Foreword

Murray Gell-Mann

DECEPTION and especially lying are typically ascribed to human beings and often distinguished from other forms of conveying incorrect or misleading information by intentionality. If a person is merely ignorant of the truth, then telling something other than the truth would not usually be considered lying, except that pretending to know the truth is itself a kind of deception. (Different ideas about intentionality are presented elsewhere in this volume, along with proposals to distinguish lying from deception.)

As we consider more and more primitive forms of life, we are presumably dealing with less and less intentionality or conscious awareness. So when we discuss other animals as well as people we may find it useful to employ a different way of talking. Perhaps we can say that conveying incorrect or misleading information is deception when some perceived benefit accrues to the deceiver. If you cheat me out of money by exaggerating the value of an object you are selling, then you obviously are getting something out of lying. Even if you are a compulsive liar and tell tall tales all the time, you are presumably gaining a subtler benefit, say feeling like a big shot by exaggerating your accomplishments or impressing an audience with your fibs. At the very least, you get the benefit of scratching the itch that you have: the need to lie.

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A government department that keeps lying (as in the Soviet Union, for example) gets, at least, the benefit of not having to change the habit, even if nobody believes the lies anymore. Our Atomic Energy Commission, later called ERDA and finally a part of the present-day Department of Energy, is an interesting case in point. Many years ago someone discovered a little tritium in the water supply near Hanford, Washington, and immediately ERDA issued a statement saying in effect: "We didn't do it." The assistant administrator of ERDA for Health Safety and Environment was a splendid Texan who went storming into the office of the administrator, Dixie Lee Ray, and told her, "Dixie, we gotta stop lying!"

I was told that in some species of fireflies the female stays in one place and flashes at a constant rate, which is identified by the male, who then mates with her. But I was told in addition that in some species the female can also blink at the rate characteristic of another species, thus attracting that alien male, whom she then devours.

Now in biology there is an important distinction between habits that are learned in a lifetime and others that are acquired over many lifetimes through the genome. In one way of talking, we can say that the first is a kind of learning or adaptation while the second is part of biological evolution. The distinction gets blurred a bit by processes such as the Baldwin effect, in which learned behavior can gradually become geneticized by favoring genetic changes that reinforce it. In any case, we want to include both sorts of behavior and anything in between.

Batesian mimicry is a very well-known example of evolved deception in biology. The monarch butterfly, raised on milkweed, is said not to taste very good to birds. The viceroy butterfly, which closely resembles the monarch although it is usually a bit smaller, is also passed over by many birds because of the resemblance. Supposedly the viceroy tastes all right, and so deception is being carried out.

When in flight, the *Buteo albonotatus*, or Zone-tailed Hawk, resembles a Turkey Vulture, holding its wings in a similar dihedral and doing a lot of gliding. Its prey, rodents and small birds, can mistake it for a vulture, which eats carrion, and thus not be afraid of it.

A very direct benefit accrues to an animal in a group that gives a warning signal when there is no danger and then grabs some food while the other members of the group are scrambling for safety. Chimps, for example, are known to do that.

My friend Charlie Munn studied birds in the lowland rain forest of the Manu National Park in Peru. There are mixed feeding flocks of several species in the lower canopy and other such flocks in the middle and upper canopy. In each case, one of the species supplies the sentinel that gives a warning cry when a predator, say a bird of prey, approaches. Charlie noticed that every so often the cry would be uttered in the absence of any danger and, sure enough, the sentinel grabbed a choice morsel to eat while the other birds were seeking cover. It occurred to Charlie to ask how often this occurred, that is, what fraction of warning calls were fake. For the lower canopy, it was around 15 percent. He then checked the middle and upper canopy flocks and found the same answer, around 15 percent.

I included this result in my book, *The Quark and the Jaguar*, and before publication I showed a version of the text to Charlie Bennett, the brilliant theoretical researcher at IBM. He commented that his late father had served in the Royal Canadian Air Force (RCAF) in Britain during the Second World War. Together with the Royal Air Force (RAF), the RCAF sent bombers over Germany and occupied Europe, typically with a fighter flying above to protect the bomber. Once in a while, they would send the fighter below the bomber to try to fool the enemy into attacking the fighter instead of the bomber. To determine when to carry out the act of deception, they used a disk divided into equal sectors and a spinning pointer that landed in one of the sectors when it stopped. A single sector was marked with color, and when the pointer ended up in that sector, the ruse was attempted. How many sectors were there? Seven. One-seventh is, of course, close to 15 percent. Could there be some principle involved?

Evidently, there is a trade-off here. If the act of deception is attempted too often, it will not be believed, as in the case of the boy who cried wolf. If it is attempted too rarely, then an opportunity for perceived benefit is being missed. But why is the proper ratio about one over seven? Is six or seven a natural order of magnitude, not based, like ten, on the number of human fingers? Is it connected with two pi?

Is it perhaps related to George Miller's collection of a large number of cases in which the numerals six or seven enter into human psychology? For example, one can immediately count a number of small objects in one's palm with very little chance for error as long as the number is less than seven or so. For somewhat higher numbers, a mistake by one is fairly likely, and so forth.

It would seem that the ratio in question would depend on the amount of benefit conferred by the deception and the amount of risk that the victim

would fail to be deceived. Why, then, should the resulting quantity be a particular number? Perhaps it is the ideal ratio in some limit and thus not dependent on the particular amounts involved.

It would be interesting to investigate, if that has not already been done, what these ratios look like in a variety of new cases. For example, how often does a particular bird pass up a viceroy meal compared with the frequency with which it turns up its beak at a monarch meal? How often does a chimp give a false alarm signal compared with giving genuine signals? And so on.

Behavior that is learned (rather than passed on through the genome and thus “instinctive”) need not simply be acquired over a single generation. It can be acquired through culture, that is, taught by other, often older members of the species. Although culture is less rich for other animals than it is for people, it certainly exists. In *The Quark and the Jaguar*, I cite the example of a species of tit in England that learned to open milk bottles on doorsteps. The trick was passed on from one member of the species to another and on and on. That is not deception, but we may ask whether some of the deceptions practiced by nonhuman animals are learned in this way rather than by inheritance or by direct experience of the individual.

What about penalties for deception in nonhuman animals (other than failure to be believed)? Sometimes a chimp will try to hoard some food instead of sharing it in the approved way. It has been remarked that, in such cases, the animal will give the food call, even though doing so undermines the animal’s intent. This example has been cited in comparing human communication with that of other animals. A human could withhold such a cry in a parallel situation, but the chimp seems unable to do so. Others have pointed out that chimps have been seen to be punished for not giving the food call and that perhaps such punishment, rather than an innate inability to withhold the call, is responsible for the phenomenon.

Before making a few remarks about human beings, let me proceed in the opposite direction. What about computers, or robots run by computers? We are only too familiar with enormous numbers of cases in which computers give false or misleading information. But what about benefit? What is the reward for deception here? Let us consider science fiction, as suggested by Brooke Harrington. In the film *2001*, the notorious computer HAL deceives two astronauts and even brings about the death of one of them, and the expected reward is to avoid being turned off by the surviving astronaut. Thus survival is the key here. In the film *Matrix*, machines engage in wholesale deception of humans,

including the construction of a whole false world, so as to be able to suck out of them the so-called “bio-energy.” Again, we deal with survival. In *Blade Runner*, the “replicant” machines lie in order to have their expiration dates canceled.

Looking back at the animal examples, we see that the rewards—getting food and not becoming food—are both connected with survival as well. Turning to human beings, I should like to ask first to what extent we have habits of deception that are inherited rather than learned in a single generation by the individual or over many generations through culture. It would be very interesting to hear what experts have to say about this matter.

Next, to what extent do we have habits of deception that are spread by culture? Certainly these exist. For example, when ethnic groups or nationalities demonize one another, they tend to distort history rather badly, and distorted histories are taught to schoolchildren and passed on to later generations. The perceived reward here is the allegiance of children, grandchildren, and so on to the struggle against the hated group.

In a much gentler vein, we teach our children to follow us in telling so-called white lies that prevent people from feeling bad. We sometimes conceal the gravity of an interlocutor’s medical problems or the severity of his or her children’s misbehavior, or even the degree to which a child’s musical performance failed to come up to snuff. Clearly, the habit of telling these lies is spread by culture over many generations.

The habit of avoiding lies can also be transmitted culturally. Karen Blixen, writing under the name of Isak Dinesen, uses as the epigraph for one of her books an ancient Persian saying about how children are taught “to ride, to shoot with the bow, and to tell the truth.” In our culture, too, telling the truth is supposed to be a great virtue, but we adults often fail to provide good models for children in that respect.

One case of truth telling is especially interesting. In Rwanda, during the last days of Belgian rule around 1959–60, one of the occasional massacres occurred involving baTutsi and baHutu. In this case, some Tutsi leaders, hoping to perpetuate their domination over the Hutu, tried to wipe out most of the Hutu with a modicum of education. For some of the murders, they made use of a third group, the baTwa, who are short people somewhat resembling pygmies. Unfortunately for the guilty Tutsi, the Twa were trained to tell the truth. When they came before the Belgian authorities, according to news reports the Twa confessed their crimes and named the Tutsi individuals who had ordered them to commit those crimes.

In the chapters covering human deception, its many forms, and the complex ethical considerations involved, we are carried far from the kinds of things I discuss here. Outlining it all would make this Foreword far too lengthy and would soon outrun my capabilities, but perhaps the remarks I have made will nevertheless serve as a useful preface by addressing a scattering of intriguing questions about the endlessly fascinating subject of deception.

DECEPTION