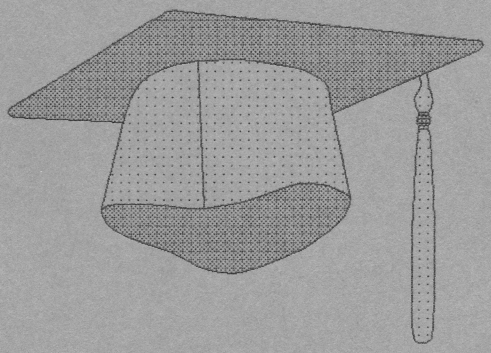
WILD WIT

OR

KING KONG GOES TO COLLEGE



Prepared for Deilvery at the
Athenaeum Society
Hopkinsville, Kentucky
February 2, 1995

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WILD WIT -OR- KING KONG GOES TO COLLEGE

I never thought I would special order a tie to wear only to one Athenaeum meeting, but for this session I did. It shows part of one of my favorite paintings of several breeds of dogs sitting around the table playing poker. At home I also have a sequel to this one showing ▪the girls▪ coming in and breaking up the game. One of the first things I learned about good public speaking is to not start the presentation with a joke. Therefore, I will refrain from doing so. However, if this paper doesn't generate at least one good ▪tale▪ from Charles Tilley (some of you), I will be truly disappointed. (I'm sure Charles is intelligent enough to come up with one.) The title of my paper for this evening is, ▪Wild Wit-or-King Kong Goes to College▪

For ages people have been fascinated with ideas about nonhuman animals possessing intelligence and understanding. Children frequently talk to their pets believing that they understand. In 1950 a movie was released with Jimmy Stewart portraying a man with an imaginary (for him very real) friend and companion, a rabbit named Harvey. In 1967 there was released another movie about a veterinary doctor, Dr. Dolittle, who could talk to animals. The song from that movie became quite popular for a time. Then there was the television series about Francis, the talking mule. On a more serious level there have been many claims and debates about whether or not nonhuman animals have intellectual ability. In 1637 Rene Descartes, the French

philosopher, mathematician and scientist claimed that creatures other than humans are little more than automatons, without the least bit of self-awareness, living by reflex alone. This position has been held rather firmly among scientists until relatively recent years. Around 1900, Berlin newspapers carried stories about Hans, the clever horse. He was reported as able to solve some fairly complicated math problems such as giving the square root of 16, even if asked for the first time by a perfect stranger. He was said to have had a knowledge of the German language and to be able to identify musical intervals. Answers involving numbers would be given by tapping his hoof and others by pointing his head toward appropriate pictures or objects. Local skeptics formed a group of professionals from different disciplines, such as a psychologist, two zoologists and others, to investigate. Hans came through correctly nine out of 10 times! Then a young Dutch psychologist, Oskar Pfungst, decided to see what would happen if the person asking the questions did not know the answers. Under this condition Hans dropped to a score of only one out of 10. Further research showed that Hans had learned to respond by observing minute changes in the questioner's posture, breathing and facial expressions. He was so adept at this that the questioners, who knew the answers, could not hide the cues even when they tried! From this Hans was declared an impostor, and it was once again claimed that even though animals may at times appear to think, they can do no more than react to stimuli. It has only been recently that much

serious research has begun to show that many of them do know a great deal and are capable of significant thought. There are implications that our minds, not just our bodies, are part of the evolutionary continuum. Just how intelligent can nonhuman animals be? Can they think? Can they plan? Can they reason? Can they solve problems? Are any of them truly "intelligent?" To effectively consider such questions it is necessary, as always, to first indicate some of the definitions and concepts involved. Just what do we mean by "intelligence"? To begin with, "intelligence" is just a word, a word used to summarize a phenomenon or group of phenomena. What that group of phenomena includes is a matter of choice. Therefore, there are different definitions of intelligence and different opinions of what factors are a necessary part of the concept. In the 1940's, psychologist Norman L. Munn claimed that so far as human beings are concerned, intelligence is flexibility or versatility in the use of symbolic processes. The manual of the latest edition of the Wechsler Adult Intelligence Scale talks about the necessity of distinguishing between intelligence and the various abilities with which it is often equated, implying that intelligence is to be considered as something beyond just a collection of abilities. It is stated that intelligence is a function of the personality as a whole and not simply cognitive abilities alone.

Historically, intelligence has been most frequently defined in terms of one or more specific abilities, such as the ability to reason abstractly, to learn, or to adapt. The author of the

manual suggests that intelligence is not, for example, always adaptive and does not always involve abstract reasoning, but is multifaceted, and refers to an overall competency. William H. Calvin, a theoretical neurophysiologist at the University of Washington School of Medicine, states that language is the most defining feature of human intelligence, and that without syntax--the orderly arrangement of verbal ideas--humans would be little more clever than a chimpanzee. However, he also admits that the common chimpanzee and the bonobo, or pygmy chimpanzee, can achieve surprising levels of language comprehension when motivated by skilled teachers. He mentions one, which will be referred to in more detail later, that can interpret sentences he has never heard before, such as, "Go to the office and bring back the red ball." Calvin claims that another important factor of intelligence is the ability to plan, with the ability for long term planning indicating more intelligence than short term planning. These are but a small sample of many ideas about what constitutes intelligence.

With some of these factors in mind let us look at some anecdotal reports and some research to help determine just how intelligent some of our animal friends are. In September 1994, there was a somewhat tongue-in-cheek report of a year-long study, or challenge, which at that time had been underway six months. The NBC Dateline program reported on their "Dateline Challenge" in which a leading Wall Street financial analyst, a group of high school students studying investments, and a chimp named Casey

were in competition to see which would have the best results in picking the most profitable investments. At every check so far Casey was ahead. The financial analyst was on bottom at first, but by the six-month check point had moved into second place! On a more serious level, some of the earliest stories I heard about the intelligence of chimpanzees were told by Dr. John B. Wolfe, then head of the Psychology Department at Ole Miss, about some of his earlier work with primate research. One brief incident, before the days of one-way mirrors, occurred when Dr. Wolfe placed toys and other objects in the room with the chimp and was planning to go outside the room to then peep into the room and watch the chimp through the key hole. When he stooped down to look through the key hole, what he saw was a big brown eye peeping at him! An incident far more indicative of intelligence and planning occurred with a chimp that loved to ride around the room on Dr. Wolfe's back. Dr. Wolfe had trained this chimp to work with a particular apparatus such that if the chimp pulled the correct lever he would get a blue token. It was then necessary for the chimp to give the token to Dr. Wolfe in exchange for a ride. Dr. Wolfe also informed us that, typically, chimpanzees, certainly this one, are afraid of mice. One day while he was working in the lab with this chimp a mouse by chance happened to run out and across the floor. The chimp, in a frantic rush, ran over to the apparatus, pulled down the lever, got the blue token, ran over and handed it to Dr. Wolfe and quickly jumped up to safety on his back. Now that was certainly

more than simple reflex action!

In an experiment supervised by Nicholas Toth of Indiana University, a chimp watched while his favorite treat was placed inside a box. The box was then locked, and the key placed inside another box which was then tied up with a cord. Quite a challenge, but inside his cage the chimp had some pieces of flint he had picked up during an outing in the countryside. No problem! The chimp slammed the pieces of flint against the concrete floor, creating some knifelike chips which he then used to cut the cord and then got to the key which he used to open the other box and then grabbed the treat! (It should be noted that chimps in the wild frequently use stones as tools, but this chimp had been raised in captivity.)

Although such anecdotal accounts that strongly indicate thinking, planning and problem solving in some animals are numerous, they have not been enough to satisfy some hard-nosed scientists. Even the earlier experiments and long-term studies with primates and language in the 1960's and 70's left the critics skeptical and claiming that the results did not show anything beyond factors as those observed in Clever Hans. However, those studies plus more recent and more carefully controlled ones, have scientists now taking seriously the flood of evidence that other animals share with humans at least some higher mental abilities. Two of the more extensive studies of the learning of human language and of indications of intelligence among at least some primates are the 1970's work with Koko the

gorilla and the later and current work with Kanzi and other chimpanzees. The project with Koko started in 1972 and continued for more than nine years, perhaps longer, being initiated by and continued by Dr. Francine Patterson. Throughout these years the project received support from various organizations and professionals such as the National Geographic Society and the famous Dr. Jane Goodall. In 1971, as a graduate student at Stanford University, Dr. Patterson was inspired by a lecture given by psychologists Allan and Beatrice Gardner who five years earlier had taught a chimpanzee named Washoe to converse with human companions by using sign language. They had also developed and described rigid research controls that were used in their work.

Dr. Patterson's project started when Koko was a half-starved infant gorilla from the San Francisco zoo. In teaching Koko, Dr. Patterson used American Sign Language, or Ameslan, which is not merely finger spelling. Finger spelling is only a method of translating spoken language into gestures. Ameslan is a language in itself. It is also noted that people of equal intelligence would have a much smaller vocabulary in sign language than in spoken language. Sign language dictionaries will have something like 2,000 entries, whereas a standard English-language dictionary might have more than 200,000 entries. This needs to be kept in mind when considering Koko's record. Within two weeks Koko was using correctly signed gestures for "food" "drink" and "more." Nine years later she was using a vocabulary of more than

600 words, conversing through a computer terminal, signing with her mate-to-be and responding to questions about death. She was said to be able to communicate emotions, such as, "sorry bite scratch," to tease, joke, argue and question, to lie, describe her world, rhyme, and to hurl an insult when wronged. When she had been wrongly accused once of breaking something she signed the insult, "you dirty bad toilet!"

Dr. Patterson not only taught but lived in a close relationship with Koko, much as a parent with a child. I think this is important since many experiments and research projects lack that factor. They claim they are being more rigid and controlled by eliminating such general influences, but these influences are certainly present when humans are taught and trained. In the work with Koko double-blind testing and other methods were used to insure that responses were not from cuing such as was the case with Clever Hans. For example, Dr. Patterson would place an object into a plywood box with a Plexiglas front, then cover the box and leave the room. Koko would then enter from another room and sit in front of the box, while an assistant standing behind the box unable to see its contents, would by signing ask Koko, "What do you see in the box?" or "What's that?" and write down the response. Then Koko would leave, Dr. Patterson would come in and change the object in the box, and the procedure then repeated. Again, the assistant never saw what was in the box. Throughout her book, The Education of Koko, Dr. Patterson provides evidence and convincing

arguments for the position that true language was being taught. She also relates numerous incidents that suggest some of Koko's personality characteristics, such as a tendency to be stubborn at times. Once Dr. Patterson wanted Koko to sign "shell" and out loud asked her to do so, first showing her a shell. There was no response. "Forgot?", Dr. Patterson asked. Still, no response. Finally Koko was sent to her room and the door was closed but not locked. As the door was being closed, Dr. Patterson said, "Well, I'll just take these goodies to Michael" (another gorilla). At that point Koko edged out of the door and, unprompted, signed "shell." Another amusing incident suggesting understanding occurred when a visitor stopped by to see Koko and pointed to Koko while making the sign meaning, "you're pretty." Koko paused for a moment and then in reply gave the sign for "false" or "fake."

Many different tests were used to measure Koko's intelligence and progress with age and development with some of the tests being the same ones used with human children. A steady growth in mental age was noted with growth in chronological age with the mental age lagging only slightly behind. For example, at age 5 ½ she had the mental age of a human child of four years, eight months. On some types of questions Koko did better than human counterparts her age, such as at age 4 ½ she scored better than the average child of six in her ability to discriminate between same and different, and in her ability to find flaws in a series of incomplete or distorted drawings. She was also

described as doing amazingly well on a logical progressions test, where a series of designs, following a logical pattern, would be shown and the task would be to select from a group of other designs the one that logically should go next. However, Koko generally did worse than children with tasks requiring other than pointing responses, such as penciling a path through a maze, or fitting pieces of puzzles together, or other tasks requiring precise coordination. On the WPPSI (Wechsler Preschool & Primary Scale of Intelligence) one sub test involved finding the missing part in a series of pictures, such as a hand without one of the fingernails, or a cat with only one set of whiskers. Koko at age four whizzed through this test at the level of a six-year-old human!

In spite of the impressive results of such studies as the one with Koko, and several other projects with chimpanzees, the critics and even some researchers still raised questions about just how much understanding was taking place on the part of the animals. It was pointed out that there is a difference between memorizing a string of signs and understanding grammatical rules that allow one to form a variety of meaningful sentences from a small number of words. These critics seem to have not understood some of the differences between the sign language being used and spoken language, and to have ignored some of the reported evidence.

About the time the Koko project was coming to completion, another very important research project was just getting

underway. The Yerkes Regional Primate Research Center of Emory University, Atlanta, Georgia, joined with the Georgia State University Language Research Center, and under the direction of Sue Savage-Rumbaugh, Duane Rumbaugh, Mary Ann Rowski and Rose A. Sevcik scientific interest in animal intelligence and language acquisition was given a big boost forward. The Language Research Center includes a large complex in a 55-acre forest near Atlanta where live a colony of chimpanzees and other apes. The project started with research with two chimps named Sherman and Austin. (Don't say anything about Atlanta making an ape out of Sherman!) The work with these two did a lot toward removing doubts that apes really do understand signs. Note that this project did not employ sign language such as with Koko, but involved the use of designs and pictures. In one test, after the usual training with the signs or symbols, the two chimps were placed in an empty room with a screen on which was flashed an occasional symbol for an object. Having seen the symbol, the chimp was to run to a separate room stocked with objects and pictures and bring back whatever had been represented by symbol on the screen. Not only did they bring back the correct objects, indicating that the symbols had specific meaning for them, but if the particular object was not there the chimp came back empty handed.

Later in the project the researchers developed the lexigram keyboard, which utilized numerous symbols that represented various words, such that when symbols were punched by the chimp it generated the words in English. The lexigram system proved to

be more appropriate for working with chimps, since with sign language approaches the physical make up of the chimp's hands is such that the intended signs can become blurred or difficult to determine. While working with certain chimps using the lexigrams they discovered yet another important aspect of human language ability possessed by the chimps: the ability to learn words by observation rather than through formal training. They were struggling to teach a wild-born female pigmy chimp, or bonobo, that was rather slow to learn, when they discovered that this chimp's young son, Kanzi, had been learning the words simply by being close by and observing. The subsequent work with Kanzi has done much to remove any doubts that at least some primates can learn and understand forms of human language. There are limits, of course, but the accomplishments are to me amazing. Kanzi, by the age of 12, had developed the grammatical abilities of a 2 ½ year-old child. He cannot speak since apes lack the vocal control to form words, but he does understand spoken language. In an attempt to demonstrate Kanzi's ability to grasp grammatical concepts such as word order, Savage-Rumbaugh and Sevcik set up an experiment to compare Kanzi with a two-year-old girl, Alia, in responding to commands expressed in 660 spoken English sentences. The sentences combined objects in ways that neither of them were likely to have encountered before, such as, "Put the melon on the potty," or "Go get the carrot that's in the microwave." Throughout most of the experiment Kanzi and Alia were even, until near the end when Alia began to move ahead. Kanzi's grammatical

comprehension reached its peak at the level of a 2 ½ year-old child; quite impressive in the light of what critics had said for so long. The results with Kanzi are no more impressive that those with Koko and sign language, but the design and controls used were more rigid and proved that the chimps were not responding to cues from their trainers, but were in fact demonstrating true abstract abilities. It is also noted that these results do not represent just one unusually adept chimp. Others, including Kanzi's younger sister have also shown similar results. It is of further interest to note that the lexigram board and other techniques utilized in this work have since been used to help work with severely retarded, autistic, and other handicapped children to open new doors of communication and hope for them.

All of the research mentioned so far in this paper has dealt with primates--gorillas and chimpanzees--but what about other animals? Do they also have intelligence and the ability to truly understand language in one form or another? Dr. Harry Harlow, famous animal research psychologist during the middle of this century, reported a hierarchy of intelligence among different animals, based on his research. He suggested that apes and monkeys have the greatest intellectual potential second to humans. Next are ocean mammals with the dolphin and whale having brains much like those of humans. The bottle-nosed dolphin was rated as the most intelligent aquatic animal. Next came flesh-eating mammals, with cats and dogs topping the list of this

group. All of these were followed by hoofed animals, then rodents (the squirrel being the brightest rodent), then birds, amphibians and reptiles, fish and finally animals without backbones. I guess that suggests it takes a lot of backbone to be smart! Many examples of research with other animals were found, but since I too watched the Clinton State of the Union speech, I will, in the interest of time, mention only a few results.

Most of you have likely seen, live or filmed, shows of dolphins demonstrating apparent communication and intelligence. Lou Herman, professor at the University of Hawaii, has taught captive dolphins to read hand gestures and to respond correctly to the gestures in sentence like combinations they have never seen before. Like some of the previously cited researchers, he uses a gestural language that borrows some words and concepts from American Sign Language. One example is, "person, left, Frisbee, fetch," which is intended to mean, "bring the Frisbee on the left to the person in the pool." Another might be, "surfboard, person, fetch," to which the dolphin gently pushes the human over to the surfboard. Herman insists that the dolphins' grammatical competence is at least as good as Kanzi's. He also claims that dolphins are able to form generalized concepts about an abject, such as responding correctly to commands involving a hoop whether the hoop is round, square or octagonal. They also appear to retain a mental image of an object whether it is present or not, being able, for example, to

report whether a particular object is in the pool by touching their snouts to yes and no paddles placed in the water. Other results indicate that the dolphins understand the meanings involved in commands and communicate with each other, such as when they simultaneously, in perfect formation, perform a feat that they choose. Dolphins also demonstrate positive or negative emotions depending on whether they are shown responses indicating they are right or wrong in their performance.

What about one other animal that can in fact "talk" to us, the parrot? A well-known study involves animal behavior scientist Irene Pepperberg and her African Gray Parrot, Alex. After eleven years of training Alex can name a toy from a pile of them on a tray, tell its shape, color, what it is made of and whether it is bigger or smaller than other objects on the tray, and can correctly say how many of an item (such as blue blocks) are on the pile of clutter. When wrong, he will often say, "I'm sorry," and at times a little later, turn his back and say, "I'm gonna go away." A favorite story is about the time Pepperberg took Alex to the vet's for lung surgery. As she turned to leave Alex in a strange place for the first time in his life, he called out, "Come here, I love you. I'm sorry. I want to go back!"

I have not seen much in the way of formal research with reference to intelligence in dogs, although the research may be there. It may also be that this is one that just isn't questioned! Vicki Hearne, an English professor and trainer of dogs in rural Connecticut, suggests that researchers of animal

intelligence make a mistake by specifying a limited number of factors to indicate intelligence. She argues that different creatures live by different forms of awareness. Humans may do infinitely better than dogs in chess or mathematics, but are grossly inferior in making sense of the world through their nostrils. Dogs are also noted to have an unbelievable ability to read someone's intentions at any given moment. The story is told of how Scotland Yard once pitted a couple of Irish wolfhounds against a sharpshooter armed with blanks, to see if he could draw fast enough to "shoot" the dogs point blank. She said he never got his gun out of his holster. The dogs knew what he was going to do before he did. (Perhaps Hans was very clever after all.) Bonita Bergin, director of Canine Companions for Independence, which trains dogs for disabled persons, points out that their dogs learn to hit elevator buttons, turn lights on and off, get things from the refrigerator and pick up things that are dropped. She also notes that they don't automatically pick up things dropped, they first look to see if the person wants it back. She says that she is not so much impressed by the fact that they can obey a string of commands, as by the sense of responsibility they develop.

Well, do nonhuman animals really think? Do they show an awareness of their thinking? Do they understand and respond to complicated communication rather than simply demonstrate conditioned responses? Do they possess conscious awareness? Much of the recent research seems to strongly indicate that at

least some of them do to varying degrees. If so, where does that leave us when we think about how we treat them? I am certainly not among the more outspoken animal rights activists, but since doing the research for this paper, I think I treat my neighbor's dog with a little more respect!