

Chimpanzees and Others at Play

by Jane Goodall

There are many windows through which we can look out into the world, searching for meaning. There are those opened by science, their panes polished by a succession of brilliant, penetrating minds. Through these we can see further and ever more clearly into areas that once lay beyond human knowledge. Gazing through such a window, I have, over the years, learned much about chimpanzees, their behavior, and their place in the nature of things. And this, in turn, has helped humans to better understand some aspects of our behavior and our own place in nature. But there are other windows that have been unshuttered by the logic of philosophers, windows through which mystics seek their visions of the truth; windows through which the leaders of the great religions have peered as they searched for purpose not only in the wondrous beauty of the world, but also in its darkness and ugliness. Most of us, when we ponder on the mystery of our existence, peer through but one of those windows onto the world and even that one is misted over by the breath of our finite humanity. We clear tiny peepholes and stare through, hoping that our own fragmentary images will cohere.

By looking through my peephole into creatures at play, perhaps you, too, can open a new window of joy and creativity. Let me begin with four stories. The first is about a young male elephant. Sometimes he stationed himself on a path that was used by buffalo when they went to drink each day. He hid in the undergrowth and then, as the buffalo appeared, he burst from his hiding place and charged toward them, ears out, with a great trumpeting sound. Startled, they scattered in all directions. At the time there were no other young elephants in his herd with whom he could play. The second story is about a little boy who occasionally hid nasty things in a friend's bed—we call that an *apple pie bed*. The boy then hid so that he could watch the startled reaction of his victim.

Those two stories have one thing in common—the element of surprise. The buffalo did not expect, when they went down to water, that an elephant would charge them (at least not the first few times), nor did the boy's friends expect to find unpleasant slimy things in their beds. Clearly, the little boy demonstrated the ability to plan and to use his imagination. What about the elephant? Was he, too, demonstrating a capacity for imagination and planning? Surely to suggest that this was so would be anthropomorphic—unscientific in the extreme! Certainly most of those studying animal behavior, until very recently, would have held this view. Some still do.

The next two stories concern a different kind of playful imagination—play with words or making jokes. In a joke, it is the punch line at the end that makes us laugh because, as was the case in both stories above, it is unexpected,

surprising. A man bought a young dog and took it for a walk in the park. Presently they came to a river, and the man picked up a stick and threw it into the water. The little dog ran across the surface of the water, picked up the stick, ran back, and dropped it at his master's feet. The man, thinking he must be dreaming, picked up the stick and threw it again. And the little dog ran over the water and retrieved the stick. The dog's owner, unable to keep this amazing phenomenon to himself, approached a passer-by. "Hey, look at this. I've got the most amazing dog. Watch!" he said, throwing the stick. "Huh!" says the passer-by, "Your dog's no good-he can't swim."

That story, surely, demonstrates a type of playful creativity that is unique to humans, or is it? This fourth story concerns a lowland gorilla, Koko, who is well known in America for her ability to communicate using American Sign Language (ASL). Her trainer, Francine Patterson (1984), claims that she knows over seven hundred signs. One day a new student, fluent in ASL, was rehearsing Koko on her knowledge of signs for the different colors. Koko had been taught all the more commonly used colors and knew them well. The young woman picked up a white napkin. "What color this?" she signed. "Red" answered Koko without hesitation. "Come on Koko, you know better than that. What color?" replied the helper. "Red," Koko signed emphatically. "Koko, if you not tell me correct color, I not give you apple juice," signed the exasperated student, sure that Koko was making fun of her. At that threat, Koko reached out for the napkin, picked off a *tiny* piece of red fluff, held it out towards the young woman, and laughing, signed "Red! Red! Red!"

Where, after all, do we draw the line between human and nonhuman? When I began my research thirty-four years ago, I was studying ethology in Cambridge, England. If I had, at that time, wanted to make a study of the animal mind, I would have been told that animals did not possess minds, in the usual sense of the word. It was not always so. In the early twenties, both Wolfgang Kohler (1925) and Robert Yerkes published results of their studies of chimpanzee intelligence. The apes were given a variety of problems that, it was asserted, they solved by reasoning and even by using imagination. But their results were not generally accepted by the scientists of the time. Pavlov wrote that such studies were anthropomorphic and "disgusting." And the American psychologist Watson proposed a strictly mechanical process to explain apparently intelligent acts in nonhuman beings. Animals, he maintained, were incapable of reasoning; they functioned through innate responses to stimuli. And even though it might appear that they had minds, it was not so. Nor did they have feelings, despite similarities in the brain and central nervous system. Only human animals, it was held, felt real pain if burned or beaten. Animals might *look* as though they felt pain or experienced feelings of joy or sadness, but to suggest that they actually *did* so was anthropomorphic fallacy. In 1960 it would not have been possible for me to have studied the mind of the chimpanzee within the ethological framework acceptable to British science at the time. As for any suggestion that nonhuman

animals might be capable of imagination—witches in the Middle Ages were burned for lesser heresies.

Gradually, however, scientific thinking changed, partly as a result of the field studies of nonhuman primates that began during the sixties. Suddenly ethologists were confronted by careful descriptions of highly complex social behaviors, and attempts to understand these using the old simplistic explanations often failed. Today we know that many nonhuman animals are capable of sophisticated cognitive performances, and it is quite fashionable to study the workings of the nonhuman animal mind. Without doubt, studies of chimpanzee behavior, particularly the longitudinal observations at Gombe and elsewhere, have played a major role in helping people to understand the nature of nonhuman animals.

As more and more information was collected about the behavior of chimpanzees, both in the wild and in captivity, the many similarities in the behavior of chimpanzees and humans became increasingly obvious. Our similar DNA structures differ by only just over one percent, and there are striking similarities also in the blood composition, the immune responses, and so on. The structure of the chimpanzee brain and central nervous system is extraordinarily like ours. This appears to have led to similar emotional expressions and intellectual abilities in our two species. Our own success as a species (if we measure success by the extent to which we have spread across the world and altered the environment to suit our immediate purposes) has been due to the explosive development of the human brain. Our intellectual abilities are clearly far more sophisticated than those of even the most gifted chimpanzees. Nevertheless, there is now good evidence of sophisticated mental performances in the apes and other higher animals.

Chimpanzees can solve simple problems through processes of reasoning and insight. They can plan for the immediate future. They can learn, as mentioned, three hundred or more of the ASL signs and use them to construct sentences similar to those used by deaf human children. Chimpanzees can be taught other complex human communication systems; they can learn the meaning of lexigrams, picking them out in correctly ordered sequences from computer keyboards or from printed boards. This helps to demonstrate their powers of generalization, abstraction, and concept formation as well as their ability to understand and use abstract symbols in their communication. One chimpanzee was able to grasp the nature of problems faced by a human actor in video sequences. In one, for example, she watched a man shivering and kicking at a faulty, sputtering electric wire and then, from a series of photos, picked the correct solution; she chose the one showing a broken cable. Chimpanzees can recognize themselves in mirrors. They clearly have a concept of self (Savage-Rembaugh 1990).

Some captive chimpanzees enjoy painting or drawing. They show great

concentration and make pleasing patterns, each one with his or her own distinctive style. Sometimes those who know ASL will, spontaneously, sign what it is they have represented with their work. Usually it does not look like anything much to us, but if the artist is shown the same picture a month or so later, he or she will usually label it the same way. Chimpanzee representational art! (see pictures in Goodall 1986, 41).

The most intelligent captive chimp I know is the female Ai (which means love in Japanese). Professor Tetsuro Matsuzawa, with great understanding and sensitivity, is investigating the upper reaches of the chimpanzee intellect in "partnership" (as he describes it) with Ai. The moment she sees her partner she is eager to leave her large outside enclosure, where she lives with eight other chimpanzees, and go to her computer. She performs many tasks better and more quickly than high school students!

Not only is the structure of the chimpanzee brain similar to that of the human brain, but, in addition, chimpanzees often use their brains in the same sort of way that we use ours. One of the evolutionary pressures that helped to develop chimpanzee intelligence was, I believe, their complex society: they needed to use their brains to cope with the problems of daily life (although, of course, this is a chicken-and-egg situation because only a complex brain permits a complex society!). Chimpanzees live in groups of thirty to fifty individuals that we call communities. Within a community the individuals recognize each other and spend varying amounts of time in each other's company. Mostly they move about in small temporary groups made up of males only, or females and youngsters with or without males. The composition of these little groups keeps changing as one or more of the members split off to move about alone or to join others. There are strong affectionate bonds between some individuals that may last throughout life, fifty years or more. Communication between community members comprises, in addition to many different calls, a rich repertoire of postures and gestures such as kissing, embracing, holding hands, patting one another on the back, swaggering, punching, pulling hair, and tickling. These are not only uncannily like many of our own, but are used in similar contexts and clearly have similar meanings. Friends greet with an embrace, and fearful individuals may be calmed by a touch, whether they be chimpanzees or humans. Chimpanzees are capable of sophisticated cooperation and complex social manipulations. Like us, they have a dark side to their nature: they can be brutal, aggressively territorial, and sometimes they even engage in a primitive type of warfare. But they also show a variety of helping and caregiving behaviors and are capable of true altruism.

Wild chimpanzees live in male-dominated societies; adult males, except on very rare occasions, are able to boss females of any age. The males, most of the time, are ordered into a dominance hierarchy with one male, the alpha, emerging at the top. Chimpanzees, like other social mammals, typically solve their disputes by means of threatening gestures rather than by attack, although fights do break

out. Most aggression between males, including fighting, takes place in the context of social dominance, and conflicts leading to a change in the top-ranking male may be particularly severe. Mostly, though, males try to intimidate each other by means of their dramatic *charging displays* when, with lips bunched in a ferocious scowl they charge across the ground slapping their hands and stamping their feet, dragging great branches and hurling rocks, leaping up to shake the vegetation. They make themselves look larger and more dangerous than they may actually be and often intimidate rivals without having to risk a direct, physical attack—in which the attacker, as well as his opponent, might be wounded.

It is important to point out that each chimpanzee has his or her own unique personality. They are as different, one from the other, as we humans are. Even individuals growing up in the same social group at the same time have their own unique life histories. Let me relate part of the story of Mike. In 1964, he was almost the lowest ranked of fourteen fully mature males. He was a small chimpanzee, just past his prime, with one canine tooth already broken. But he was characterized by a strong motivation to improve his social standing, determination, and a high degree of intelligence. One day, during a charging display, Mike seized and hit an empty four-gallon kerosene can from my camp. It made a loud and unusual noise as it clanged and banged along the ground, and a couple of senior males rushed out of the way. Over the next few months, Mike began, systematically, to incorporate these cans into his displays. He learned to keep as many as three ahead of him, hitting and kicking them, as he charged directly toward males who were, at that time, his superiors. Alarmed by the noise, they fled. And within a period of four months Mike rose to the coveted top-ranking position in the male hierarchy without, so far as we know, having to fight at all! The point that should be made is that every male had the same opportunity as Mike to use those cans. Moreover, every male was seen to use a can at least once during a display. Only Mike had the intelligence—and, dare I say it, the imagination—to capitalize on a chance experience and turn it to his own advantage. This introduction serves as a grounding for discussion of creativity and imaginative play in nonhuman beings. We should first ask one key question: What is play? Scientists have great difficulty providing a precise definition of play in animals, even though observers usually agree as to what is and what is not playful behavior. Although, as mentioned, we usually know when an animal is playing, it is not always clear cut. For example, when animals investigate the world around them, touching, picking up, tasting, and biting things, it looks as though they are playing, but we cannot be sure. When a human toddler "plays" with blocks, is this play or "work"? What most observers do in these cases is to make their own working definitions.

Play seems intrinsic and begins with simple rhythmic movements that may even occur in the womb. The most common patterns described as play in almost all mammals and birds comprise variations on upward springing, turning around, and tumbling over and over. The patterns may involve pirouetting, turning and

twirling, twisting around, leaping and swinging in trees, or turning somersaults. These play movements may be repeated many times. It is possible that the repetition of newly learned phrases by young songbirds, such as blackbirds and nightingales, may represent a type of vocal play.

During play, the actor may change actions very quickly: one moment running as though fleeing, and the next chasing or pouncing as though attacking. These shifts occur effortlessly. In many species the young, particularly young primates and young carnivores, play with objects; they pounce on feathers, pieces of dried skin, dried dung, and so forth. During bouts of social play, youngsters tumble and wrestle together, chase and flee from and bite one another. Sometimes play partners take it in turns to be the "aggressor" or the "victim," but in some cases the larger or more assertive individual consistently assumes the dominant role.

Many actions seen during play occur in similar form in adult communication sequences in a variety of contexts, but it is usually very obvious when the behavior is performed playfully. Moreover, there are special signals that clearly indicate playful intentions, such as the "play walk" in chimpanzees. And there are many ways in which an animal can signal its desire to initiate play, as any dog owner knows. When a play session involves partners of different ages, the older typically adjusts his or her behavior so as not to hurt the younger playmate. Sometimes squabbles break out during play, typically when one of the playmates hurts the other. Usually this seems unintentional and the rough individual quickly tries to reassure the others, and then play continues. When a real fight is triggered, bystanders, particularly mothers or other family members, may become involved, joining in to support one or another of the youngsters. Or a dominant male may charge over to stop the fight, thus restoring social harmony.

Another example is taken from my own observations of spotted hyenas in Tanzania. One evening as I was watching two youngsters at a den—a yearling male, Baggage, and his infant sister, Brindle—the small cub found a large smooth stone. She tried to pick it up, but the stone was large, her mouth small. She persevered and seemed about to succeed when Baggage, who had been watching, gave her ear a sudden pull, and she lost her grip. Again she tried to pick up that special stone, and again, just as it seemed she would succeed, Baggage pounced on her so that she lost her grip. This happened three times more. Then suddenly Brindle darted behind Baggage and pulled his tail. Quickly Baggage picked up the coveted stone and ran off with it, Brindle in hot pursuit. During phase two of this teasing game, Baggage repeatedly slowed down so that Brindle caught up, but as soon as she jumped up to try to grab the stone from his mouth, he ran on again. Finally she knocked it from her brother's mouth, at which point phase one began again. Eventually, ten minutes or more after the start of play, Brindle suddenly moved away, as though no longer interested. She bit at some twigs, broke one off and began tossing it in the air, then pouncing on it. Baggage, who

was watching with the stone in his mouth, could not resist this new game. He dropped the stone and ambled over to try to grab the twig. For a few seconds they had a tug of war, and then, suddenly, Brindle let go of the twig, rushed back to the stone and again tried to pick it up. But this time, when Baggage bounded over, Brindle turned to face him and sat firmly on the stone! The game had ended!

Dietmar Todt observed fascinating play behavior among semi-free-ranging barbary macaques. The monkeys were living in a large sanctuary. Water was provided in a trough, filled each day from a pipe. When the water was turned on, some of the young monkeys hurried up to play. One put his hand at the end of the pipe so that the water squirted in all directions, causing him and all his companions to jump back. Then another approached and put his hand in the stream of water. And so it went on, the monkeys taking it in turns to spray and be sprayed. At other times, when the water was calm, some of the monkeys would sit motionless, apparently gazing at their reflections. Then one would take a stick and very gently poke it in his or her reflection, so that the image became distorted by ripples.

Play in animals is rich and varied, and it occurs frequently in many species, including our own. It has been estimated that during childhood up to 20 percent of the energy needed for daily survival is expended in play. Animals may even take serious risks, especially monkeys and apes playing high in the trees. So, why do we play? It must surely serve some useful function.

There is no doubt that locomotor play, along with object play, helps young animals to learn about their environment, to develop muscles and coordination, and to prepare for adult life. Play provides opportunity for youngsters to become familiar with an arboreal environment so that, as adults, they will be less likely to fall during sudden flight through the treetops. Playful exploration provides information about the nature of the environment that will be useful in getting food, escaping enemies, and so forth, as they grow older. And social play provides information about the strengths and weaknesses of an individual in relation to others in the group. In other words, play teaches young animals what they can and cannot do at a time when they are relatively free from the survival pressures of adult life—when they are dependent on their mothers to take care of their needs. Thus they have time to explore, to test, and to learn about the world around them.

Young chimpanzees are full of energy and engage in high levels of active play. Because all chimpanzee mothers spend a good deal of time away from other adults, a first-born infant, particularly if the mother is not very playful, must learn to amuse him- or herself. All manners of innovative performances are observed during lone play. Objects such as stones, oddly shaped twigs, pieces of dry skin, hollow gourds, and so forth are picked up, thrown, carried, even used as

tickling tools when youngsters rub them in their ticklish neck or groin. Two infant females occasionally tickled their own genitals with sticks while laughing. Three infant males sometimes carried small rocks, set them down, then made thrusting movements against them with their erect penes. And water play is quite common: youngsters poke the surface with twigs, throw stones into it, slap it, and stare into it.

During their playful exploratory behavior, young chimpanzees often perform activities in a seemingly purposeless way, but those same patterns may subsequently appear in goal-oriented performances. For example, small infants play with bits of twig and sometimes poke them into crannies in a tree or holes in the ground. This is done in a careless manner, but when they are older, twigs become tools and are inserted into termite passages with great skill and concentration. Psychologist Paul Schiller found that captive chimpanzees were able to use sticks and branches as tools only if they had first become familiar with sticks, and the properties of sticks, during free play. Wolfgang Kohler (1925) made similar observations.

Chimpanzee youngsters not only show great interest in the behavior of others, but are, in addition, able to imitate, or try to imitate, what they have seen. An infant male is fascinated by the vivid aggressive patterns of a big male, and after a charging display he may pick up the very rock that was thrown and try to throw it himself. Many animals, having watched the behavior of others, are then stimulated to do the same thing. In other words, some behavior is contagious so that young animals learn when to act in certain ways. But chimpanzees, in addition, are capable of true imitation; they can even copy motor patterns that are not part of the normal chimpanzee repertoire. A home-raised chimpanzee, for example, learned to purse her lips in order to apply lipstick!

It is because chimpanzees are curious and watch unusual actions with close attention, and because they are able to learn through observing the behavior of others, that a novel performance, if adaptive, may be passed on to others in the group. And it is during infant or juvenile exploratory play that we most often see unusual behaviors. A juvenile, Freud, once threw a strychnos fruit which is round, hard, and the size of a tennis ball—into the air and, to our amazement, caught it! He spent the next ten minutes trying to repeat the performance, going after the "ball" every time it rolled off into the undergrowth. Another infant "invented" a game with sand, lying on his back and dropping handfuls down from above, trying to catch it in his mouth without getting it into his eyes. Had other youngsters been around, they might have imitated the behavior which, for a while, might have become a "fashion" in play, as described by Kohler when he observed his captive colony at Tenerife. One Gombe youngster, Gilka, developed an idiosyncratic gesture—rapid flapping movements with one hand. She "flapped" at insects, other chimps, humans, and, sometimes, apparently at nothing. A novel performance like this seldom persists over time. Occasionally, though, it may be

incorporated into the behavior of the growing child and imitated by other youngsters. Thus Gilka's "flapping" gradually became, for her, a gesture that she used to threaten conspecifics. The gesture was imitated by another juvenile, Fifi, who also used it in an aggressive context. Eventually, though, both youngsters stopped using the new gesture.

One infant, Wilkie, sometimes played with trails of ants, poking at them with little sticks and watching as they scattered in all directions. (My son, growing up in Africa with no TV, liked to do the same!) The same youngster was watched as he poked a twig into a hole in a tree, then darted back as some large black carpenter ants swarmed out. His mother, who was watching, came over and picked the ants off the branch with her lips. The chimpanzees living one hundred miles south in the Mahale Mountains area regularly fish for these carpenter ants, using an *anting* technique similar to that seen when the Gombe chimps feed on termites. But this type of *anting* was not once recorded at Gombe in thirty-four years of study. The incident described above suggests how a chance action could result in the "invention" of a new tool-using technique—a performance that could, if adapted, spread through the community and be passed from one generation to the next through observation, imitation, and practice. Given the fact that chimpanzees have been seen eating a variety of insects throughout their range, and that young chimpanzees so often investigate their environment by poking at things and into holes with twigs, it is hardly surprising that the use of twig and stick tools for insect eating is one of the most common tool-using patterns across Africa.

In West and parts of Central Africa, chimpanzees use rocks or heavy pieces of wood to open hard-shelled fruits—a "hammer and anvil" technique that has never been seen in any of the East African chimpanzees studied. At least, not yet. But the *pattern* is available at Gombe: one infant was seen to use a rock (once) and, on another occasion, a wooden club, to pound playfully at small insects on the ground. Thus, since the patterns necessary for nut cracking are present in the Gombe chimps, the use of hammer stones in feeding at some point in the future is not an impossibility.

It is clear that play not only functions to teach growing animals a great deal about their physical and social environments and their own strengths and weaknesses, but also serves as a medium for the appearance and nurturance of innovative performances—performances that may become integrated into the social traditions of a group. But play can also be used innovatively as a social tool, to influence the behavior of companions. Among chimpanzees, play is often used to distract. Sometimes the aim is deception, as when an adult male initiated a tickling session with a higher ranking male who was eating meat. During the game, the initiator managed to steal a piece of meat without the other noticing. More often, play serves to distract an individual from his or her goal. When an older child makes repeated efforts to play with or carry a small infant, the

mother, rather than punishing the child, often starts a tickling game, and the baby is temporarily forgotten. Sometimes a mother uses play to distract her child during weaning depression. When the child approaches to suckle, whimpering, the mother starts to play. Usually the child, after a moment, responds, and yet another conflict is, at least temporarily, shelved. An adult male chimpanzee in a zoo learned to use an exaggerated play invitation—an upright play walk and a big play face—to distract the alpha male when he was working himself up into an aggressive frenzy. Often the play worked. Humans use similar tactics. Police in Los Angeles were told to joke when they were making dangerous arrests: sometimes the joking broke the tension and averted violence. Shakespeare knew that laughter can relieve a great chimpanzee grin and set off again, round and round the toilet, pulling nothing behind her.

Because chimpanzees show striking similarities to humans in social behavior, play, cognition, and emotionality, all once thought unique to our own species, the line between humans and the rest of the animal kingdom, once thought to be so clear, has become blurred. Caged and abused chimpanzees deprived of play and normal socialization reflect many of the pathologies seen in abused, victimized humans. Surely it should be a matter of moral responsibility (differing from animals by virtue of our own highly developed intellect and with it our greater capacity for understanding and compassion) to ensure that the benefits of our wisdom extend to both the human child and the sentient animal.

Play is a signal that nature's wisdom is being enacted.

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