

Almost Human

*Monkey see, monkey develop language,
monkey use tools, monkey practice medicine,
monkey run for political office,
monkey teach narrow-minded human a thing or two.*

Photography by Ron Garrison,
Zoological Society of San Diego

By Claudia Pearce

We used to know who we were. We used to know what separated us from the beasts. We had souls, language, a knowledge of self. We could make tools, paint pictures, write The Great American Novel. They had none of the above. They were just dumb animals, entrusted to us by some higher power for our use, amusement and pleasure.

Today, however, things are no longer so simple or so clear. Scientists—those destroyers of safe assumptions and reassuring beliefs—now tell us that we're neither so alone nor so superior as we once thought. The dividing line between man and beast isn't so solid after all. It's punctuated with dots and dashes, with ellipses and question marks. All this new information seems to be making monkeys out of us, and humans out of apes—provided that we define human as an assortment of characteristics: tool-making, language-

using, political-thinking, family-building.

Nature's fascinating season premiere, *Monkey in the Mirror* (Sunday, November 5, at 8 p.m.) provides a little perspective on the perplexing situation. The program asks, and only partially answers, that question that scientists, theologians and poets have asked for centuries: What makes humans human?

Next to Aunt Louella, who lives in El Cajon, our closest known relative is the bonobo chimp. More than 98 percent of the bonobo's DNA is identical to ours. Bonobos display an intriguing combination of animal and human characteristics. Their arms are long and agile and they're covered with glossy, black fur, but their eyes appear as soulful as any human's. And they share another trait with people: a vulnerability to many of the same viruses that plague the average kindergartner. So if you want to visit San Diego Zoo's bonobos in person, you have to wear a mask and don sanitized booties.

Which is how I'm dressed when I visit the Zoo's bonobos on a recent Monday morning. The bonobos hoot and point with their long fingers as I climb down a spiral staircase to their private bedroom area below their lush, green enclosure, which is just up the hill from the gorillas

at the San Diego Zoo. When I respond to their gestures to come closer and hand them my notebook, keeper Mike Hammond stops me. "They'll grab you and examine you," he says. "They're very strong," adds keeper Gale Foland. "It's not a pleasant experience to be grabbed." He speaks from experience. Once, a curious bonobo held him off the ground for almost a minute. Foland is 6 foot 2, the bonobo who grabbed him is only 4 foot 6.

I tear off notebook sheets for the bonobos and Hammond passes them out. Once again there is a lot of hooting and hollering from the bonobos. Most of the bonobos crumple and uncrumple their sheets of paper, examining them minutely. But an adult female named Kuni immediately puts her sheet down and starts "writing" on it with her finger, presumably to see if marks will appear like the ones I make with my pen.

"Presumably" is the operative word here, since the keepers have warned not to anthropomorphize the chimps, even when they appear to be doing the same things humans do.

"Don't say 'they think' because you don't know what they think," says Hammond.

Easier said than done. Humans can't help but

Escape artist:
When a new enclosure was built, the zoo used an orangutan to test its security.

wonder about what other humans (and animals) are thinking. According to Christine Johnson, a researcher and professor at UCSD, it is human nature to conjecture what others are thinking.

Johnson, a specialist in both cognitive science and primatology, has devoted much of her life to thinking about what other animals are thinking. Having already worked with dolphins, she and her UCSD interns have spent the past three and a half years observing and filming the Zoo's bonobos, paying special attention to their social interactions. Johnson is looking for irrefutable evidence of something she already strongly suspects: that bonobos are capable of "mentalist thinking," i.e. making assumptions about what other bonobos (or humans) are thinking—something scientists previously believed only people could do.

Mentalistic thinking is the only wall remaining between humans and apes. If it can be proven that chimps think mentalistically, then the difference between us and them (and no one's denying there's a difference) is only one of degree (they have smaller brains).

To a lay person, much of the behavior in Johnson's videos sure looks like mentalistic thinking. In one interaction, a young male bonobo (Congo) and a female (Kuni) are having sex. But they both keep glancing uneasily in the direction of a bush where they know an older, more dominant bonobo (Maiko) is hang-

ing out. When Maiko comes out of the bush, they immediately stop copulating and run off.

The mentalistic interpretation: Kuni and Congo want to have sex, but they know they have to do it behind Maiko's back, because (even though bonobos are not monogamous) Maiko is the jealous type, and they know if he sees them having sex, he'll give them a hard time.

"The mentalistic explanation for their behavior could be right," says Johnson, pushing back her long hair. "Kuni and Congo could be thinking about what Maiko is thinking.

"But it could actually be that Kuni and Congo are just thinking, 'When we do sex around Maiko, and we can see Maiko's face, then Maiko seems to come out at us.' They don't have to be attributing ignorance or knowledge to Maiko."

"There are dangers in anthropomorphism because you start believing what you think is happening in their minds," Johnson says. "And you could be wrong. I teach a class called 'Animal Minds.' And students come to me with their stories about how their dog deceived them and their cat is plotting whatever. So I spend a lot of time creating behavioristic explanations so I can get them to be more critical and careful in their thinking."

Scientific rigor, of course, requires Johnson to assume a behavioristic explanation until it's been proven that a non-human can think mentalistically. But, she says, "often times, the mentalistic explanation is simpler and more direct than the behavioristic explanation, and, maybe, on that basis alone, ought to be believed.

"I'm reserving my final acceptance of theory of mind until we have experimental evidence. I anticipate it will happen eventually."

So what would it take to actually *prove* that apes are capable of mentalistic thinking?



The "Sally-Ann" test, says Johnson.

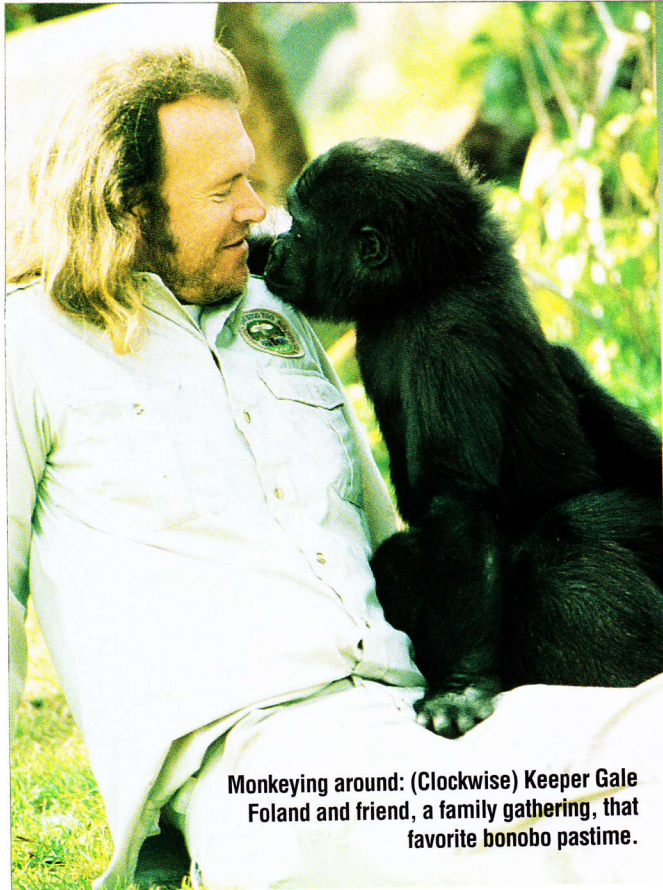
"Sally comes into the room and puts her little pencil into this box and she leaves. And while Sally's gone, Ann comes in and moves the pencil to a different box. And now you ask the subject, 'When Sally comes back, where will she look for the pencil?' And, usually, if the subject is a child under the age of 3, the child will say she'll look in the box where the pencil, in fact, is. By the time they're 4 years old, children will say, 'Well, I know the pencil is here, but Sally doesn't know that. Sally thinks the pencil is still in the first box, so Sally will look there.'

"The only way you can get this test correct is by being able to attribute a mental state that's different from your own to somebody else. And the whole problem with chimps, even language-trained chimps, is accurately communicating the question, 'When Sally comes back, where will she look?' It's very frustrating for someone like me, because I really want to know if they can answer that question."

Mentalistic thinking is a huge evolutionary advantage, says Johnson. It's beneficial to pay attention to what others know or don't know, both in terms of getting away with things and in terms of helping each other out. And that explains why we tend to anthropomorphize everything.

"Mentalistic interpretations pay off in our interactions with each other, so we naturally apply them to the universe at large," says Johnson. "'My computer's out to get me.' 'My car's got it in for me.' People have even suggested that God is a





Monkeying around: (Clockwise) Keeper Gale Foland and friend, a family gathering, that favorite bonobo pastime.

human invention for that reason. You bargain with the universe by trying to use tactics that pay off when you're predicting, interpreting and manipulating human behavior."

If this last chink in the wall between humans and the apes were ever to fall, where would that leave us? Would there be anything left to separate us from the beasts?

Johnson counts off the differences that would still remain: "We're much more object-oriented. We care about *stuff* more. Humans are always doing stuff to stuff with stuff—everything from stone tools to VCRs. And it starts in infancy. Stuff is not that big of a deal with other primates unless it's food.

"I also think we've elaborated cooperative effort much more. You see it among chimps and dolphins. But we've taken cooperation to the point where we've got government and whole cultures.

"And I think language is a major difference. Many animals can master reference—using a symbol to represent something. But using grammatical syntax, sentence structure and narrative is something that seems to be innate in us."

What does she think about humans keeping creatures like bonobos in captivity?

"It's a gray area. But there are so few bonobos left in the wild that captivity may be their only hope for survival. The guesstimated 10,000 bonobos left in the wild won't last very long with civilization encroaching so rapidly."

About a quarter mile north of Johnson's office, another UCSD primatologist—Jim Moore—has just moved into his brand-new digs in the new Social Sciences building. Boxes and cartons of *stuff* are lying everywhere. A malfunctioning alarm goes off every now and then in a nearby hall. Moore is barefoot and wearing shorts. He looks like a man who has spent the day lifting and unpacking—glad for an excuse to stop a while.

The primatology department is in the Social Sciences

building, he says, because primatology is a division of anthropology—the science of human beings.

How did primatology land in the anthropological domain (rather than, say, biology or zoology)?

"Earnest Hooton in the '30s and '40s, and Sherwood Washburn in the '50s, pointed out that if we wanted to understand where we are, it's good to know where we came from," says Moore. "And also to have a point of reference for comparison. So they began looking at non-human primates in an anthropological context. And it's really taken off from there.

"And, anyway, biologists are trying to understand fundamental principals. They tend to not like anything bigger than a fruit fly. Anthropologists are resigned to long generation times."

Moore has done most of his research in Africa—with chimps (as an undergraduate under Jane Goodall), baboons and langur monkeys.

Since 1988, Moore has concentrated on a savanna woodland area of Tanzania, where a small number of common chimps live. The environment is sparse, arid and not particularly hospitable for hunting and gathering. As a result, only about 50 or 60 chimps live in the 1,000 square kilometers that serve as Moore's laboratory, and he rarely sees his subjects.

Moore chose the area because it's the same kind of environment that gave rise

to our earliest upright ancestors. Learning how chimps adapt to that environment gives insight into how early hominids evolved.

And since he can't see the chimps, Moore studies their remains—nests, left-over food, feces—to get a picture of what their life is like. He climbs up trees to collect hair from their nests, and identifies who hangs out with whom using the DNA from their hair follicles. And the nest hairs are leading to some remarkable conclusions.

The elusive chimps' evolution appears to be mirroring that of our own ancestors. Early results, for example, seem to be showing that these chimps, in contrast to other chimps, have monogamous relations for the purpose of raising their young—an evolutionary advantage in a harsh habitat.

"It would be fascinating if the monogamy proved to be true," says Moore. "That's the kind of thing I'll be able to answer with enough samples, as soon as the cost per sample comes down. Because to address it in a statistically meaningful way, you have to run through hundreds and hundreds of samples. And at \$40 a pop [for a DNA test on a single hair]—that's more than I've got lying around."

In this kind of research, you'd think the question of what makes humans human would come up often. Does Moore have any insight to offer?

"What it's really made me think about is that we form a continuum in which either chimpanzees are a little bit human or we are a little bit chimpanzee. It's broken down the Cartesian notion of humans and non-humans being separate entities. We have as much justification for talking about 'non-humans' as the chimpanzees would for talking about 'non-chimps.'

"We've got a history of trying to define humans by 'we're the only tool-user,' and, of course, chimpanzees are using



tools. And 'we're the only language user,' and then we find all the great apes and sea lions and dolphins and parrots are capable of linguistic feats and communication. Whether they have comparably complex communication, we're not sure yet, because we can't understand their language. So it's not surprising that they can't understand us all that well."

There are more similarities: Chimps have primitive number systems, commonly counting up to eight, nine or ten. Certain tribes of chimps use medicinal herbs to cure stomachaches and parasites. And then there's politics, ethics, sex for pleasure, and warfare. Chimps can even play computer games—sometimes better than humans!

And when it comes to the arts, simians love to monkey around with paint and brush. "I don't know of any chimp that has been presented with art materials that hasn't been interested," says Moore. "They may chew on the crayon, but once they see that it can make a mark, they get interested in the mark."

"In my own research, a lot of the nests I find are very often, clearly statistically often, on hillsides that have vast, sweeping, beautiful views."

"Even if you said it was for survival reasons," Moore continues, "you could turn it around and say, 'So why do humans like a view like that?' We think it's for esthetic reasons, but why is that esthetic so common? Was it for survival reasons in our history?"

"That's why this business of what is human becomes so contentious. If you come into it thinking that humans and non-humans are separate, well, you can make a pretty strong argument." On the other hand, "Most people who spend five minutes watching a chimpanzee say, 'There's something in there,' some kind of consciousness."

But once you start to allow the line between human and ape to blur a bit, there are other ramifications, says Moore. "I've pretty much gotten off pork, because I think pigs are probably pretty smart. I know a number of primatologists who have become vegetarians, partly as a result of getting uncomfortable about the continuum. It's a slippery slope. If chimps, then gorillas? Probably. Orangutans? Yeah. Gibbons, monkeys? Then all of a sudden we're at cows and chickens. And it becomes a little confusing."

"I had an interesting experience with

monkeys in the Congo Republic. People there eat monkeys and apes. When I was working with a group there, I said, 'No apes. I'm sorry, we're not going to kill apes. But if you want to hunt monkeys, go ahead.' When in Rome, do as the Romans. I did say I wanted to collect data from the bodies and take samples."

"The way these people prepare the monkeys for food is they shoot them and throw them on the fire, and it singes the fur and you end up with this black, rather disgusting-looking carcass, and eat that."

"One of the first monkeys they brought was from a species that was rare in that area. And I know a guy who works on their taxonomy, so I said, 'I'd like the skin.' And I skinned it and gave the body back to them. They said (he lowers his voice with horror), 'Looks like a baby.' They wouldn't eat it because it looked too human. For me it was very amusing."

I was thinking, 'How long have you guys been living in this forest, and you're just noticing that monkeys look pretty human.'

"A lot of the resistance to acknowledging what we see in animals is because it's hard. It's so much neater and cleaner to just draw a barrier. But it's not honest."

There's another problem in current discussions about this issue. Though a lot of people still think it's simply humans vs. beasts, Moore says, "Animal-rights people are saying there's no difference between a human and a rat or an oyster. The truth is somewhere in between. I don't think a rat's life is worth as much as a chimpanzee's life. I have no qualms about people killing rats in grain silos. Whereas with apes, I think how we treat them has ethical salience. Apes are a little bit human. Dolphins are too, in the sense that we're talking about humans being thoughtful, intelligent, sentient creatures. We really need to work on our ethics in this area."

But still the question remains: What makes humans human?

When most animals look into a mirror, they think the reflection is just another animal. They never catch on, never learn to recognize themselves. But bonobos and other apes, like humans, realize that it is themselves who they are seeing.

And once you have a sense of self, how much further must you go to recognize *your* self in someone else? Isn't that part of our fascination with apes? As we look into the eyes of these primate cousins of ours, they seem to reflect something back



at us as well: that we are both sentient beings, bound together by ancient evolutionary threads.

Humans have evolved to occupy a strange niche—the custodianship of the Earth. Merely due to the fact that we can destroy our planet, we're now responsible for preserving it. Our outstanding evolutionary success has already annihilated many species and put others, including the bonobos, at risk. If we don't start using our gifts—mentalistic and otherwise—to do a better job of preservation, we could eventually become victims as well. And then the question of what makes humans human won't matter. Because the earth will be in the hands (or antennae) of a bunch of hardy cockroaches and ants. And who will be the superior species then?

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