two bears to some gypsies. They were old animals, but by no means tame. The gypsies gave them nothing to drink for a whole day and then fed them with some salted herrings. After this they put large bowls of highly sweetened spirits of wine in front of them. The thirsty bears drank deeply,



THE BULL ZEBU ON WHOM OUR VET HAD TO OPERATE



A SERVAL WATCHING A FILM. IT IS ON THE POINT OF POUNCING
AT THE SCREEN TO TRY AND CATCH THE FLAMINGOES

became drunk and finally lost consciousness. The gypsies then pulled out their teeth and claws with pliers and put an iron ring through the division between their nostrils. When the bears came to, they were in such pain that they made no attempt to attack their cruel owners. It is a good thing that dancing bears were banned in Germany long ago.

In 1945, after the War, foreign workers caused a great deal of damage and loss at the big Nuremberg Zoo, which is situated in beautiful country outside the city. They shot the rarest animals, roasted them on spits over open fires and then sold the flesh by the pound on the black market. Using food as bait, they lured bears to the barrier at the edge of the bear-pit, dropped nooses over their heads, then drew the ropes tight and strangled them. Many of these ruffians got their deserts, however. They contracted trichinosis, a parasitic disease that attacks the intestines, and died in agonising pain.

In Germany all pig-meat is inspected under veterinary supervision to ensure that it is not infected by trichinae. But these parasites may also be found in bear meat, through their having passed into a bear's system that has become infected through its eating rats. Anyone unfortunate enough to eat meat infected with trichinae develops a high temperature, diarrhoea and stiffness of the muscles. Later on, the muscles become so swollen and cause such excruciating pain that the sufferer cannot move and lies doubled up in agony. Trichinosis is very often fatal, but even if anyone unlucky enough to contract it does not die, he will suffer from pains, not unlike rheumatic pains, for a long time afterwards, because the trichinae burrow into the flesh and encapsulate themselves there. In Stuttgart in 1930 there were many fatal cases of trichinosis, contracted by people who had eaten unexamined bear meat.

Once, bears were native to Germany, where they feature in many legends and fairy tales. What would happen if, as in most west European countries bears were to reappear in German forests? If they were reintroduced in the valleys of the German Alps, would we be afraid to enter the forests? Not at all. Wild bears shun human beings in the same way as do other wildlife. There would certainly be no more road accidents involving bears than there are now with the domestic animals which run free in the fields, and

TWENTY ANIMALS, ONE MAN

are often more malevolent, more aggressive and above all more shy, of human beings than bears are.

The losses bears are said to cause cattle farmers are greatly exaggerated. In fact, they do next to no damage, since they are almost entirely herbivorous. In northern Sweden, bears are strictly protected, yet in two years, they killed only a hundred and two reindeer there, which it cost the Government less than £150 to replace. Local farmers always blame bears for any lost sheep or pigs, even if they have not been killed by bears.

Bears roam America's national parks at will and are their biggest tourist attraction. In South Africa's Kruger National Park and in the British-administered East African territories, visitors drive along the road with bull elephants, lions and leopards only a few yards away. People are steadily becoming more and more removed from nature, trapped as they are in the stone canyons of our big cities, and are glad to have a chance of seeing wild animals in their natural surroundings. It would be easier to reintroduce bears into the German countryside than eagles, eagle owls, wild cats, ravens or other animals. Why should these magnificent and clever animals not make their home in our forests once more? After all, they have as much right there as we have.

Animals and Cars

WHEN motor-cars were invented more than half a century ago people laughed at the rattling, smelly monsters, and horses bolted at the sight of them. Today people no longer laugh at cars, and horses have lost their fear of them. The battle between cars and horses has long been decided in favour of cars, and in Frankfurt, for instance, no horse-drawn vehicles are allowed in the centre of the city. And it is not only the horse which has been vanquished, but every creature that walks and has blood in its veins. The number of cars in the world increases by the hour, while the number of animals decreases. There is no doubt what the end will be. We have a fairly good idea of domestic animals' reactions to these malodorous, rushing man-made creatures. Many dogs, for instance, will never learn that it is quite useless to run after cars, barking at them and snapping at their tyres; cows continue on their way undisturbed by hooting and without paying regard even to the biggest lorry; goats scatter wildly in all directions; mules merely draw in their hindquarters or raise their heads when a car goes by.

Today, the wild animals of Africa, those in the national parks, at least, pay hardly any attention to passing cars, of which they see quite a number every day. Forty or fifty years ago, when cars were a comparative rarity, wild animals either used to run away from them or come up close and examine them with great curiosity. They wanted to see what strange kind of animal this was, which screamed like a hyena, had a pair of over-sized eyes, a short head and no neck. It had no hostile scent, and looked like a cross between an elephant and a rhinoceros, from neither of which do other wild animals run away.

Big animals such as these are the only ones that sometimes regard cars as rivals when they approach too close or enter their territories,

and then they react accordingly. Many a motorist has had to take refuge in a nearby tree and watch helplessly while an elephant has demolished his car. Two white rhinoceroses encountered by an acquaintance of mine a few years ago, doggedly followed him for more than a mile while he drove in reverse back along the way he had come. It has also happened that a male rhinoceros has sometimes assumed a car to be a female rhino (they are very short-sighted) and, after walking slowly round on a tour of inspection, has become very angry on discovering its mistake.

Some few years ago an old farmer told me about some anxious minutes he once spent in his old Ford, which could only go up steep hills in reverse and whose lights only worked as long as the engine was running. One day he found his path blocked by four lions which began to come steadily towards him. However, they had no evil intentions, they were merely curious and wanted to examine the car at close quarters. Monkeys when he met them usually drew back at the last moment, chattering loudly and shrieking abuse, but would follow the car for some time. Once, when he rashly drove up to a herd of buffalo, they split into two groups. One stayed where it was, while the other went round behind the car to cut off his retreat. He was very relieved when he managed to get past the pugnacious animals at the last moment. An aggressive gnu once attacked Walter Schultz, the animal collector, in his car with such fury that it drove its horn right into his radiator and could only be released with an axe. Many wild creatures are very brave when they come face to face with a car. A White Father once had to wrap his soutane round himself and climb a nearby tree while a rhino completely wrecked his car.

Why do so many animals run right across the road in front of cars - lesser cats, rodents, lizards, antelopes, even warthogs and giraffes? They are probably not running away from the car, because to them it seems to be running away itself. They are just seized by the feeling of panic that grips prairie animals. It is also probable that they do not usually chase their quarry directly but take a course which will cross its path some way further on. To ascertain whether this is in fact so would require much fuller observation and research into how animals live together in their natural state. Baboons, for example, will run away from a car, but their

ANIMALS AND CARS

rearguard notes the direction in which it is travelling, just as it does in the case of beasts of prey.

Where cars are able to travel at top speed they cause more harm to wild life in the countryside than beasts of prey. In ten years, 125,460 animals and birds were killed on the trunk roads of seven districts of Pennsylvania alone, apart from hundreds of deer and injured animals which were able to crawl off into the bushes to die. In 1952, some 10,000 dogs, 11,600 cats, 10,800 rabbits, 4,000 skunks and 10,000 racoons, hamsters and other small animals were killed on the roads in Virginia. A German visitor to Brazil who went for a short drive with a Brazilian in the neighbourhood of Sao Paulo one evening became very upset when his companion deliberately blinded armadilloes with his headlights, ran them over to break their bony carapaces, and then picked them up and threw them into the back of the car to be sold later on for a tidy sum.

Animals have to some extent 'revenged' themselves for this slaughter. Between January and September 1953, animals were the cause of 6,499 road accidents in the Federal Republic of West Germany, and in France in 1954 they caused as many accidents as drunken drivers. According to statistics published by the West German agricultural co-operative associations, 36,549 agricultural workers were injured in accidents involving animals, 169 of them fatally. Some of the smaller animals can still cause damage and annoyance to drivers. In one case, a man noticed a persistent smell in his car. It grew steadily worse and nothing would eradicate it. The smell finally became so obnoxious that he could hardly bear to sit in the car, and he decided to strip down the interior. He soon found the cause of the smell - a dead mouse under one of the seat cushions.

One day in May 1954, a peasant loading wood in a forest near Franzenheim in the Trier district, made his way back to the clearing where he had left his tractor and was surprised to see seven brightly striped young wild boar running about underneath it. They had mistaken the slow tickover of its engine for their mother's call. The peasant caught one of them to rear it on the bottle and chased the other six away.

An Australian farmer had an even more astonishing experience. He had stopped his car in the bush about a mile from his farm to

have a look round. When he came back, the ignition key had disappeared, even though there was no other human being for miles around. The farmer scoured the surrounding forest and finally found his ignition key in a bower bird's nest. The cocks of this remarkable species build structures of sticks, to which they lure the hens for their courtship rites. They decorate these courting structures with any glittering objects they can find. One variety of Australian bower birds collects only blue, greenish yellow, grey and brown coloured objects. In one small hotel, bower birds always flew into the laundry room and stole the bags of washing blue. Their courting sites in the neighbourhood were embellished with blue-bags and the petals of blue flowers. Nobody there plants any blue flowers in his garden unless he wants to spend a great deal of his time shooting bower birds.

Entomologists have reported having silver cutlery and their collecting instruments stolen, and one even lost his glass eye which he had left in a tumbler of water on his bedside table. At first he suspected his dog and gave it a beating. In fact, he even went as far as to consider shooting it to regain his precious eye. In the end, however, it was found in a bower bird's nest. When telephones were installed in a certain district, the nests of all the bower birds in the neighbourhood were found to be decorated with innumerable screws, bits of wire and electrical instruments.

European birds also have dealings with cars. At the beginning of the 1920's there was a vogue for very high-pitched car hooters, and after a while skylarks in the Kremlingen area in Brunswick began to imitate them. But only larks whose nests were within three-quarters of a mile of a road mimicked the car-hooters. Those with nests further away did not change their song. Mimicry is evidently not confirmed to parrots.

A lion was involved in a remarkable incident in Blantyre, Nyasaland in southern Africa. A woman who happened to be alone on a farm with her children was asked by a travelling tobacco salesman if she could put him up for the night, which is quite normal in Africa. He parked his car, an Austin, near the house. The woman was woken in the middle of the night by the loud clucking of her hens, which she kept in chicken coops on the verandah. She picked up her revolver from her bedside table, and went out on to the

verandah with a lantern, but could see nothing unusual. Suddenly she heard heavy panting, which seemed to be coming from near where she was standing, and on closer inspection made out a lion crouching on the verandah. In her excitement she pushed down the safety catch instead of pressing the trigger, with the result that she could not fire at the lion. By the time she had realised what had happened and released the safety catch, the lion ran off, and she emptied her revolver into the darkness, without knowing whether she had hit the animal or not. The salesman had already said during supper that he would only help someone from whom he could expect something in return, and this statement had irritated his hostess so much, that she had not even thought of waking him when she had heard all the noise on the verandah. In any case, the shooting outside his open window must have woken him, she thought to herself, and went back to bed. She was so excited that she could not go to sleep again, and a quarter of an hour later she heard a noise from the other side of the farmyard some distance from the house. It sounded 'like maize being poured on to a sheet of tin'. She paid no more attention to it, but next morning she found her overnight guest's small car extensively damaged. The lion had ripped the front tyres to pieces and eaten them and smashed a headlamp, and there was blood and fur on the car in numerous places. A strip of hide several inches long was found on the ground near the lion's tracks. It was not clear whether the lion had injured itself when it had attacked the car or whether the woman's blind shots in the dark had wounded it. The reason for the lion's attack on the car remained equally obscure.

Unexpected encounters between vehicles and the larger animals can end badly, even if the animals do not feel themselves threatened or think they are going to be attacked. Quite a number of years ago a motorist in Wyoming surprised an eagle in the middle of the road, gorging itself on a rabbit. The big bird did not get out of the way quickly enough and smashed against the windscreen. There was no safety glass in those days, and the windscreen shattered, showering the inside of the car with glass splinters. The driver was unhurt, but the eagle was knocked senseless, and the driver found it lying on the back seat. Some hours later it recovered and flew off.

Hippopotamuses are particularly numerous in the area round Lake Edward, where they are fully protected and hunting is for-

bidden. Every night hundreds of them cross one of the roads connecting Lake Victoria with Lake Edward, in order to graze on the rich grass nearby. One night a few years ago, a lorry crashed into a hippo. The driver felt a heavy impact, and accelerated in an effort to drive off, but his wheels could not get a grip and just spun round at great speed. What had happened was that the lorry had run up on to the hippo's back, and its rear wheels were just turning in thin air. Finally both monsters got free of each other and the hippo, just as scared as the lorry driver, splashed back into the water.

Cars encourage unfair hunting methods. It is so easy to overtake wild animals, which have no idea that there are human beings inside the metal rhinoceros they see advancing on them. Furthermore, a car offers good protection against most animal attacks. It has become the fashion to hunt the remaining gazelles in Egypt from cars, even though it is strictly forbidden by law, and now there are only a few gazelles left along the border with Libya. Men in cars chase these dainty creatures over the level plain at more than 55 m.p.h. for five minutes at a stretch, until their hearts cannot stand the strain and they slow down. They can then be shot very easily.

Major G. Gilliland of the United States Marines Corps, used to take great pleasure in checking up on the hunting ethics of his car-borne fellow-Americans. One day during the close season he planted a stuffed white-tailed deer in front of some bushes not far from the roadside and took cover behind a bush some distance away. Soon the first car stopped and directed a withering fire at the stuffed deer. The major presented every one of the car-borne hunters with a cigar, and soon ran out of them. That evening he counted four hundred shot-holes in the stuffed deer. The surroundings were more full of lead than a lead mine. I myself tried a similar experiment in Africa with a stuffed antelope, and it was very successful.

Nevertheless, cars have turned out to be a blessing for animals from at least one point of view. Using cars to hunt and catch wild prairie animals has not only cut down the hunters' losses, but also, and more particularly, it has reduced the losses suffered by the animals themselves in the past. In the old days, animal trappers often used to shoot the mother animals in order to catch the young. A later development in the Belgian Congo was to stampede a herd of elephants by shooting into the air and shouting, and then catch the

calves (which could not keep up with the rest of the herd) and rope them to trees. If one of the adult elephants turned round and came in to attack, the only thing to do was to shoot it if it could not be scared off.

Trappers who use two vehicles, as is the practice in Kenya and Tanganyika today, can always overtake fleeing elephants, whereas athletic African runners can only keep up with them for a short time. If an elephant should attack, it is easy to turn the car round and drive off, so the encounter can never develop into anything dangerous. It is also much better to remove captured calf elephants from the scene, because they calm down very quickly once they are out of sight of the herd. As a matter of fact, they usually get as close to the cars as they can and try to touch them, apparently thinking that they look like elephants. When this happens the men in the car quickly unload a crate, push the young elephant inside, load it on to the other vehicle and drive off. In this way elephant trapping in East Africa takes hardly any toll of animal life.

In the African national parks, which are highly popular visitors' attractions, motorists are forbidden to open their car doors and get out because the lions prowling about by the side of the road can become very dangerous. Visitors have to drive in closed cars from one barbed-wire enclosure to the next, and spend the night in a guesthouse or small hotel inside the wire. A national park of this sort is to a certain extent a zoo in reverse. It is the visitors who have to stay in cages and behind bars; the animals run free. That such situations exist is a source of deep satisfaction for zoo people. And it can reconcile us somewhat to the existence of cars.

Right-Handed or Left-Handed?

THE American lion trainer, Clyde Beatty, has told how he once owned a lion which could be cowed by a pistol, a whip or a flaming torch only if he held any of them in his left hand. All lions and tigers are either 'right-handed' or 'left-handed', that is to say, use either their right fore-paw or left fore-paw first to strike at anything. Spanish bull-fighters claim that every bull has a favourite horn, and attacks first with that one. Eagles, buzzards, falcons and owls are all said to carry their prey in their left claws. A tame crow has been known to distinguish quite clearly which was his owner's right hand and which his left. The right hand, from which the bird received its food, was treated as a 'friend', while the left hand, which the bird sometimes avoided and was afraid of, was treated as an 'enemy'. Gnus, antelopes and other prairie animals are said usually to cross the road in front of cars from left to right. Most beasts of prey are supposed to attack from the left too.

How true all this is, I do not know. I have carried out several months' research on the subject with parrots, horses and anthropoid apes, but the deeper one delves into the question, the more complex it becomes, especially with man.

Many years ago an anatomist from Tübingen declared that the Venus de Milo was not as beautiful as she was supposed to be, nor, he said, were many other ancient marbles. Having measured both halves of their faces, he discovered that they were not symmetrical. His statement caused some astonishment and people began to take a closer look at the faces of those living around them. If you draw a line down the centre of a full-face portrait, make a reverse copy of the right-hand side, put the two right-hand sides together, and then do the same with the left, the two faces thus produced will not resemble each other at all. Other investigators, by measuring some

contemporary human skulls, and also those of some Egyptian mummies, discovered that 97 per cent of them were asymmetrical.

Further research revealed that the bones in the right half of the body are about 5 per cent heavier than those in the left, that the left eye-socket is squarer in shape than the right, which is rounder and deeper, that the left pupil, usually protrudes a millimetre more than the right, that the human body's centre of gravity is not in the centre of the body but in the right half, that the left side of the forehead is more domed and that it bulges out more.

It is exceedingly rare for the heart not to be on the left. It is more frequent for the appendix or the liver to be on the wrong side of the body, and this sometimes leads to surprises in the operating theatre; one person in 5,000 has his appendix on the left. Seventy-five per cent of people have right arms that are longer than their left, and the left legs of something over fifty per cent are half to three-quarters of an inch longer than their right; only 25 per cent have legs of equal length. Many children, before birth, have limbs of differing lengths and strengths, and our right-hand finger- and toe-nails grow more quickly and strongly than our left. Even the hair on our heads does not grow evenly.

Just how asymmetrical the two halves of our egos are can be seen from left-handers and right-handers. Apparently, man has not needed to use his right and left arm to the same extent since primeval times. Prehistoric iron and bronze tools, especially sickles, were almost all right-handed. More than sixty-five years ago attempts were made to establish whether this was also true of Stone Age hammers, but they were too crude and clumsy. Ancient statues, some more than five thousand years old, portray mostly right-handed people.

Philologists can also tell us a great deal on the subject. In many languages the word for 'five', or at least its root, is the same as for 'left'. Similarly with 'ten' and 'right'. In Latin, for instance, right is *dexter*, ten is *decem*.

Primitive races, then, used to count up to five on the fingers of the left hand (using their right hand to count with), and from six to ten on the fingers of their right. This is, however, an indication of right-handedness. The Greek word for 'count' actually means to tell off in fives, so, even when they had developed their language the

Greeks still counted on their fingers. For many peoples and religions the left hand symbolises clumsiness and awkwardness, while the right hand signifies uprightness and honourableness. In German the words for 'right' and 'correct', and for 'left' and 'clumsy' come from the same root, while in Latin, '*dexter*' means wholesome as well as right, and '*sinister*' unwholesome, as well as left. In Greek the same applies. Mohammedans and Jews assign totally different roles to the right and left hands in their religious usage, and we use the right hand when taking an oath. The devil is supposed to fiddle with his left. Today right-handed people far outnumber left-handers all over the world.

It is not so easy, however, to find out how many right- and left-handed people there are. When army recruits, for instance, are questioned on the subject, many of them do not divulge that they are left-handed because left-handed people are commonly supposed to be less skilful. Soldiers are consequently given all kinds of tests without their knowing the reason for them. Only people with a very strong tendency towards left-handedness use their left hand to hold a spoon or to uncork a bottle. Medium left-handers deal cards, brush their teeth, clean their shoes, throw stones, hammer nails, sew, thread a needle and cut bread with their left hand. Women can give away the fact of being left-handed by cutting bread, peeling potatoes or dusting.

The activity least affected by outside influences is clapping. How many people are aware of the fact that there are two ways of clapping one's hands? Left-handed individuals clap by bringing their left hand diagonally down on to their right; but fewer than one per cent of right-handers clap in this way.

This does not mean that right-handed people always use their right to do things that need only one hand, or that left-handers habitually use their left. In blowing one's nose, picking up a tea-cup, doing up one's coat, holding a cigarette, habit or one's posture at the time determines which hand is used. Some right-handed people prefer to use their left hand for doing certain things, such as holding a horse's reins, carrying a brief-case or holding a baby, and they often do so in order to leave the right hand free for doing something more important.

Very few right-handed people – usually only those whose right

arm has been badly injured – are forced to become left-handed. Sometimes lesser injuries bring this about. A concert violinist who lost the joint of one finger changed over to left-handed bowing, and after not too long a time, he became as proficient at it as he had once been with his right hand. Left-handed people are usually forced to become completely or very largely right-handed. Almost all our working tools are made to be used by right-handed people. Among civilised human beings, five per cent of the men and $2\frac{1}{2}$ per cent of the women are left-handed. Examination of children up to school age shows twenty per cent of them to be left-handed, but this percentage decreases steadily up to school-leaving age. At puberty there is some increase in the incidence of left-handedness, probably due to the weakening of educational influences. Babies, by the way, begin to show a preference for using one particular hand at the age of seven months.

Among a group of left-handed recruits who were asked whether their parents or grandparents were also left-handed, it turned out in many cases that they were. For a long time left-handedness was thought to be an inherited characteristic. However, research into twins revealed a few more facts about the matter. Identical twins develop from one ovary fertilized by one male spermatozoon. They will have identical inherited characteristics; any differences there may be cannot have been inherited, but must be a result of upbringing and environment. An examination of 574 pairs of identical twins, showed each pair to be as like as two peas in a pod. In 67 per cent of the cases both twins were right-handed, in 5 per cent both were left-handed, and in 28 per cent one was right-handed and one left-handed. These last could either not have been identical twins, or else – and this is the astonishing thing – their preferential use of either right or left hand was not inherited, but due to environmental influences.

However, these influences are in fact pre-natal. The arms of an embryo in the womb may be in any one of a variety of positions, exercising one or other half of the brain more strongly as a result. So left-handedness and right-handedness are not exclusively inherited but are partly affected by other post- and pre-natal influences, and not only in twins. Identical twins often sleep in the same position, although facing opposite ways. If one sleeps on his right side, with

his right arm under his head, the other will sleep on his left side with his left arm under his head.

This may perhaps throw light on another matter concerning left-handed people, about which there has often been dispute in the past. The proportion of left-handers who stutter, squint, have served prison sentences, are less gifted, colour-blind or deaf mutes is greater than among right-handers. From pure knowledge of heredity we know that these facts do not by any means signify that left-handed people suffer from these defects at birth, but it is enough for only a certain number of them to be for it to constitute a significant percentage of the small total of left-handers.

There is more probably a different explanation. In right-handed people, the part of the brain that controls speech is on the left side of the body, whereas in left-handed people it is on the right. This has been established in the course of brain surgery. Right-handers who have to change over to their left hand, perhaps after losing their right arm, frequently suffer from speech difficulties such as stuttering, probably because their speech centre is also in the right half of the brain. Similar accompanying symptoms can also be expected when a born left-hander changes over to the use of his right hand in other circumstances, or a right-hander to his left hand.

Even if we assume that as many left-handers change over to their right hand as the other way round, the number of stutterers among the 5 per cent of left-handers will naturally be much more apparent than among the 95 per cent of right-handers. In fact, however, as we have already seen, many more left-handers change over to their right hand than *vice-versa*. We can, therefore, see that people born left-handed are just as capable and as genetically healthy as right-handers. The fact that handicaps are more often apparent among left-handers can be explained statistically by the fact that there are fewer left-handers and that more of them change over to using their other hand.

I have two parakeets called Joringel and Jorinda. One day I left the door of their cage open and Joringel came out, flew round the room, perched at the window and then went back inside the cage, having left a 'trademark' on the glass. Then the cat climbed on to the top of the fence outside. I could see only its body and tail, because the patch on the window obscured its head, but when I

closed my right eye without moving my head, the cat's head came into view and the patch seemed to have shifted position towards the cat's tail. When I opened my right eye and closed my left, the patch seemed to have moved back to its former position. This was a highly intriguing discovery. My right eye sees a different picture from my left because they are in different positions. My brain superimposes these two images on each other and combines them into one, but it is my right eye which determines what I see, because the patch is in the same position now as when I looked at it with my left eye closed. This means then that I am 'right-eyed' so to speak, and that I, like 75 per cent of the rest of the human race, can see better with my right eye than with my left. Only some 23 per cent of people see better with their left eye, and a mere 2 per cent see equally well with either eye. There is a connection between being right-handed and 'right-eyed', and equally if a person sees better with his left eye than with his right, it can be assumed with near-certainty that he was born left-handed. In the case of a person with a squint, the left eye will generally be the weak one if he is right-handed, and the right eye if he is left-handed. One can always tell which leg or foot a person prefers to use by observing which foot comes down first when he does the long jump, or goes sliding on the ice, or kicks a football. People with a very strong tendency to left-handedness always mount a bicycle from the right. In the overwhelming majority of cases, people who are 'right-legged' wear out the sole of their right shoe first. With 'left-legged' people the opposite is the case. As against this, the way a person crosses his legs has no connection with left- or right-handedness.

The tendency towards using one hand, eye or leg in preference to the other shows that basically people and animals develop unevenly. Wilhelm Ludwig, in his book *Das Rechts—Links-Problem (The Problem of Right and Left)* goes into the whole subject very deeply.

Most people can immediately say which side of their bodies is the right or the left, or which side of the room they are sitting on, even if they are asked without any warning, but there is a group which cannot tell the difference between right and left. Others again, can only differentiate between right and left by reference to external objects, for example, a wedding ring on a woman's hand tells them that it is her left hand. All small children are incapable of telling left

from right, and it generally takes them until they are six to learn the difference. It is estimated that 16 to 20 per cent of adults cannot tell the difference between left and right unless they can refer to an external factor like a wedding ring. This particular weakness has nothing to do with lack of ability. In the case of von Helmholtz, for example, it did not stop him from becoming a famous physicist.

Parrots, as is well known, perch on one leg to feed, and use the other for conveying what they are eating to their beaks. Even the least observant parrot-owner will have noticed that his pet never uses the 'perching leg' for picking up food, or the 'feeding leg' to perch on. In the course of some research into this question, I studied the habits of 131 parrots and found that 60 per cent always used the right leg to pick up their food and 40 per cent always used the left.

I also spent several months on research into which legs horses preferred to use. Seventy-seven per cent of horses always use the same fore-leg when they paw the ground with impatience, half of them the right foreleg and the other half the left. Many horses have a 'favourite leg' when galloping, jumping or climbing over an obstacle, but here again, 50 per cent put the left fore-leg first, the other 50 per cent the right. Anthropoid apes and rhesus monkeys are the same. If one side of their brain is injured, they, like human beings, must accustom themselves to using the limbs on the other side of their body. Rats, too, also show a 'right' or 'left-handed' tendency, again half and half. Elephants, on the other hand, are said always to favour their right-hand tusks.

One of the main differences between man and animals then, is that animals are more or less evenly divided between 'right' and 'left-handers', while 95 per cent of human beings are right-handed. Are you one of the left-handed 5 per cent or the right-handed 95 per cent?

Animal Hearing

SUPPOSE you are sitting at the edge of a forest enjoying the peaceful stillness of the night. In reality, however, it is far from peaceful. Bats are squeaking, insects are making high pitched buzzing and humming sounds, and nocturnal butterflies are making a variety of noises. But you cannot hear anything of this because the human ear, which is like an old-fashioned radio receiver, can only pick up signals on a narrow waveband. Sounds produced on many other wave-bands are inaudible to it.

Nevertheless, human hearing is by no means bad. Many species of creatures cannot hear at all, although most can see, even if their eyesight is not as good as that of man or the apes, who can see clearly and make out colours, or even of eagles and buzzards. On the other hand, only some vertebrates and a considerable number of insect species can hear. Snakes are totally deaf, and so are worms, crabs, mussels, snails and many other creatures. They live in a completely soundless world.

When a violin string is plucked it vibrates, the speed of the vibrations vary with the length and the degree of the tension of the string. The G string vibrates 200 times a second, the E string 650 times a second. As the violin string vibrates it pushes the air around it backwards and forwards in waves, and when these air waves reach the ear they stimulate certain sensory cells, which send a weak electric current to the brain, and the brain then registers the air waves as sounds. Imagine a lake spanned by a railway bridge. Over the water a swarm of midges hover. Suddenly, a railway engine passing over the bridge sounds its whistle, and the whole swarm jerks abruptly downwards towards the water. One might conclude that they had heard the engine whistle, but this would be premature. A stone-deaf person can half understand what someone else is

saying by putting his finger-tips on the other person's larynx. Helen Keller, who was deaf and blind and completed her higher education by sheer will power, could even 'listen' to organ music by this method and enjoy it.

A house-fly's wings vibrate 320 times a second, a bee's 190 times a second. Slow vibrations, as slow as sixteen a second, are picked up by the human ear as very low-pitched sounds, while the much faster beating of insects' wings often registers as a humming noise. Humming birds are so called because their wings beat so rapidly that they produce a humming sound. A vertebrate could never move its wings so quickly or for such extended periods. It would get muscle spasms before very long if it tried to do so.

As a fly flexes its flying muscles a hundred times a second, however, it is not hard to understand that its nerves will register every single fast-moving air wave set up by the wings of another fly. But this does not mean that the fly hears the vibrations as sounds. If you put your finger very gently to a tuning fork which is sounding a very deep note, you can feel the vibrations, thus registering them by touch through your skin as well as hearing them as sounds.

If you make a high-pitched hissing, humming noise (something like *ssss-eeeeee*) at a brightly coloured hawk moth caterpillar, it goes completely wild, whipping its head from side to side and thrashing with its tail. These movements are instinctive, because it reacts in the same way to the hissing hum made by the ichneumon fly, which bores into the caterpillar with its long ovipositor and lays its eggs inside the caterpillar's body, where they hatch out into larvae. Nevertheless, we can hardly say that the caterpillar 'hears' the vibrations. Only animals with ears register vibrations as sounds.

'Happy are the cicadas, because their wives are dumb', wrote Xenophon the Greek, thousands of years ago. His observation was correct, because only the males of grasshoppers and crickets chirp. Vertebrates make their vocal cords vibrate by expelling a stream of air from their lungs. Insects often produce their sounds from different parts of their bodies or with their legs. The cockroach draws a file or rasp across a series of sharp ridges on its abdomen, grasshoppers stridulate (chirrup) by rubbing their ridged legs across the edges of their wings, in much the same way as we can produce sounds by drawing a comb quickly across the edge of a piece of cardboard.

The cicadas would certainly not make their music if they themselves were deaf. In fact, the dumb females will always make a beeline for the chirruping males. Some acute observers who were not convinced that the male cicada attracted the female by its chirping and not by scent, once put a telephone mouthpiece near some males in one room, and placed the receiver in the next room where there were some females. The female cicadas immediately made for the receiver and not for the males themselves. They must therefore, have something resembling ears. Actually, if one looks for them carefully enough one can find ears on many insects, though not on their heads, where vertebrates have them. It is mere chance that we have them there. Many insects have them on their legs, and they consist simply of hollow cavities with a cutaneous membrane stretched over them. When a sound causes this membrane to vibrate, the sensory cells surrounding it flash the message to the brain. It is easy to prove this. When leaf hoppers stridulate, they do not maintain an unbroken chirping, but chirp in regular bursts like a telegraphist sending morse. Another member of the same species regulates its chirping so that it comes in the silences between the bursts of chirping of another of its kind nearby. However, this only works when their hearing membranes are functioning properly. If these should be perforated, the hoppers can no longer synchronise their chirping.

There is a swing in our corridor for the baby gorillas, and they learnt a long time ago, just as human children do sooner or later, how to make it go higher and higher with a swift bodily movement on the down-swing. However, every swing has its own speed and rhythm, governed by the length of the chains that hold it to its frame, so little fat Thomas has to time his bodily movements accordingly.

That is the secret of resonance too. Open a piano wide, press the pedal right down so that the strings are not damped at all, and sing a loud note into the piano. The corresponding string will begin to hum softly and sound the same note. Our ears work in the same way, but have more strings than a piano, in fact, about 20,000. In man and in dogs, the tympanum is not simply stretched over an opening in the body, as in grasshoppers and frogs, but lies at the far end of a deep funnel-shaped opening – the external auditory canal. The bones of the middle ear – the hammer, the anvil and the stirrup – transfer

the vibrations of the tympanum to a second, oval-shaped membrane stretched over the inner ear, which is a long spiral-shaped canal filled with fluid. It is shown in the diagram as a U-shaped metal tube, because it is in fact located in the centre of our rigid head bones. Fluids are not easily compressed, so when the stirrup presses the membrane inwards towards the fluid-filled tube, a pressure wave is set up which pushes a membrane closing off the other end of the tube, outwards. In this way, every disturbance of the air caused by a sound is transferred by the tympanum to the fluid in the inner ear in the form of waves.

The whole tube of the inner ear is divided lengthways by a membrane of skin, bearing fibres running through the fluid from one wall of the inner ear to the other. They are of varying lengths, beginning with 1/20th of a millimetre and growing longer past the bend in the hearing tube until the end fibres are half a millimetre in length. Human beings, as I have said, have about 20,000 of these fibres in each ear. They are shown as piano strings in the diagram. It was Helmholtz, the great physiologist and research scientist who actually discovered that each of the 20,000 fibres is tuned to a particular number of vibrations. The frequency of the waves set up in the fluid by the tympanum decides which fibres are activated by sympathetic vibration in the same pitch as the sound. There is a sensory cell on each fibre which projects a fine hair into the fluid. When the fibre moves, the hair is moved against the wall of the canal, stimulating the sensory cell, which passes the stimulus on to the corresponding brain cells. These in turn translate the vibrations into sounds in our consciousness. We enjoy a Wagner opera by using the same principles that enable wolves howling in the Siberian plain to communicate with one another.

Actually, the number of fibres in the human ear corresponds almost exactly to the number of audible tones, as do their differing lengths (1:12) with the perceptible tone range of twelve octaves. The axolotl, a blind amphibian, can hear only four octaves, the small minnow, eight. Autopsies performed on people who were unable to hear certain high notes have revealed that corresponding sections of the resonance membranes of the inner ear had been affected by illness. The same thing has been observed with guinea-pigs subjected to continuous high, shrill tones. Doctors, incidentally,

have also experimented with the use of high frequency sound waves for various types of medical treatment during the last few years.

There are some small muscles attached to the three auditory bones, and when they flex they damp down any over-loud tones. In the same way that many people can move their ears by flexing their ear muscles, others can flex their auditory bone muscles at will. They then hear all sounds muted, without having to put their fingers in their ears. When certain nerves in the head are damaged, this damping down action does not take place and people affected in this way are particularly susceptible to any kind of noise. The auditory bones are in any case only needed for low tones, since the sound waves set up by the higher tones reach the membrane of the inner ear without their help.

If we sun-bathe on snow in mountain country our skin becomes tanned by ultra-violet rays which we can feel as warmth on our skins, but cannot see. Bees on the other hand, see them as a coloured light. Other animals jump back in alarm when infra-red rays are directed at them at night. In the same way, our ears pick up as sounds only a small proportion of the vibrations in the air. The lowest tone we can hear is produced by sixteen vibrations a second, the very highest by 20,000. Sound films reproduce tones produced by vibrations in the 8-11,000 per second range, yet we understand what the actors are saying and the music on the sound track appears melodious enough. This indicates that tones we usually use are produced by vibrations with a frequency rate of less than 10,000 per second, the same as radio employs. Dogs, on the other hand, can hear sounds in the 80-100,000 vibrations per second range, which is why they can be controlled by whistles which are inaudible to the human ear. Grasshoppers can make and hear sounds produced by up to 90,000 vibrations a second, dung-beetles up to 40,000. Many moths begin at the top end of the human hearing range and can hear sounds as high as 175,000 vibrations a second. Experiments have been made with special sound machines and high-pitched whistles, and when moths have heard them they have suddenly swooped upwards or simply fallen to the ground. They have good reason to do so, because normally similar ultra-sonic noises announce the presence of bats, their chief enemies.

Bats have attracted a great deal of attention in recent times because

of their use of 'radar' to find their way about. Anti-submarine detectors used by destroyers in the last war were based on exactly the same principle. As early as 1790 the Italian scholar Spalanzani had observed that bats were able to fly about with perfect safety in a room without doors or windows. Owls cannot do so. They fly into the walls, because they must have at least a glimmer of light to be able to find their way. Bats, on the other hand, easily avoid wires and branches stretched across their path of flight. The only time they could no longer avoid obstacles was when their ears had been stopped up with wax.

A hundred and fifty years after Spalanzani's observations of bats, two Englishmen and a Dutchman working quite independently, made the discovery in the 1940's that bats emit continuous ultrasonic waves beyond the hearing range of the human ear, before they launch into flight. These waves bounce off walls and other objects, telling the bats exactly where they are and enabling them to avoid such obstacles, even in complete darkness. In any case, they are almost blind, but so accurate is their 'radar' that they can tell whether a wall is smooth or rough, and whether there are any little projections or cracks that they can fasten their claws into. They then fly towards them with unerring aim, and can even fly through narrow openings without hitting the sides. Nocturnal moths, which are bats' principal prey, can also hear the sounds they emit, just as bats can hear the sounds emitted by the moths. Since bats make up a sixth of all mammals, and human beings prefer to sleep at night, it is just as well that our hearing range is different from theirs.

Birds have a more restricted hearing range than ours, and can only hear eight to nine octaves - three or four less than we can. They are as adept as humans at distinguishing between different sounds, and, in addition, have an exceptionally good ear for 'absolute pitch' which enables them to imitate the sounds made by other creatures. They are also far more musical than most human beings. A blackbird varies the theme of its song, puts in dotted notes, changes its tonal texture, lengthens and shortens the pauses between bursts of song, borrows and develops themes already used to some extent by composers like Beethoven and Mozart. In short, the blackbird is a composer in its own right.

Up till very recently, all natural history books said that fish were

deaf and dumb. It is easy to make a statement of that kind, which is just as difficult to prove as to disprove. Von Frisch, the well-known zoologist, recounts that whenever he fed the minnows in his aquarium he always sounded a certain note. Whenever he 'punished' these fish by tapping them with a thin glass rod, he sounded another note. It did not take long for the little fish, which had previously been thought to be totally deaf, to come swimming over to von Frisch whenever they heard the first note and to swim rapidly away and hide under the stones when they heard the second.

Further investigations have revealed that almost all fish species can hear to a greater or lesser extent. Water is a better sound conductor than air, so many fish use their air bladders to pick up sounds, which are transmitted to their inner ears by an auditory bone system very similar to the human tympanum. Carp, which have air bladders, have very acute hearing, but trout, perch, pike and most sea fish hear very badly. Whales and dolphins hear well.

Tortoises were long thought to be deaf, because it is easy to come up on them from the rear, and they only draw in their heads when they actually see anyone approaching. A Russian scientist took some tortoises and rigged up little foam rubber 'hammers' on the front edge of their carapaces. Whenever a buzzer sounded a particular note, the little hammers tapped the tortoises on the head. After this had been repeated a good number of times, the rubber hammers were removed, but every time the buzzer sounded the same note the tortoises drew in their heads. Thus it was proved that tortoises can hear. Lizards find it difficult to distinguish between different sounds, crocodiles bellow and react to a good many. We have often roused the male crocodiles in our aquarium to great excitement simply by shouting into a watering can.

I have lost count of the number of times people have written to me about their dogs' uncanny capabilities. A woman living in a fourth-floor flat wrote to tell me how her dog began to grow restless as soon as her husband approached the building on his way home from the office. Another described how it was enough for her husband to drive down a neighbouring street for their dog to become excited. Now, dogs can not only hear sounds inaudible to the human ear, but they can also tell which direction they are coming from. Fish

cannot. They are only aware that something is making a humming, slapping or rumbling noise somewhere. (These are usually the only kinds of sounds fish are capable of hearing.) If we close our eyes and then get two people to call out from twenty yards away, they have to be standing at least three yards apart for us to be able to tell which of the two actually called out. They only need to be a yard apart for a dog to be able to tell the difference, and eighteen inches for a cat. If dogs or cats have lost the use of their big ear muscles, they can hear only half as well. Many animals are helped by the fact that they can move their ears. If a horse sees something moving it immediately points both its ears in that direction, since they are connected with each other to a degree. Since animals listen for sounds all round them the whole time, the floppy-eared breeds of dog we have artificially created are at a distinct disadvantage, because they have to hold their heads askew to be able to hear which direction a sound is coming from.

Sounds which can be heard by a human being up to three yards away, can be heard by a dog twenty-four yards away. A Polish biologist who reared two tame lynxes carried out a series of experiments to determine how well they could hear. He found that, whereas he himself and other people, could hear a police whistle from as far away as a mile and a half, and their dogs from two and a quarter, the lynxes could pick up the sound from almost three miles away. Dogs can also distinguish very easily between different kinds of sound.

In many ways our ears serve us better than our eyes. When we see a beam of white light we cannot tell whether it is composed of all the colours of the spectrum or, whether just the two complementary colours of blue and orange have combined to produce white light. As far as sounds are concerned, however, our ears can make such distinctions. A man playing a violin produces a fundamental tone and a number of harmonic tones at the same time. The harmonic tones vibrate much faster than the fundamental and together they make up the tonal texture of the instrument. When we listen to a recorded concert or hear it on the radio, we can recognise the sound of the violins, trumpets, flutes, and so on by their tonal textures. The human ear, therefore, can evaluate the individual sounds which go to make up a particular combination of them.

Helmholtz had already demonstrated how the human ear does this. If a chord is struck on a piano, all the strings of all the notes making up the chord vibrate together. The human ear works on the same principle. The fibres corresponding to say, a high c sung by Maria Callas, together with its harmonic tones, vibrate inside the ear. The brain combines all these separate sounds into one and we hear the voice of a famous soprano. What operas our modern composers could write if we could hear like bats and they could produce a range of sounds like the dung-beetle!

Animals and Aeroplanes

My youngest son, Michael, who lost his life in a flying accident at Serengeti in East Africa while we were on an expedition there in 1959, was an animal man like me. After his sixteenth birthday he accompanied me on nearly all my foreign trips and we were generally entirely on our own in the bush. One thing he did not inherit from me was his ability to grub about inside an oily, dirt-encrusted, broken-down car engine and get it into working order again. It was he who persuaded me to learn to drive and I should not have been surprised if he had made me take flying lessons so as to qualify as a pilot in middle age. On our last trip to Africa, we both greatly enjoyed flying in light planes.

Airliners usually fly at about 30,000 feet at a speed of 500 m.p.h. or more*, but small, light aircraft are less than half as fast and our altitude was never more than 2,100 feet, and sometimes 1,500 feet or less. From this height one can see every antelope and every jackal. If you are a passenger in an airliner you have to be lucky to get a seat next to a window, especially one that is clear of the wings, and even then you have to crane your neck to see the ground. We removed the glass from the windows of our light aircraft to make it easier for Michael to do his filming. In a plane with no glass in the windows, even a relatively slow one, the airstream hits you very powerfully, especially when you are flying round Mount Kilimanjaro for a lot of the time, as we were. I had all ready contracted bronchitis in the Kivu Mountains, and this sort of treatment did not help cure it. When I started running a temperature I quickly got Michael to give me a combined streptomycin and penicillin injection, because catching pneumonia in Africa is no joke.

It is cheaper to fly than to travel by car in Africa, and air travel

* Written in 1956.

is, of course, faster. A journey that would take a whole day by car over twisting, dusty or muddy mountain roads can be completed in an hour by plane. Unfortunately, though, we often did not know how we were going to land. On one occasion, when we were flying over Mau-Mau country in Kenya, we had to circle over a friend's camp while he drove his car up and down the landing strip to show us where it was. It was so overgrown with grass that we could not see it from the air at all. We managed to make it out in the end and landed safely. 'I must have that landing strip put right without delay', said my friend guiltily. He did so by getting his African boys to run a harrow over it. Although it was then visible from the air, it had a surface like a ploughed field, but we took off again successfully.

When commercial airliners first started flying over Africa, their pilots used to amuse themselves by diving on herds of antelopes or elephants and scattering them. They were not in the least concerned that many of the panic-stricken animals might be trapped in swamps in their efforts to escape or become completely separated from their own herd and find themselves in strange territory. When this happens, fierce battles ensue and often end in the death of some of the participants. What was worse, the low-flying commercial planes frightened many animals away from the national parks and nature reserves and they fell ready victims to white big game hunters and Africans outside the borders of the reserves. Animals which have become used to the sound of aircraft engines are very little disturbed by them, provided that they maintain a reasonable altitude. Not long ago a farmer landed on his neighbour's farm near the Kruger National Park in broad daylight, and as he was taxi-ing to the hangar in his light aircraft, he saw a lioness and her three cubs coming over to investigate. Luckily, he had not switched off his engine, so he took off again, circled the landing strip and then dived on the lioness, which did not react at all. He repeated the performance, and this time she spat at the plane and tried to strike it with her paw. He was unable to drive the animals away, and they only made off when a lorryload of chattering natives appeared.

The owner of the farm finally had to build a lion-proof hanger because the lions liked the noise their claws made when they ripped into an aeroplane's body fabric. The sound of landing wheel tyres

bursting also seemed to amuse them. An aircraft left out in the open one night looked as if it had been attacked by twenty schoolboys with knives the next morning. On one occasion the owner found that hyenas had ripped the tyres.

Just how used to aircraft animals can become can be seen in the Umfolotse nature reserve and the Bluhluwe district. In some parts of Rhodesia attempts are being made to stamp out nagana, the tsetse fly disease, by slaughtering wild animals wholesale*, a horrible method of combating the disease and one which is repugnant to all civilised people. In the two areas mentioned earlier, however, other measures have been taken against the tsetse-fly – the carrier of nagana and sleeping-sickness. The entire region was sprayed from the air with DDT and gammexane. Even when whole formations of aircraft flew overhead at tree-top height, the antelopes, gnus and zebras hardly raised their heads.

Today, aircraft are often used to help animals. After a succession of hard winters some years ago, the large herds of wapiti (the big red deer of North America) round Washington began invading orchards and farmland in search of food, and the angry farmers wanted to shoot them. But the wild life conservation service, using low-flying helicopters, succeeded in driving the wapiti back into the forests and dropping food to them there. Since then, the wapiti have been afforded aerial protection whenever the winter has been a severe one. Some years ago wolves were on the increase in some parts of Canada, and in British Columbia and the Yukon they were hunted from the air, a method which is hardly in accordance with the hunting code. Anyhow, sixty wolves were shot and the reindeer and wild sheep soon began to increase again. In 1951, aircraft came to the rescue of Idaho's beavers. These assiduous little dam builders had caused extensive flooding on farms in the state and had also been felling too many trees. Nine hundred and sixty beavers were caught, put in cages in pairs and then dropped by parachute from a height of 450 to 900 feet over uninhabited mountain districts. The cages had been constructed in such a way that they opened when they hit the ground. Not one beaver was killed throughout the entire operation. Many of them travelled across country twenty miles from where they landed before finding a suitable site

* Written in 1956.

for re-establishing their colonies, and some even crossed mountain ridges in their search for a new home. This 'resettlement' operation was so successful that trappers now have to trap and hand in one live beaver for every nine they kill for their skins. The 'flying beavers' had all had numbers marked on their ears, so that a record could be kept of how many were subsequently trapped or shot, how old they were and how far they had travelled from where they had originally been dropped.

Trout learnt to fly a long time ago. More and more mountain lakes in California have been stocked with trout from the air in recent years. In 1950 alone, 1,685,000 sea trout were distributed over 421 lakes. Most of these otherwise inaccessible stretches of water lie 4,500 to 11,000 feet up in the mountains, and to reach them, aircraft often have to fly over 13,000-foot mountain peaks or even higher. Between two and three thousand fingerlings at a time are dropped into each lake, although sometimes the figure may be as high as 10,000. They are dropped from an altitude of 300 to 750 feet, falling in an arc for the first 180 feet and then vertically the rest of the way. Three thousand trout fingerlings hit the surface of the water over an area some twenty yards by forty. It costs a little over £1 to stock a lake with a thousand trout in this way, whereas taking them up into the mountains on pack horses would cost about £7 a thousand. New York State even used a small airship for the job.

The United States Air Force had at one time a parachute training scheme for dogs in Goose Bay, Labrador, so that they could be dropped to help stranded airmen. A sledge driver, the sledge itself and a dog were parachuted down separately. Dogs are particularly suited for parachute jumping and their trainers claim that they much prefer jumping out and landing in the snow to sitting in a bucking aircraft.

An air accident near Rome a few years ago resulted in a completely unintentional animal migration. A Philippine Airlines plane crashed near the airport, killing seventeen passengers. It was also carrying a consignment of butterfly chrysalises for the Wilhelma Botanical Gardens in Stuttgart, which got lost in the crash. It is easy to picture how surprised Roman lepidopterists were the following year to find the neighbourhood swarming with giant butterflies, some of them measuring ten inches across the wings. They were Atlas

butterflies from South-East Asia. The fifty chrysalises in their cardboard box had survived the crash and had completed their transformation into butterflies.

Boys' storybooks often used to contain hair-raising tales of eagles or vultures attacking aircraft. Certainly, in the early days of flying, encounters between big birds and the shaky aeroplanes of the time must have been dangerous. In 1955 a vulture flew into an aeroplane over the Kenya-Abyssinia border and caused it to crash-land. The plane had been quartering the area in order to observe the effects of an epidemic of rinderpest that had broken out among the Kaffirs' buffalo herds. The pilot had seen and carefully avoided a flock of vultures circling over some carcasses on the ground below, but did not see a lone bird some way off. It was this vulture which crashed into the plane, forcing it down. The pilot and observer had to tramp thirty miles through the pathless wilderness to reach the nearest native village.

In the autumn of 1953, banner headlines in the German press announced: 'Thousands of storks cause plane crash. Passengers radio last will and testament.' A big four-engined aircraft, oz 14, belonging to an Indian airline, with forty-four passengers aboard and piloted by Chief Pilot Dadim Thelum was passing over Casos and Cape Sidero (two islands at the North-East tip of Crete) at 4,500 feet when it flew into a huge flock of storks 12,000 to 15,000 strong, making for Crete. Dozens of them were cut to pieces by the aircraft's propellers, which were finally stopped by the mass of bones and feathers. According to the newspaper accounts, the plane then made radio contact with Heraklion airport amid scenes of near-panic among the passengers. Four Indian industrialists had their last wills and testaments radioed to Crete. The plane had to make a crash-landing a mile and a half from the airport and was badly damaged. It then caught fire, but all the passengers were rescued before the flames took hold. The reports of the accident were highly detailed, giving exact times and places. The enormous number of storks reported as flying towards Crete in one flock aroused the interest of ornithologists. They established that the story had originally been filed by a German news agency. In the meantime, the German Embassy in Athens had instituted extensive enquiries among all Greek airports and airlines and then issued a

statement declaring that nothing was known of any air accident like the one described in the agency story and that there had been no forced landing near Heraklion for several years. The Indian airline mentioned in the story had not lost any aircraft and the number OZ 14 had just been invented. So the 12,000 storks turned out to be so many newspaper canards.

In earlier days, animals were a hazard to landing aircraft. An SAS plane en route to New York some years ago had to circle Gander in Newfoundland for more than an hour, waiting for radio permission to land. When the plane finally touched down, its passengers learnt that a fierce battle had been raging on the airfield while they had been circling overhead. A family of bears had left the shelter of the thick forest surrounding the airport and invaded the runways. They refused to be driven off, and airport personnel finally had to shoot two of them with automatic pistols. At this, the other bears retreated to the forest. Seaplanes coming down to land on various Central African lakes have sometimes similar trouble with hippopotamuses.

We saw more of Africa's wild life and native villages from an aeroplane in a few hours, than we could have done in days and weeks of travel by car or on foot. A national park in East Africa – where Nature is supposed to be left undisturbed – was crowded with Masai tribesmen's huge herds of domestic cattle. In only one area, smaller and with rather more vegetation, did we manage to make out two elephant herds and some fairly large herds of antelopes. The only tourist motor road led to it, and the overnight camp was situated there too. When we reached it at the end of the dry season, after a car journey lasting several days, the place looked more like a wilderness than a park. The sandy ground was bare, and from time to time a mirage floated before our eyes, while the wind raised whirling columns of dust towards the sky.

East Africa's natives are steadily attaining more and more rights and are benefiting from the friendlier policy adopted towards them, but nobody has yet dared to make any public attempt to curb the black nomadic, pastoral tribes and their growing herds of cattle. Matters were better arranged in the national parks of what used to be the Belgian Congo. The few native villages that existed in the areas designated as national parks were re-sited elsewhere, leaving the

parks to the animals alone. In other national parks, however, we several times came across native villages. These clusters of huts with corrugated iron roofs were not marked on official maps at all yet some of their inhabitants owned cars. (It might be as well to point out here that national parks abroad are not parks in our sense, with fences and patches of grass and trees, but large areas, often the size of a European province, set aside as native reserves and protected against the onward march of civilisation.)

It was amazing to see birds appearing to fly backwards as we overtook them in our low-flying aircraft. In the United States during recent years low-speed aircraft have been used to follow pigeons and seagulls in flight. Flocks containing both dark and light plumaged pigeons are the easiest to follow, because dark birds are scarcely visible from the air when they are flying over a forest, while light-coloured birds do not show up at all over water or cornfields. Cities and towns are the worst areas to fly over because they show up as variegated patches of colour from the air. Pigeons were found to fly at about 45 m.p.h. and were not in the least bothered by the presence of the aircraft, even though it had to keep circling round overhead because it flew faster than they did. During this flight the observer discovered that pigeons never avoid mountains, even though they could often do so by making a detour of less than a hundred yards. They fly straight over the top. In fact, pigeons avoid open country if they can and fly over woodland whenever possible, because of their instinctive fear of hawks and falcons. The seagulls followed by the plane had to fly round and round in great spirals a number of times before they were able to find the right direction for their homeward flight, whereas the pigeons, especially trained homing pigeons, found the right direction very quickly.

Von Sanden, one of our best observers of wild life, noted on many occasions how birds of prey immediately flew towards any aircraft that happened to be circling over a lake. White-tailed eagles, spotted eagles, lesser spotted eagles, marsh harriers, buzzards, kestrels, kites – they all hurried from every direction, sometimes only two or three at a time, at others five or more. They positioned themselves beneath the aircraft and circled as well. Probably the circling plane created favourable up-currents for the birds. When they meet rising air currents, these hovering birds can stay aloft without moving their

wings. Even when some jet fighters appeared, streaking across the surface of the lake and producing their usual screaming, roaring noise, they did not affect the birds in the least. When a plane doing 100 m.p.h. flew over at about ninety feet above the ground, a hobby caught it up and effortlessly flew along with it for about five hundred yards. Only the bird's feeling of its own strength impelled it to do this, and it would not have done so had it had the slightest fear of the aircraft.

Before man learnt to fly himself, he often drew false conclusions from the flight of birds. In those days ornithologists asserted that many migratory birds used to fly over Heligoland at a height of several thousand feet; some species flew over the island at more than 9,000 feet, they said, and rooks at 12,000 feet or higher. This may often be so, but birds visible to observers on the ground could certainly not have been flying at those heights. Von Lucanus proved this at the beginning of the century, using balloons with stuffed birds in the flight position hanging from them with their wings spread. Rooks could just be made out as specks at 2,500 feet, but were invisible at a greater altitude. Sparrowhawks could be seen at 1,950 feet and bearded vultures at 4,500 to 6,000 feet.

Nevertheless, birds can fly at very great heights. At the beginning of March 1943 all the German anti-aircraft batteries round Cologne – except one – opened fire on 'approaching enemy aircraft.' The one silent battery was under a platoon commander named Mildenerger who was at great pains to inform his c.o. why he had not opened fire. As an ornithologist, Mildenerger had discovered that what the anti-aircraft range-finders and spotting equipment had picked up were not in fact aircraft but birds. He made good use of the equipment during the next few weeks, measuring the height and speed at which migratory birds were flying overhead. A hundred and fifty ring-doves, for example, flew overhead at an altitude of 5,200 feet at 41 m.p.h.; cranes at 3,600 feet at 33 m.p.h. and four hundred rooks on another occasion at 5,800 feet at 43 m.p.h.

Nobody can dispute the fact that we have long since overtaken birds in the art of flight. We fly higher than the boldest bird and can find our direction at night and in fog much more easily. I have never flown in a glider, and perhaps things are different there, but certainly

in an ordinary aircraft I always feel as if I am in a bouncing, rattling taxi which happens by chance to be flying through the air instead of jolting along the road. Despite the many flights over land and sea that I have let myself be dragged into, I have still come no nearer to my youthful ambition – to be able to soar in wide, wide sweeps up into the sky like an eagle.

Our Animals Look at Films

MANY species of wild animal are almost born to be tamed and be friendly towards human beings. Cheetahs, the big, tawny, black-spotted predatory cats that look like leopards and are always mistaken for them, come into this category. Many of them are very affectionate and begin purring just like a domestic cat as soon as anyone comes near them, so much so that one feels it almost a duty to release them from their cages and take them home.

Before I start getting dozens of requests for cheetahs as domestic pets, I must point out that cheetahs may cost anything from £225 to £350 apiece, and must be fed only on meat – not mere horseflesh like lions and tigers, but poultry, guinea-pigs, rabbits and other small animals as well. A cheetah on a lead is only suitable for a film actress who wants to impress the news photographers. In fact, cheetahs whose owners take them everywhere drive them to despair, because they lie down at frequent intervals and refuse to get up, and nothing will move them.

While the cat-house in the Frankfurt Zoo was being rebuilt we took a cheetah called Ali home to live with us temporarily. We realised that we would be unable to let him out of his room on his own when he needed exercise and that he would have to be taken out on a lead, but when we wanted to take him out, he refused to budge, whenever we did. In the end we decided to try wheeling him out of the house in a wheelbarrow, and he jumped into it willingly enough.

Apart from this incident, Ali's behaviour was angelic. Three days after he first came to the zoo he came down with feline infectious enteritis which he had caught somewhere on the journey to the zoo. The injection all our cats get as soon as they arrive had not had time to take effect, Ali was the first big cat we had ever received which was

already infected with feline infectious enteritis and he had to endure a great deal of discomfort. For almost a week, day and night, he had to have four-hourly intravenous injections of aureomycin in his thigh. This must have been extremely painful, for the entire skin area was full of needle punctures. He fought against being injected with all his strength and always had to be overpowered by force. I thought that this would be the end of his friendliness towards human beings, but I was wrong. He remained as tame as ever.

On one occasion we had another cheetah in the house. It was sitting in the passage with us while we watched an animal film my son Michael had made. We were sitting there in the dark, having forgotten all about the cheetah, when it suddenly made a leap at two flamingoes that appeared on the screen. The same sort of thing had happened to us before with dogs. They often barked or rushed at the screen when other dogs or birds appeared in the film. If the dogs were put close to the screen, however, they lost all interest in the proceedings, perhaps because they could not pick up the other animals' scent even though they were so near, or else because the picture seen from close up and at floor level became so distorted as to be unrecognizable. I had my own theories about it, in any case.

Explorers in Brazil have reported that Moré Indians as well as other tribes, have no understanding of photographs at all. They held them upside down and called them 'maramchi', the word they use for the ornamentation on their arrowheads. When Martin Johnson, who took many pictures in Africa, visited the pygmies of the Congo he wanted to amuse them by photographing them and then showing them the finished pictures. But they too were unable to recognise themselves, their relatives or their huts and reacted as we would if someone pressed a blank piece of paper into our hand.

Despite these accounts, I have never been able to believe that human beings, however primitive, would be incapable of recognising pictures, so on one of my trips to Africa I made an experiment with some pygmies. In my book *No Room for Wild Animals** I have described in words and photographs how extraordinarily adept the pygmies were at recognising animals, ourselves and themselves from photographs. Not long ago, a hunter reported a similar case.

* Thames and Hudson, London, 1956.

He showed some pygmies a book about animals, illustrated in colour and asked whether any of them were to be found in the vicinity. The pygmies showed great interest and lied furiously so that they would be paid more for their information. One of them looked at a picture of a walrus and said that he often saw such animals, but that they lived in the darkest depths of the jungle and attacked any human being they encountered! My own assumption is that the failure to recognise photographs in the other cases was due to shyness, language difficulties or the complete novelty of the pictures.

If this was not the case, how was it that our chimpanzees were so interested in looking at pictures? When they looked at photographs of antelopes they used to try and pull them out of the picture with thumb and forefinger. When they were shown a reduced picture of a chimpanzee's head they always kissed the mouth and scratched it as well. Photographs of this can be seen in another book of mine, *We Animals Are Not Really Like That*. If anthropoid apes can recognise small pictures, human beings, no matter how primitive, must also be able to do so, because man has the gift of speech and a much more highly developed brain than his animal relatives. Even horses and zebras were able to recognise life-size pictures of their own species (see my book *Elephant School*).

When we put wild goose eggs in an incubator and then reared the young birds artificially, so that they had no contact with other wild geese, they still uttered warning cries and took cover the first time they saw an eagle in the sky. They can recognise their hereditary enemy instinctively and do not need to be taught to do so. They can also recognise their own species. A mallard hatched from an incubated egg and artificially reared in solitary seclusion, will mate with another mallard, not with a sheldrake or even a gander. As we saw, however, in the chapter, 'Kaspar Hausers of the Animal World', it seems to be different with horses.

Our cheetah's attack on the screen gave me the idea of showing the film to other animals. Our chimpanzees displayed noticeable curiosity, especially when they saw themselves on the screen. They made interested noises and followed the activities of the film chimps very closely. After a few minutes, however, they lost interest in the film, like small children, who also cannot concentrate on one

activity for long. African servals, enchanting terrier-sized predatory cats with very big ears, jumped at the screen as soon as birds appeared on it. The gorillas wanted to find out exactly what the film show was all about and got up in the middle of the performance and lifted up the screen to see whether the animals they had seen were hiding behind it. This is not as laughable as it may seem to the many people who always adopt a superior attitude towards their fellow creatures. In Africa, where numerous cinemas are springing up in the interior in competition with the missions, natives paying their first visit often search behind the screen and under the stage to try and find the people they have just seen in a film.

It was very difficult to photograph the animals' reactions to a film because the room had to be in darkness to show it. It was no good taking flashlight pictures, because then the screen merely showed up as a blank white patch. My son Michael experimented for a long time, and finally hit on the idea of building a funnel-shaped hood of black cardboard round the screen, which kept it in darkness when the flashbulb went off at the side of the room. Then he built a flash unit into another projector and coupled it with the first one. In this way we were able for the first time to photograph the reactions of young gorillas, cheetahs and servals to movie films.

Some years ago a farmer in Maberly, in the north-eastern Transvaal, happened to observe the same behaviour in wild, long-tailed monkeys as I had seen in my tame animals. Leopards have been extinct for decades in the area, since events follow the same vicious circle everywhere when new settlements are established in Africa. First the antelopes are shot for meat for the farm workers. This forces the leopards, deprived of their natural prey, to attack the farmers' and Africans' cattle and dogs. Then the leopards are wiped out. In the end, baboons and warthogs take over and ruin the crops. Then everyone wishes they had the leopards back, even though their skins may have sold for a pretty penny. The farmer in question had taken a stuffed leopard head off the wall in his house and displayed it to some long-tailed monkeys living in large troops in the jungle trees at the edge of the farm. They took no notice whatever.

Later on a pair of leopards entered the neighbourhood. The farmer saw from their tracks as well as their droppings that they

had been coming to drink at the spring near his house almost every night. They both used to scour the area for prey and then return to the neighbourhood of the farm every few weeks.

Next time he displayed the stuffed leopard head to the monkeys there was great indignation among them. They congregated in the branches of the trees, chattering and gesticulating, and did not seem to be able to tear themselves away. Later the farmer placed an almost life-sized crayon drawing of a leopard at the edge of the forest. As soon as one of the male monkeys saw it he gave a warning cry, and the whole troop appeared one after another and gathered at the boundary fence of the farm, chattering and shrieking abuse. When the farmer walked through the forest carrying the picture, the excited monkeys followed him, ignoring his companions completely. So the long-tailed monkeys had also recognised a picture of their enemy, although in their case, this was not instinctive, as it was in the case of the wild geese and the eagle. The monkeys had had to learn by bitter experience that leopards were their enemies.

Animal Experiences with Press and Radio

WHEN I was in the first form at school I was an enthusiastic bantam hen breeder and, since the child is father to the man, I wrote an article for a small poultry journal about a breed of hen I had found particularly fascinating. I was very proud to see myself in print for the first time, but my pride was short-lived when I saw what the journal had printed.

There are species of bantam hens with wide tufts of feathers on their legs and others with smooth legs. In German the second species are known as '*glattfüssig*', (smooth-footed) and these were the ones I had written about. The printer had, however, used the word '*plattfüssig*' (flat-footed) throughout the article. This experience did more to make me feel that I must get used to writing clearly and legibly than all my teachers' exhortations could have done. What is more, I saved up and bought a second-hand typewriter and began typing my work with one finger, as I still do.

Newspapers and the radio have given me many surprises over the years. So have newsreel cameramen. Once, when my son Michael arrived in Hamburg aboard a small French ship with a collection of animals which he had brought with him from Africa, the newsreel men took a film of him holding up a huge python, which then slithered back into the crate it had travelled in. The commentator described how the python had done this on the 'word of command'. In fact, there was nothing remarkable about the python's performance, because a snake will always take cover in a dark hole when it finds itself in unfamiliar surroundings. Big snakes like pythons are not poisonous and kill their prey by constriction. Anyone who is bitten by a poisonous snake today is immediately injected with anti-

venom serum. During this particular African trip my son had in fact been bitten by a snake and I had immediately given him an injection.

He told the pressmen about it, and it was not long before many newspapers were carrying stories, friendly enough in themselves, about how the supposedly poisonous python Michael had taken out of its crate had bitten him. But, the papers reported, he had immediately 'swallowed some serum'. When we had left for Africa, one paper had reported that we wanted to observe hippopotamuses, lions and tigers. Tigers, mark you, in Africa!

Some years ago a woman in Bavaria sent me a page from the *New Yorker*, which contained an article by an American woman about a trip she had made to Germany in 1949. Towards the end of the article there was a description of her visit to the Frankfurt Zoo:

'That zoo, in the midst of dreadful destruction had been a winning sight', she wrote. 'There was a gaily coloured and fantastic merry-go-round, and there were pretty pools occupied by good-looking ducks who sometimes quacked contemptuously at the peacocks that strolled in all their self-conceit under the trees. Germans wearing knickerbockers and Tyrolean hats smoking pipes quietly drank beer at the outdoor cafés. [Typical of the way foreigners describe Germans; all that is missing is sauerkraut and a description of everyone eating sausages]; children screamed with laughter at the monkeys, desired to take home the sleeping leopard, and silently observed the girl lion tamer, who slapped her beast on the rump with a gloved hand and cracked her whip before his nose and made him growl. There was an air of holiday kindness and humour and warmth. But then I came to the pool where the rhinoceros wallowed and rolled, and I saw a boy trying to put a small monkey which he had on a leash, into the hideous mouth of the outsize animal. The monkey was terrified and would not step in between those monstrous teeth, upon that nasty tongue. Sometimes in his battle he fell into the water, and then the look on his face was one of unutterable defeat and misery. The crowds had never seen a sight so comic, and they could hardly steady their cameras, they were laughing so hard. Suddenly the monkey got away and, trailing his leash behind him, ran like the wind; his master went after him with a yell of fury through the

bright sunlight, between the brilliant flowers, underneath the lovely weeping-willow trees.'

In other words, how basically cruel these philistine Germans are. I wrote a letter of correction to the *New Yorker*:

'In a December issue of *The New Yorker*, I have just been shown a description by Jean Stafford of an incident that occurred at the Frankfurt Zoo involving a hippopotamus and a monkey. Miss Stafford misunderstood what happened, I'm afraid, and I ask that you set matters right. At the Frankfurt Zoo it is wholly impossible that a young boy would stuff a monkey into the mouth of a hippopotamus and that the spectators would laugh at the sight. As the director of the Zoo, I myself was a witness to the incident that Miss Stafford observed. The boy with the monkey was my son, and the monkey, named August, is one we have raised from infancy. For a long time he did not live at the Zoo but at home with us. I am also the man your reporter saw taking photographs of the proceedings.

August is a rhesus monkey and, like rhesus monkeys, is extremely bold. He runs around with my son a great deal and is kept on a leather leash to restrain him from biting people in the legs. He considers it great sport to dive into the water and, from below the surface pull ducks around by their legs. Also, whenever he encounters dogs he loves to annoy them and then, when they attack him, jump over them and scamper away. The rhinoceros that Miss Stafford saw was a hippopotamus. Hippopotamuses are fed bread, fruit, etc. They do not eat monkeys, anymore than rhinoceroses do. They have giant mouths lined with huge teeth, and they like to open their mouths towards onlookers. Our hippopotamus, Toni, is not dangerous. He is so good-humoured, that his keeper goes swimming in the same pool with him. August is so bold, however, that he tries to annoy Toni by jumping on top of his nose when his mouth is wide open. At such times, I occasionally take a snapshot of him.

There was surely no terrified expression on the face of the monkey. I am enclosing some photographs that will convince you of that, I am certain. I am sorry that Miss Stafford, who wrote so clearly about the Frankfurt Zoo in other respects, did not ask us to explain the meaning of the scene. She may rest assured that neither at the Frankfurt Zoo nor at any other German or American zoo would

anyone be permitted with impunity to let little monkeys be devoured by big animals. Yours respectfully . . .'

I was very curious to see whether the *New Yorker* would play fair and print my letter. I had had some unhappy experiences with German newspapers in similar circumstances, but the *New Yorker* printed my letter word for word, exactly as I had written it. Before the new issue reached me, I received an airmail letter without a sender's address on it. 'No American would bathe in the same water as a hippopotamus,' wrote my correspondent in English, 'even if its bodily orifices had first been sewn up.' 'But you Germans fear nothing in the world except God (Bismarck)', the letter concluded in stilted German - 'Yours truly, Charles F. Hanslik'.

During the next few days I received masses of letters from all over America. They were all friendly, even cordial, and many expressed regret that nations were incited against each other by such misunderstandings.

One day I broadcast a programme with the South-West German radio's reporter, Reinhard Albrecht. I played tape recordings of animal noises, and he and the listeners had to identify the animals. Then Albrecht said that he had recorded some noises and would like me to guess what they were. I agreed, and a weird 'eh, eh, eh, eh' came over the loudspeaker. I wrote down 'male camel,' but I was wrong. It had been me. What Albrecht had done was to take a tape recording of some of our earlier conversations, cut out everything except sounds like 'er, ahem, mm, eh' and then run them together.

I had no difficulty in revenging myself on him. For five years, I used to broadcast a regular talk on the South-West German radio every Saturday. They were pre-recorded at my home by Reinhard Albrecht, who always smoked during the recording sessions. What I did was to put a joke box of matches on the table in front of him. As the recording proceeded, he would become engrossed in what he was doing, take out a cigarette and reach for the matches. As soon as he touched the box it would give a loud buzz and startle him, and he had to cut that part of the programme out of the tape. Of course, he always swore that he would not fall for the same trick again, but I caught him at least forty times.

Zoos are generally considered fair game for newspapers on April

Fools' Day, but a few years ago I turned the tables. I had already told a few newspapermen in the middle of March that the Siamese head of State had made a gift of a white elephant to the Copenhagen Zoo. These famous creatures are even rarer than white ravens and extremely expensive, so the one that had been presented to Copenhagen had been landed at Genoa and taken on to Denmark by road, I had told them. As the journey was such a long one, the white elephant would be staying at the Frankfurt Zoo for a day or two and would be on view to visitors. To make the story sound convincing, I had produced a photograph of the famous white elephant. This had been made by first photographing three of our elephants and making a very light print from the negative. Then I had cut out the middle elephant, sticking it on a normal print between the other two and photographing the resulting montage. The camera cannot lie. There was a white elephant standing between two ordinary ones.

Next, we mixed up some whitewash and sprayed our cow elephant, Simla, white. She obviously liked this, and there was no danger attached to it, because elephants always spatter themselves with mud and earth. This was on March 31, and I informed the press that the Siamese white elephant would be arriving at the Frankfurt Zoo the next day for a twelve-hour stay.

The press were very interested, especially the Americans. They came to see me a day before the 'Siamese elephant's' expected arrival and pumped me for every scrap of information I could give them about white elephants. I told them the most incredible things, such as, for example, that white elephants were regarded as holy from birth and were reared in temples; that Siamese mothers regarded it as great good fortune to be allowed to give their own milk for rearing white elephants, and that the temples were guarded by snakes. 'The elephant that is coming to this zoo has actually been reared on human milk,' I told the reporters. It was not very easy to explain all this in English and keep a straight face. The reporters found the whole matter so interesting that they wanted to know still more about it, so I told them that the Siamese were often seized by paroxysms of religious frenzy during festival processions and threw themselves to their death under the feet of these white elephants. 'The elephant that is due to arrive tomorrow has

already trampled many people to death.' (In fact, it is impossible to make an elephant trample on anyone unless it is furious with rage or a vicious animal, because elephants are always particularly careful about where they put their feet down.)

I was somewhat embarrassed when I was woken in the middle of the night by an American news agency. There had been big headlines in all the Scandinavian newspapers about the forthcoming arrival of a white elephant at the Copenhagen Zoo, so the agency's Copenhagen staff had telephoned the zoo director, who had said he knew nothing about it. Perhaps the elephant was for a circus, and not for the zoo, the agency reporter asked me. I had to keep the ball rolling, so I replied: 'Please tell my colleague Reventlow that he might as well admit that he is expecting a white elephant, since I have unfortunately leaked the story to the press.' Crowds of people paid special admission fees to come and see the white elephant in our elephant-house at the Frankfurt Zoo. A turbaned 'Siamese' with his skin dyed brown sat on the ground nearby, and at certain times of the day, as the rules required, he turned in the direction of Mecca and prayed.

In the evening two ladies from the radio station turned up. They were going to broadcast a programme about the most successful April Fools' Day hoaxes and also give a round-up of the most noteworthy genuine news items. They steadfastly refused to believe that I really had a white elephant in the zoo, and it was only with the greatest difficulty that I managed to persuade them even to enter the elephant-house. When they finally did, however, they swallowed the story hook, line and sinker. They asked some of the people there to come to the microphone and describe the scene and tell the listeners that there really was a snow-white elephant behind the bars in the elephant-house. The two ladies included the white elephant in their list of genuine news items on their programme that night . . .

April the First is a difficult time for zoos. All day long people keep ringing up and asking to speak to 'Mr Wolf' or 'Mrs Fox' or 'Miss Pike'. Many callers apologise as soon as they hear our telephone operator say 'Good morning, the Zoo'. Someone has left a note on their desks asking them to ring a certain number and ask for 'Mr Lyon', or whatever it may be. A lot of people hang up as soon as

they hear the word 'zoo'. We have often had as many as a hundred telephone calls like that on April 1. Only mortuaries and mental hospitals have as bad a time as zoos on April Fools' Day.

One of the most recent April Fool jokes played on us was by the *Abendpost*, which published a story alleging that the Frankfurt Zoo was prepared to buy cats at three marks apiece in order to feed them to some weird, blood-thirsty mice I was supposed to have brought back from Africa. All sorts of people turned up at our cashier's office with stolen cats, and were terribly upset when we refused to pay for them. They did not want to believe that we were not responsible for the announcement in the paper, and I began to be worried in case the animal protection association took action against me.

On another occasion, I received a telephone call from the editorial department of a magazine which goes in for publishing rather naughty photographs of unclothed girls. The magazine people asked if we had a big bull in the zoo, and when I told them we had, they asked if they could bring along a pretty girl who would pose in the nude on the animal's back as 'Europa and the Bull'. Of course, that would have been a wonderful advertisement, especially for a municipal undertaking like our zoo! It would have been convincing proof of the zoo director's loose way of life, too! But the magazine people persisted, and only became convinced that their idea was impracticable when they paid a personal visit to the zoo. Then they soon saw that our big African Watussi bull with its giant horns, good-natured though it was, would certainly not tolerate a girl sitting on its back, clothed or otherwise.

I have always had a quiet liking for Denmark and Copenhagen, and before the War I went there almost every year. In the army, I was given a posting there for a few days, and went to my usual hotel near the station, but the commissionaire would not let me in. The hotel was now reserved for German officers above the rank of major and I had not yet reached those heights, so I had to move into the Kong Frederick Hotel. The same evening, the Danish newsmen and photographers came to see me, and the next day the papers ran articles and pictures about me and my experiments with elephants and other animals.

The press attaché at the German Embassy rang me up first thing

in the morning. He had always had great difficulty, he said, in persuading the Danish press to publish anything favourable about Germany, and had had to prod and coerce them. Now, here was I a junior member of the armed forces, and without his asking them to do so the papers had published such good stories. How had I managed it? I replied that elephants and wolves had nothing to do with politics. Still, the German Embassy invited me to dine on snipe with Svend Fleuron, the well-known author of animal books. The snipe were very tough, but my talk with Fleuron was extremely lively and fruitful.

The attaché asked me whether I would like to lecture on animal psychology in Stockholm. Naturally, I was very keen. Anyone who has been a soldier on active service can imagine how wonderful it would have been to go to Sweden for three days in the middle of the War – a rich country, flowing with milk and honey, which was at peace and where one could probably still get packets of butter to smuggle home. But I soon learnt that the plan had fallen through, because Furtwängler, the conductor, had been booted out of the concert hall. A few years later I was to be glad that the trip had not come off, because if it had the Americans would certainly have tried me in 1945 for making Nazi propaganda in a neutral country during the War. Thank God that innocent people still have guardian angels.

Naturalists are careful not to indulge in political activities, and I think that this is as it ought to be, even if they have definite political convictions of one kind or another. All the same, they often have political worries. Twice the Berlin Gestapo locked me in the Alexander Prison, and a pair of iron gates without handles clanged to behind me. A police official told me that I knew very well why I had been taken there. This is a favourite police trick to get people to deny having committed all sorts of crimes the police do not even know about.

When I denied having any idea why I had been arrested, the official held up a document. I had put a mark in an envelope, he said, addressed it 'to some stationer in Halberstadt' and asked him to send me an aerial view of the town. Was it not perfectly clear that such conduct was highly suspicious in view of all the air raids? And why did I want an aerial view of anywhere?

For a newspaper article about saurians, I told him. The clay deposits near Halberstadt contained large quantities of saurian fossils, and some of them had been baked into bricks with clay. I had wanted the picture of Halberstadt to accompany the article, with a caption saying that the walls of many houses in Halberstadt contained bricks made with saurian fossils as well as clay.

What were saurians? the official demanded. So I gave him a lecture about these extinct giant lizards. If I had been a foreign spy I could easily have gone to Halberstadt myself and bought the postcard I wanted for twenty pfennigs, and I would not have sent it to my home addressed to me. It was only by a great effort that I managed to dissuade him from having the newspaper offices searched for the article on saurians.

Another time I had taken a photograph of a small boy for an article on cockchafer. He was standing in front of a tree in full blossom, letting a cockchafer fly off his finger. The caption was: 'Fly, cockchafer fly, your father has gone to war.' The picture was banned by the censor because cockchafers were injurious pests and it was forbidden to show them in a favourable light . . .

On yet another occasion I wanted to show how diligently our goats gave milk. I had worked out the quantity and painted a picture of a big dam full of milk. This picture too was banned by the worried censorship of the Third Reich 'because readers might think that Germany had too much goat's milk and would stop keeping goats'. Censors have always made many unintentional jokes.

Recently a man from the Sudetenland came to see me. He was a manufacturer of dog food and wanted a testimonial. He was amazed to learn that I was a German and not a Czech, because my articles had been appearing in a certain Czech newspaper for years, and many Czechs thought because of my unpronounceable name that I lived somewhere in Bohemia. Unfortunately I cannot speak a word of Czech. As a matter of interest, I have never received a penny piece from the Czech newspaper. During the War one of my books appeared in a Czech translation and I had the greatest difficulty in obtaining even one copy.

It is a strange feeling to pick up a book you have written yourself and not even be able to decipher the captions under the pictures. '*We Animals are Not Really Like That*' is '*Takova is me my zvirata*' in

Czech, which is much shorter and more compressed than German, so the book contains fewer pages. Since it appeared during the time of the 'Reich Protectorate' of blessed memory, I had the foreword translated as quickly as possible after the War, in order to find out whether the Czech translator had put in anything inspired by the Nazis. Luckily he had not.

These are some of the ways in which a man who writes only as a kind of advocate for our four-legged and feathered fellow-creatures acquired a store of experiences through newspapers, publishers and broadcasting.



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