Out of the Armchair and into the Field

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As a philospher of mind, I have often imagined myself in exotic surroundings, engaged in one fantastic thought experiment or another —stranded on Mars or living as a brain in a vat or attempting to decipher the alien tongue of apparently intelligent creatures—but in June 1983 I had an opportunity to set aside thought experiments in favor of real experiments designed to explore the minds—and "language" —of some real alien creatures: vervet monkeys, living not in lab cages or enclosures but fending for themselves against a daunting array of predators in the beautiful, dangerous world of the East African savannah.

What makes vervet monkeys particularly interesting to a philosopher—or to anyone interested in the origins of human language and consciousness—is that they have the *rudiments* of a language, which serves them well in circumstances that must be quite similar to the world our ancestors faced at the dawn of human language and culture. Vervets have a variety of different vocalizations—calls and grunts —which seem to have clearly definable meanings. The most obvious (to an alien observer) are the alarm calls: one for snakes, another for eagles, a third for leopards, and each call evokes its own distinct and appropriate sort of behavior—for instance, scanning the sky and heading for cover in response to the eagle alarm. These might have been nothing more than instinctual cries, of course, no more like real, versatile human language than the famous dance of the honeybee, or

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the alarm calls of birds, but there is some tantalizing evidence suggesting that something more is going on with these monkeys. Unlike the birds and the bees, vervets *seem* to be engaged in a practice that could involve learning, insincerity, trustworthiness, deception, divided loyalty. While it would be wildly romantic to suppose that a vervet could *tell a joke*, it is not so clear that there isn't room in their way of life for one to *tell a lie*.

For instance, two bands or groups of vervets were once observed in a territorial skirmish; one group was losing ground and one of the losing-side monkeys, temporarily out of the fray, seemed to get a bright idea: it suddenly issued a leopard-alarm (in the absence of any leopards), leading all the vervets to head for the trees—creating a truce and regaining the ground his side had been losing. Does this anecdote reveal real cleverness and versatility among the speakers of Vervetese or was it just a coincidence or bit of dumb luck for the losing-side monkeys—or a case of over-eager interpretation on the part of the observers? Could further observation—or better: experiments—shed light on these questions? This is what I had come to Kenya to investigate.

Several years ago, at the Dahlem Conference on animal intelligence in Berlin, I had been delighted to discover that some of my "purely philosophical" ideas about how to interpret creatures as having minds —having beliefs and desires and intentions—had struck a chord in some of the animal behavior experts. It might just be, they thought, that my philosophical theory provided a theoretical framework in which to describe their investigations and perhaps some of my philosophical suggestions could be harnessed to good effect in field research. Among those I met at the conference was Robert Seyfarth, who, with his wife Dorothy Cheney, has spent years studying the social organization and communication system of bands of vervets living in Amboseli National Park, in Kenya. In the aftermath of the conference, I continued discussing these prospects with Seyfarth and others in the field and even wrote a scholarly article on the subject (1983). But reading, writing and discussing were still just armchair work. I would never be able to tell whether my suggestions were capable of doing real work until I had had some field experience and seen first-hand the sort of difficulties that researchers face. Philosophical thought experiments, unlike real ones, have the happy property of never running into snags —the weather is always perfect, there is always film in your camera and no distracting circumstances intrude on the scenario. Proposals that make sense in such idealized situations are often hopeless in the real world.

So I was delighted when Seyfarth invited me to visit their research camp and spend some time actually observing and experimenting on

the monkeys. Before my visit, I had devoted considerable armchair time to pondering the presuppositions and implications of everything I had learned about vervet monkeys but, as one would expect, reality outstripped all my anticipatory imaginings.

Vervets are monkeys, not apes, so they are millions of years less closely related to us than chimps, for instance. You can actually see —and feel—the difference quite directly; their faces and facial expressions are nowhere near as human and evocative as the mugging of chimps or gorillas and, in many other ways, they are strangely—often disappointingly—alien. For instance, while they exhibit terror and sometimes prolonged grief when one of the group is killed, a monkey won't bring food to a starving or injured member of the group, even though they cooperate in other ways and spend a great deal of time in mutual grooming. But in one important regard they seem to be more like our ancestors than are the larger apes and monkeys: their lives are more harrowing, more fraught with danger. While baboons, for instance, are nonchalant, swaggering bullies, able to defend themselves, the much smaller vervets are fearful, defenseless and hence supercautious. (Occasionally a wild vervet will die under circumstances that permit an autopsy; most are found to suffer from gastric ulcers.) Perhaps the reason vervets have such a surprisingly advanced "language" is that they are more desperately in need of communicating with each other than many other species.

How does one go about learning the language of these monkeys? This is a case of what the philosopher W. V. O. Quine calls "radical translation"—since there are no bilingual interpreters to help the investigator compile the Vervetese-English manual. Here is where philosophy might come in handy, for this is not just a question of another language; it is the traditional philosophical problem of Other Minds.

My proposal, in simplest terms, was this. First, observe their behavior for a while and make a tentative catalogue of their needs—their immediate biological needs as well as their derivative, *informational* needs—what they *need to know* about the world they live in. Then adopt what I call the *intentional stance*: treat the monkeys as if they were —as they may well turn out to be—rational agents with the "right" beliefs and desires. Frame hypotheses about what they believe and desire by figuring out what they *ought* to believe and desire, given their circumstances, and then test these hypotheses by assuming that they are rational enough to do what they ought to do, given those beliefs and desires. The method yields predictions of behavior under various conditions; if the predictions are falsified, something has to give in the set of tentative hypotheses and further tests will sift out what should give.

There is nothing particularly novel or "scientific" about the method;

it is, I claim, the method we all habitually use to interpret each other, after all. But if it is done self-consciously and carefully, it can become a powerful and reliable strategy of discovery. In particular, the tactic of *assuming* some particular beliefs and desires in the monkeys and then asking what ought to follow from those assumptions can lead to the design of particularly telling experiments—setting up situations where the monkeys will "betray" their beliefs by doing otherwise unlikely things. I call this the "Sherlock Holmes method"—since it is the attempt to play the sort of tricks in the real world that catch the culprits in thousands of mystery stories. (Only someone who *believed there was a corpse in the closet* would go to such lengths to prevent Sherlock from opening the closet door—that sort of trick.) But would the sort of stunt that works so deliciously in fiction—and philosophers' thought experiments—be at all practical in the field?

After breakfast the first day, we drove the 10 kilometers from the camp to the vervets' home ranges. Robert and Dorothy always drive as close as possible to the place they expect the monkeys to be and Dorothy explained to me that this is not just to save walking in the hot sun. We must be careful never to get more than about a hundred yards from the jeep and must keep an eye on the intervening ground for interlopers. We were unarmed—no firearms are permitted in Amboseli—and if a lion or elephant or buffalo should suddenly appear, we would retreat as swiftly and noiselessly as possible to the safety of the enclosed vehicle. Since keeping an eye out for lions and elephants is not part of my normal routine, I found this all very romantic and not a little frightening but for Robert and Dorothy, such precautions are as routine as the precautions I take when crossing a busy street.

Seyfarth and Cheney study three adjacent groups of vervets intensively and several other neighboring groups quite comprehensively. The first task of the day is simply to find the group of monkeys in whose territory we have decided to begin. While the home ranges of groups are small—less than a kilometer across in any direction—finding the monkeys (more than a dozen in a group, usually)—can be a time-consuming process. The task was made slightly more difficult by my presence. I was a novel and hence suspect creature; the monkeys could be expected to take some time to "habituate" to me. Robert and Dorothy, after more than six years of observing these monkeys at close range, are utterly familiar—and uninteresting—to the monkeys and can stand within a few feet of them, apparently without disturbing their behavior at all. Since I was accompanied by these familiar beings, the monkeys habituated to me after only fifteen or twenty minutes and I too could then walk in their midst so long as I didn't make prolonged eye contact.

At first it bothered me that the three of us could stand around in the

open, talking quietly, taking photos and moving equipment around, without provoking any apparent reaction in the monkeys. Were they so stupid, so oblivious, so incurious that these noisy, looming bipeds-with-clothes made no difference to them? "But remember," Robert reminded me, "that you *would* provoke their curiosity and fear if you came here by yourself. It is only because they are habituated to us that you can come in under our protective mantle."

"How do you get the animals to habituate to you in the first instance?"

"It takes weeks of patient waiting," Robert replied. "Bring along a few good books and just sit down as close to them as you can get. Gradually they lose their fear of you and you can move closer."

The rule to follow is best expressed from the intentional stance: never act in such a way as to *give a vervet a reason* to pay attention to you in the future. That is the general rule, of which these are a few instances: never provide food or show the monkeys that you have food (we were careful to eat our box lunches some distance away from the monkeys); never warn the monkeys of danger or help them out of a difficulty; never interact with them by responding to threats. Make sure, in other words, that *paying attention* to you is an investment that never pays the monkeys a dividend; then you can count on the rational, self-interested vervets to ignore that unattractive investment opportunity. If you follow the general rule scrupulously, you soon disappear, for the vervets, into the background—which after all contains a lot of other large, moving, things that are irrelevant to vervet concerns: wildebeests and wart hogs—and elephants. The ideal is to be as boring to a vervet as any wildebeest; that puts you almost in the observer's dream position: the proverbial fly on the wall, who sees and hears all but is perfectly unobtrusive.

Whatever further doubts I had about the extent of the vervets' habituation to me were erased as we rode home in the jeep that evening and I suddenly realized that we had just continued an animated conversation without the tiniest hitch or reaction while half a dozen zebras had galloped across the road in front of us. After only three or four days of driving through Kenya's fabulous game parks, I had become so habituated to zebras—zebras!—that I paid no more attention to their crossing in front of us than I would to a pedestrian in Boston. A few days later in camp, the point was brought home to me again when an elephant briefly interrupted our breakfast conversation by emerging from the thicket and grazing on the tall grass next to the clothesline. After taking note of the elephant, we went on with our conversation, while the elephant continued to graze, more or less ignored, for about half an hour. Advice to eavesdroppers: if you want to listen in unobtrusively on Seyfarth and Cheney in the dining tent, why not try

dressing up as an elephant and standing in broad daylight about thirty feet in front of them.

Once we had found the monkeys, the daily census began. Each monkey has been given a name and each of the more than seventy monkeys in the studied groups is readily identifiable by Robert and Dorothy. There is a system: each season's new babies get names with a common theme. There are the London underground stations: Picadilly, Charing Cross and Holborn; the prisons: Sing Sing, Wormwood Scrubs, Attica; the dictators: Amin, Marcos, Pinochet, Somoza and Duvalier; and the cooks: Escoffier, Claiborne, Brillat-Savarin and "Julian" Child. The infants are named before their gender can be determined; Julia turned out to be a Julian but you just have to get used to the fact that Amin, Newton (from the cosmologist cohort), Burgess, McLean, and Philby are all females.

I was frankly skeptical, at first, witnessing Robert and Dorothy glancing at distant monkeys scampering through trees or facing away or in silhouette and tallying up: "There's Runnymede, and Tycho. Have you seen Jenkin's Ear?" "Yes, she's in the top of the tortilis tree." (I could barely make her out to be a monkey with my binoculars.) But I gradually had to grant that they were not playing a trick on me; they really could identify these monkeys, with complete reliability. To me, the monkeys looked as indistinguishable as any identical twins—but that of course is the point. After a while it is uncannily easy to tell identical twins apart—often without being able to say just how you do it.

It is not enough just to keep track of the monkeys as individuals. You have to know how they are related, what their rank in the group is and their recent history of alliances and confrontations. When I asked Robert if there was any background reading that would particularly prepare me for participating in the experiments, he had suggested —only partly in jest—that I refresh my acquaintance with the novels of Jane Austen. In fact, my first day or so of monkey-watching with Robert and Dorothy was full of the sort of confusion I often suffer when reading the open chapters of a complicated novel of manners. "Look," Dorothy would say, "that's Wormwood trying to supplant Tycho, who's grooming Amin; but here comes Holborn, who will no doubt side with Tycho—they're sisters, after all—but Picadilly outranks them both, and "—I would flip back through my notes, utterly confused, muttering "Isn't Picadilly Wormwood's aunt? I thought Wormwood and Sing Sing were sisters. No, wait, Marcos is Wormwood's mother and she's from the low-ranking family. ." I wanted to go back to Chapter One and get a reminder of who all the characters were.

Without a good fix on all these relationships, the significance of

much of the communication and interaction is completely inscrutable. (Imagine trying to make sense of the knowing glances and frowns—to say nothing of the words—in a foreign film without having any idea how the characters were related to each other.) In one experiment, for instance, Robert played tape recordings of the screams of juveniles where their mothers (and other adults) could hear them. Not only did the mother—and only the mother—drop everything to go to the aid of her child but as soon as the other mothers heard the cries, they looked at the mother of the juvenile. They not only know which cry belongs to which juvenile, they know which offspring belong to which mother. (It seems unlikely that they have much knowledge, if any, of paternity but experiments soon to be conducted may shed light on this.) Those telltale glances betray their knowledge just as surely as the guilty glances in many a mystery story, but interpreting those glances requires a mountain of reliable background information.

Only after witnessing the births in a group over several seasons can one reliably sort a group into its families, siblings, cousins and more distant relatives. It takes years to gather this information—something a philosopher is apt to forget when concentrating on what the "observable evidence" is; you can't observe *directly* that Nut is the granddaughter of Marcos but it's an empirical fact with plenty of implications in experiments. That is why it is so important to take a census of the monkeys in the watched groups every day. Only thus can accurate records of deaths, births and shifting social relationships be maintained. Every now and then, for one reason or another, a daily census must be missed but it is the first order of business on a normal day and it can be frustrating, especially if a group of monkeys has moved deep into the swamp where they cannot be followed.

After the census of a group, which includes taking notes on any noteworthy behavior, changes of appearance and the like, Robert and Dorothy can think about trying to run an experiment or two. Most of their voluminous data on a wide variety of ecological factors have been gathered by patient observation, not experiment, and this information is an invaluable asset when it comes to designing and interpreting experiments. Robert and Dorothy can already confidently answer many of the questions that come up. When a male matures and leaves his natal group for another, are the relations between those two groups more cordial than between groups where there has been no recent male interchange? Yes. Are higher-ranking animals more likely to fall to predation than to illness or starvation? Yes, much more so. Do low-ranking monkeys scan the habitat with the same frequency as high-ranking monkeys? Yes, but they issue fewer alarm calls. *Aha!* Are they perhaps keeping mum in hopes of seeing a higher-ranking competitor knocked off? This would seem to make evolutionary sense.

(Robert and Dorothy, working with a group of captive vervets back in the States, have shown that under controlled conditions, if an adult male sees a predator and he's in the presence of a higher-ranking male, he doesn't alarm-call at all; but if the same male sees a predator when in the presence of a female, he gives alarm calls.)

Most of their experiments have involved playing recordings of vocalizations and other sounds from a hidden speaker and filming and recording the monkeys' reactions. This means figuring out opportunistically where to hide the speaker for a more or less definite experiment, from a long menu of experiments-to-be-done. All experiments are one-shot and non-repeatable. No practice runs and no allowance for technical foul-up. For instance, if all the juveniles in a group are to be tested to see whether they react in a certain way to a particular sound, each juvenile gets just one exposure to the test and care must be taken to ensure that, when the test runs, the subject is generally facing in the right direction (not in the direction of the hidden speaker) and not running out of camera range and not being harrassed by a higher-ranking monkey and so forth. Some experiments are designed to answer questions that have much more particular conditions: will a monkey who has been recently groomed (within a half hour) by another be more ready to respond to a request for alliance from that monkey (whose call will be played on the speaker) than one who has not been so groomed?

How do you run a single trial of this experiment? First observe the grooming of a monkey who has yet to be tested; then try to predict where that target monkey is apt to be during the next half hour. Then hide the speaker in an appropriate place, locate the groomer's call for assistance on the tape and get it ready to roll and wait for the groomer to move out of sight in the right general direction (to be consistent with a call for help from that area). Then make sure that no other monkey (e.g., the groomer's mother) is in a position to interfere. If all is well, turn on the movie camera, start the countdown to playback and cross your fingers hoping that no sudden change in conditions will ruin your "take."

Sometimes, after the speaker is set out, the "right" monkey or monkeys will wander out of range but others will move in who can be subjected to another experiment, with no more bother than advancing the tape on the playback machine. But that is a rare and lucky break. Patience, patience, patience. Most often, when the speaker is set out and everything is made ready for an experiment, something happens to call off the test. But this is actually an important generality, however frustrating it is on the occasion. The monkeys have seen Robert walking around a bush with a speaker in his hand and returning empty-handed hundreds of times and it is important that they not be able

to associate this with a subsequent interesting noise from the bush. *Usually,* such hiding episodes are followed by . . . nothing memorable at all. So the monkeys are not interested in the speaker; it has never been associated with any interesting regularities at all in their experience. If they acquired an interest in it and began to investigate it, no further experimentation using speakers would be possible.

One of the most puzzling facts about vervets is that they are apparently so smart about some things—social relations among their conspecifics, in particular—and so stupid about other things one would think were at least equally important to them and no more difficult. As Dorothy puts it, they seem to have "laser beam" intelligence: brilliant, narrowly specialized cognitive talents, with almost no carry-over of skill to other topics. They *seem* to be able to reason by analogy and recognize one thing as a sign or symptom of another, for instance, *so long as the topic is social relations* but then they appear unable to draw the same sort of conclusions about other matters. What are the boundaries of their competence? This is where the intentional stance and the Sherlock Holmes method ought to yield the results we want —by showing us just where knowledge or belief shades off into ignorance. Thought experiments suggest just which circumstances would be particularly telling but designing actual experiments to rig these circumstances is a frustrating business.

A big difference between real experiments and thought experiments is that, whereas thought experiments are usually taken to wear their meanings on their sleeves—or worse, their intended interpretation is simply stipulated—when you try to design a real experiment, you often notice to your initial dismay that any result you get is open to multiple interpretations. This is a concern in any science, of course, but when you adopt the intentional stance and use it to chart the (likely) beliefs and desires of some (possibly) rational agents, any *single* experiment suggests a profusion of serious hypotheses, ranging from romantic to killjoy and only a large family of related experiments taken together can narrow the field. There are no short cuts.

This was brought home vividly to me one evening. Earlier in the year, Robert had made a recording of a leopard "sawing"—marking its territorial boundary by stopping and scratching the ground and growling in a peculiar, loud rhythmic rasping way. To any knowledgeable human naturalist, the sound is unmistakable evidence of a nearby leopard. Can the monkeys also draw this conclusion? They almost certainly have heard the sound and probably witnessed leopards making it; but can they recognize its import in isolation? One evening after supper, in an exploratory mood, Robert and Dorothy and I drove out of camp in the jeep and parked quietly under the nearby sleeping tree of a group of vervets—not a habituated group but one that had

often seen the jeep. After waiting a bit, I held the loudspeaker out the window and Robert played the leopardsawing tape. Silence from the tree. We tried it again. Again silence. A third playing also yielded nothing. No audible reaction at all—even though during the day, if the monkeys spot a leopard they leap from branch to branch, warning each other and making a great hullabaloo.

How is this silence to be interpreted? Maybe the monkeys just don't recognize the sound. Perhaps this is one of those topics that are outside the monkey's narrow competence. That is what Robert and Dorothy think and they may be right. But what other candidate explanations offer themselves? The monkeys are heavy sleepers? Almost certainly not. The monkeys are on to the playback tricks? Again, almost certainly not—this was an unhabituated group that had never been experimented upon. But perhaps the monkeys are confused by the simultaneous presence of a jeep and a leopard? Would *silence* be the expected sign of such confusion, though? And in any case, there is nothing particularly odd about a jeep and a leopard in close proximity; after all, the leopard sawing Robert had recorded had been right at the edge of their camp. Perhaps, though, the monkeys realize that a sawing leopard is not a (stealthy) hunting leopard and hence is temporarily no threat. Perhaps but there is no obvious reason why a sawing leopard would refrain from taking advantage of any easy predation that came his way. Sawing would not seem to be a high-priority behavior.

Then how about this: at night the risk-benefit payoff of giving an alarm changes dramatically; if you make a noise at night you give away your presence—which may be entirely unsuspected—and for what? If *you* heard the leopard sawing, presumably any vervet who could hear your alarm also heard the sawing. *Seeing* a leopard is apt to create a radical *information-gradient:* the sharp-eyed one is *alone* in having the information about the leopard. *Hearing* a leopard, on the other hand, is apt to be an occasion of group or mutual knowledge; everyone gets the bad news at once. But then if vervets did disturb the night with a chorus of alarms on hearing a leopard sawing, this would seem less intelligent than the discrimination they (apparently) make. (Note, by the way, that this wily calculation of the risks and benefits might not "run through each vervet's head" and yet *still* be the rationale that actually explains why the vervets are silent; it would be what I call a "free-floating" rationale—a rationale that explains the evolutionary development of this instinctual policy—if it is merely instinctual.)

Passive observation, no matter how patient and careful, is not likely to settle the issue between these hypotheses, since every particular telling observation raises the question "But would they have done the

same thing if the circumstance were altered in this way or that?" And the likelihood of all the right variations on the theme showing up without the experimenter's connivance is minuscule. Only a series of carefully designed experiments can put enough pressure on the hypotheses to sort them out. It could turn out that much of the puzzling "stupidity" of the vervets is actually disguised cleverness (or "cleverly designed" instincts). Or it could turn out that vervets are caught in the evolutionary trap of specialization: they developed special-purpose cognitive mechanisms that served them well enough to make the development of general-purpose problem-solving or reasoning mechanisms (like ours) too costly. (After all, researchers in *artificial* intelligence are finding that it is much, much easier to design weirdly narrow-minded "expert systems" than it is to design a general-purpose common-sense reasoner, and natural selection may have discovered a similar way to get some of the benefits of intelligence via a cheap substitute.)

The vervets' different alarm calls were identified (or, one might say, translated) by Robert and Dorothy several years ago and these translations have stood up well and been further sharpened and confirmed during their subsequent efforts to decipher the other vocalizations. (One day around noon we heard the eagle alarm of a superb starling, which the monkeys immediately heeded. Amin, the dominant female in the group, looked up, found the eagle in a treetop about a hundred and fifty meters away and gave a vervet eagle alarm. The others followed her gaze, *but didn't take up the alarm.* They saw, as she did on second glance, that it was not a martial eagle, which preys on vervets, but a snake eagle—just about the same size and with very similar markings but no threat to vervets. Only through binoculars could I observe the minor differences in the eagle's crest and coloration that had put the monkeys' minds at ease.)

Among the other vocalizations that have been identified are "grunt to a dominant" and "grunt to a subordinate" and a chutter that could be translated "I spy vervets from another group." A vocalization that Robert and Dorothy are currently studying has been dubbed the Moving Into the Open (or MIO) grunt. Shortly before a monkey in a bush moves out into the open, it often gives a MIO grunt. Other monkeys in the bush will often repeat it—spectrographic analysis has not (yet) revealed a clear mark of difference between the initial grunt and this response. If no such echo is made, the original grunter will often stay in the bush for five or ten minutes and then repeat the MIO. Often, when the MIO is echoed by one or more other monkeys, the original grunter will thereupon move cautiously into the open.

But what does the MIO grunt mean? I suggested to Robert and Dorothy that we sit down and make a list of possible translations and

see which we could eliminate or support on the basis of evidence already at hand. I started with what seemed the most straightforward and obvious possibility:

"I'm going"
"I read you. You're going."

But what would be the use of saying this? Vervets are in fact a taciturn lot, who keep silent most of the time and are not given to anything that looks like passing the time of day by making obvious remarks. Like E. F. Hutton, when a vervet talks, the others listen. "Well, then," I asked, "could it be a request for permission to leave?"

"May I go, please?"
"Yes, you have my permission to go."

This hypothesis could be knocked out if higher ranking vervets ever originated the MIO in the presence of their subordinates. In fact, higher-ranking vervets do tend to move into the open first, so it doesn't seem that MIO is a request for permission. Could it be a command, then?

"Follow me!"
"Aye, Aye, Cap'n."

Not very plausible, Dorothy thought. "Why waste words with such an order when it would seem to *go without saying* in vervet society that low-ranking animals follow the lead of their superiors? For instance, you would think that there would be a vocalization meaning 'May I?' to be said by a monkey when approaching a dominant in hopes of grooming it. And you'd expect there to be two responses: 'You may' and 'You may not' but there is no sign of any such vocalization. Apparently such interchanges would not be useful enough to be worth the effort. There are gestures and facial expressions which may serve this purpose but no audible signals."

Perhaps, Dorothy thought, the MIO grunt served simply to acknowledge and share the fear:

"I'm really scared."
"Yeah. Me too."

Another interesting possibility was that the grunt helped with coordination of the group's movements:

"Ready for me to go?"
"Ready whenever you are."

A monkey that gives the echo is apt to be the next to leave. Or perhaps even better:

"Coast clear?"
"Coast is clear. We're covering you.'

The behavior so far observed is compatible with this reading, which would give the MIO grunt a robust purpose, orienting the monkeys to a task of cooperative vigilance. The responding monkeys do watch the leave-taker and look in the right directions to be keeping an eye out.

"Suppose then, that this is our best candidate hypothesis," I said. "Can we think of anything to look for that would particularly shed light on it?" Among males, competition overshadows cooperation more than among females. Would a male bother giving the MIO if its only company in a bush was another male? Robert had a better idea: suppose a male originated the MIO grunt; would a rival male be devious enough to give a dangerously misleading MIO response when he saw that the originator was about to step into trouble? The likelihood of ever getting any good evidence of this is minuscule, for you would have to observe a case in which Originator didn't see and Responder did see a nearby predator *and* Responder saw that Originator didn't see the predator. (Otherwise Responder would just waste his credibility and incur the wrath and mistrust of Originator for no gain.) Such a coincidence of conditions must be extremely rare.

"But perhaps we could contrive it," Robert went on. "Perhaps we could do it with something like a stuffed python that we could very slyly and surreptitiously reveal to just one of two males who seemed about to venture out of a bush." The technical problems would clearly be nasty and at best it would be a long shot but with luck we might just manage to lure a liar into our trap.

But on further reflection, the technical problems looked virtually insurmountable. How would we establish that the "liar" had actually seen (and been taken in by) the "predator" and wasn't just innocently and sincerely reporting that the coast was clear? I found myself tempted (as often before in our discussions) to indulge in a fantasy: "If only I were small enough to dress up in a vervet suit, or if only we could introduce a trained vervet, or a robot or puppet vervet who could . . ." and slowly it dawned on me that this recurring escape from reality had a point: there is really no substitute, in the radical translation business, for going in and *talking with the natives*. You can test more hypotheses in half an hour of attempted chitchat than you can in a month of observation and unobtrusive manipulation. But to take advantage of this you have to become obtrusive; you—or your puppet—have to enter into communicative encounters with the natives, if only to go around pointing to things and asking "Gavagai?" in an attempt to figure out what "Gavagai" means. Similarly, in your typical mystery story caper, some crucial part of the setting up of the "Sherlock Holmes method" trap is—*must be*—accomplished by imparting some (mis)information verbally. Maneuvering your subjects into the right frame of mind—

and knowing you've succeeded—without the luxurious efficiency of words can prove to be arduous at best and often next to impossible.

In particular, it is often next to impossible in the field to establish that particular monkeys have been shielded from a particular bit of information. Since many of the theoretically most interesting hypotheses depend on just such circumstances, it is often very tempting to think of moving the monkeys into a lab, where a monkey can be physically *removed* from the group and given opportunities to acquire information that the others don't have *and that the test monkey knows they don't have*. Just such experiments are being done, by Robert and Dorothy with a group of captive vervets in California, and by other researchers with chimpanzees. The early results are tantalizing but equivocal (of course) and *perhaps* the lab environment, with its isolation booths, will be just the tool we need to open up the monkey's minds but my hunch is that being isolated in that way is such an unusual predicament for vervet monkeys that they will prove to be unprepared by evolution to take advantage of it.

The most important thing I think I learned from actually watching the vervets is that they live in a world in which secrets are virtually impossible. Unlike orangutans, who are solitary and get together only to mate and when mothers are rearing offspring, and unlike chimps, who have a fluid social organization in which individuals come and go, seeing each other fairly often but also venturing out on their own a large proportion of the time, vervets live in the open in close proximity to the other members of their groups and have no solitary projects of any scope. So it is a rare occasion indeed when one vervet is in a position to learn something it alone knows *and knows that it alone knows*. (The knowledge of the others' ignorance and of the possibility of maintaining it is critical. Even when one monkey is the first to see a predator or a rival group and knows it, it is almost never in a position to be sure the others won't very soon make the same discovery.) But without such occasions in abundance, there is little to impart to others. Moreover, without frequent opportunities to *recognize* that one knows something the others don't know, devious reasons for or against imparting information cannot even exist—let alone be recognized and acted upon. People who live in glass houses have no stones to throw—or hoard—and hence have no use for a sophisticated delivery system with lots of options and decision points.

In sum, the vervets couldn't really make use of most of the features of a human language, for their world—or you might even say their lifestyle—is too simple. Their communicative needs are few but intense and their communicative opportunities are limited. Like honeymooners who have not been out of each other's sight for days, they

find themselves with not much to say to each other (or to decide to withhold). But if they couldn't make use of a fancy, humanlike language, we can be quite sure that evolution hasn't provided them with one. Of course *if* evolution provided them with an elaborate language in which to communicate, the language itself would radically change their world and permit them to create and pass secrets as profusely as we do. Then they could go on to use their language, as we use ours, in hundreds of diverting and marginally "useful" ways. But without the original information-gradients needed to prime the evolutionary pump, such a language couldn't get established.

So we can be quite sure that the MIO grunt, for instance, is not crisply and properly translated by *any* familiar human interchange. It can't be a (pure, perfect) command or request or question or exclamation because it isn't part of a system that is elaborate enough to make room for such sophisticated distinctions. When you say "Wanna go for a walk?" to your dog and he jumps up with a lively bark and expectant wag of the tail, this is not really a question and answer. There are only a few ways of "replying" available to the dog. It can't do anything tantamount to saying "I'd rather wait till sundown" or "Not if you're going to cross the highway" or even "No thanks." Your utterance is a question *in English* but a sort of melted-together mixture of question, command, exclamation and mere *harbinger* (you've made some of those going-out-noises again) to your dog. The vervets' MIO grunt is no doubt a similar mixture but while that means we shouldn't get our hopes too high about learning Vervetese and finding out all about monkey life by having conversations with the vervets, it doesn't at all rule out the utility of these somewhat fanciful translation hypotheses as ways of interpreting—and uncovering—the actual informational roles or functions of these vocalizations. When you think of the MIO as "Coast clear?" your attention is directed to a variety of testable hypotheses about further relationships and dependencies that ought to be discoverable if that is what MIO means—or even just "sort of" means.

Alas, some of the most interesting hypotheses are testable "in principle" (as a philosopher would say) but not really testable in practice. Sometimes this is due to the sort of technical difficulties that would make our MIO liar-trap so hard to set up. But it was brought home to me that there are other obstacles I hadn't counted on as well. Overexperimentation is a constant temptation but must be resisted. These monkeys have been scrupulously and unobtrusively studied for years and enough is now known about them—as individuals—to make them gloriously valuable subjects in these subtle probes into their beliefs. They could easily be spoiled for further research, however, by being

subjected to experiments that drew their attention to their human observers or to the equipment or that disrupted their lives in other ways.

For instance, a good way to try to *refute* the "Coast clear?" hypothesis about MIO—and such an attempt should of course be made—would be to originate MIO from a speaker hidden in the same bush with some monkeys. If they respond *without being able to see just where the originator is,* it is very unlikely that their response means "I'm covering you." But if our hypothesis turns out to be correct, the monkeys should be motivated to *find the originator* before responding and this would lead them to the hidden speaker in a state of heightened curiosity. The experiment threatens to blow the cover of the hidden speakers.

Robert and Dorothy have an informal list of experiments like this, what you might call last-one-out-the-door experiments, which they may someday run. If they ever learned, for instance, that changes in Kenya's political or social circumstances were about to make further experimentation impossible, then on the eve of their departure and knowing that no one else would be in a position to continue studying their groups, they might run through these experiments, roughly ranked in order of the damage they might do, as best they could.

Other experiments which at first glance seem tempting would involve getting the monkeys into a certain frame of mind by repeatedly presenting them with certain evidence, but nothing that smacks of *training* must enter their lives. They are well situated to be studied for what they know now or can pick up easily with a normal investment of normally motivated attention, not for what can be dinned into them under extraordinary conditions. (You can train a bear to ride a bicycle —an astonishing fact of elusive theoretical significance.) But without resorting to intensive training and without the luxury of a rich language with which you can simply *tell* your subjects the information that gets them into the "right" state for the experiment, it is often just impossible to assure yourself that your subjects have the one or two critical (and typically false) beliefs that can make a Sherlock Holmes trap so devastatingly revealing.

So this is what I learned. I learned that my methods, which work so well on people (especially in thought experiments and other fictional settings!), are strictly limited in application to animals who cannot be prepared as subjects with the help of language. But (looking on the bright side) the attempt to apply the methods helps uncover the very features of the monkeys' predicament that make them poor customers for a language that would give more power to the methods. Wittgenstein once said "If a lion could speak, we could not understand him." I disagree. If a monkey could speak—really speak a language—we

could understand him just fine because, if a monkey could speak, his way of life would have to be very much more like ours than it is.

References

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