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LOOKING IN THE DESTINATION FOR WHAT SHOULD HAVE BEEN SOUGHT IN THE SOURCE

Gibt es nicht gelehrte Hunde?
Und auch Pferde, welche rechnen
Wie Commerzienräthe? Trommeln
Nicht die Hasen ganz vorzüglich?

Heinrich Heine,
Atta Troll (Cap. V, Quatr. 15)

The notorious but unimpeachably corroborated case of Pavlov's mice raises, in capsule form, a variety of fascinating issues with far-reaching ramifications in several directions, but with particularly serious implications, several of which are well worth restating and pondering further (cf. Sebeok 1977b: 192-201), both for the foundations and research methodology of contemporary semiotics.

The facts, as reconstructed by Gruenberg (1929: 326-327), Zirkle (1958), and Razran (1959) are straightforward enough. Pavlov, convinced that acquired characters could be inherited, thought at one time that this process might be demonstrated by inducing conditioned reflexes in mice and then counting the

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conditioning trials required through successive generations. His expectation, in conformity with the Lamarckian model of information transmission then, as later, favored in the USSR (Razran 1958), was that the numbers would significantly decrease. Accordingly, he caused an assistant of his, one Studentsov (who appears in the history of science solely as an obscure although, for present purposes, emblematic figure confined to this single episode), to conduct a series of experiments over five generations of mice, the astounding results of which the collaborator then reported to the 1923 Soviet Physiological Conference, as expressed by the following dramatically cascading figures (rounded out later by Pavlov himself): 300, 100, 30, 10, and 5.

The intellectual milieu in which Pavlov worked, and, of course, the very assumptions he brought to the investigation of the problem, accounts for his remissness in not instantly questioning the results, let alone repudiating the conclusions, obtained and announced by his "over-zealous assistant" (Razran 1959:916). "It seems reasonable to assume," Razran continues (*ibid.*), "that Pavlov would not have been so gullible if he had not shared the Lamarckian predisposition, common to Russian bioscientists—and to the intelligentsia in general—even before the Revolution, and if he had reviewed critically the general evidence on the topic..." Only in 1929 did this uncompromisingly empirical scientist, whose honesty was never in doubt, indeed who, in a famous lecture, as far back as April 23, 1921, on the basic qualities of mind deemed indispensable to a scientist, put in a leading place exceptional facility in constructing scientific hypotheses—the capacity, that is, "to get behind the facts," as he used to say (Frolov 1938:256)—set forth publicly an alternative hypothesis to explain the astonishing data emanating from his laboratory. As related in Gruenberg's *The Story of Evolution* (1929.327, fn. 1), "In an informal statement made at the time of the Thirteenth International Physiological Congress, Boston, August 1929, Pavlov explained that in checking up these experiments it was found that the apparent improvement in the ability to learn, on the part of successive generations of mice, was really due to an improvement in the ability to teach, on the part of the experimenter! And so this 'proof' of the transmission of modifications drops out of the picture, at least for the present."

This little tale of self-deception—a variant of what Merton (1948) has dubbed the self-fulfilling prophecy, a phenomenon which was later most creatively and ingeniously explored by Rosenthal (e.g., 1976:136-137) and Rosenthal and Jacobson (e.g., 1968:36), but which is perhaps best known by the tag, Clever Hans Fallacy—evokes certain urgent lines of inquiry which continue to be neglected by semioticians, as well as most other students of human and animal behavior, at their peril. The issue is such an important one because the Clever Hans effect informs, in fact insiduously infects, all dyadic interactions whatsoever, whether interpersonal, or between man and animal,[1] and by no means excepting the interactions of any living organism with a computer.[2]

In what follows, I will confine my observations to the three salient features suggested by the Pavlov episode which seem to me to be especially instructive for a general theory of signs. The first of these has to do with the notion of deception, especially within or at the perimeter of the academy, and the importance of being able to recognize different kinds and degrees thereof, ranging from out-and-out fraud for financial gain (say, royalties) and preferment (in the form, for example, of a doctorate), as in

[1] In view of the now hardly controvertible fact, underlined once again by Hediger (1974:27-28), that the Clever Hans effect in "animals is only explainable by the continually repressed fact that the animal—be it horse, monkey or planarian—is generally more capable of interpreting the signals emanating from humans than is conversely the case," it is irksome repeatedly to come across reports fatuously stating that "[i]n order to avoid the results of suggestion [certain] investigators decided to use animals rather than humans as their experimental organisms" (this in reference to mice, in a test of "laying-on-of-hands" healing, as reported by Rhine [1970:316-317]).

[2] Cf. Weizenbaum's (1977) telling remark about the "power of... [his] computer program [being] no more and no less than the power to deceive," and the constant, inevitable, yet apparently discounted intrusion of Clever Hans cues into the Lana experiment intended to be conducted by means of an "impersonal" computerized system—see, e.g., Rumbaugh (1977:159, 161), and the acerb comment on this project by Gardner and Gardner (1977:44), alleging that his "results... presented thus far are more parsimoniously interpreted in terms of such classic factors as Clever Hans cues..." The Gardners claim that, to the contrary, testing procedures they themselves developed rule out this and kindred alternative interpretations. The procedures they refer to presumably involve the "double-blind" design, adapted from psychopharmacological researches. The objectivity of this method, however, though comforting, is altogether illusory; see, e.g., Tuteur 1957-1958. So what we have here is a blatant case of, paraphrasing Cervantes, the pot calling the kettle black.

a scintillating instance of fictional ethnography, cleverly unwrapped by de Mille (1976; cf. Truzzi 1977). Imposture is somethimes alleged where facts remain forever bafflingly insubstantial while nonetheless mortally damaging, as in the melodramatic Paul Kammerer scandal made famous anew by Koestler (1971): was the principal in the case deliberately trying to perpetrate a swindle, or was he an ingenuous yet suicidal victim of his own Lamarckian tendencies, or did he have a Studentsov in his lab, and, if so, was this putative staff member doctoring critical specimens of *Alytes obstetricans* either to please or to discredit (*ibid.* 124) his master? No possibility can be entirely excluded, just as we shall never know whether Claudius Ptolemy is the most successful fraud in the history of science, as Robert R. Newton recently argued, or the greatest astronomer of antiquity, as Owen Gingerich reaffirms. The question hinges on whether Ptolemy systematically invented or doctored earlier astronomers' data in order to support his own theories, whether he was unknowingly deceived by a dishonest assistant, or selected, for pedagogical purposes, just the data which happened to agree best with his theory (Wade 1977).

From a semiotic point of view, the deliberate exercise of fraud and deceit—the traditional confidence game or, as this is known to its practitioners, the con—is less interesting than self-deception and its far-flung consequences. For centuries, of course, one very special and continuing form of the con has been perpetrated upon marks by an operator using a tame, trained, domesticated animal, such as a horse, as his or her pivotal prop. A celebrated equine in point, popularized in a ballad published on November 14, 1595, was Morocco, "Maroccus Extaticus, or Bankes [John Bank's, the operator's] Bay Horse in Trance," whose astonishing feats, suspected of verging on magic, were graphically portrayed, in 1602, by Jean de Montlyard, Sieur de Melleray, in a long note (trascribed in Halliwell-Phillipps 1879: 31-36) to a French translation of the Golden Ass of Apuleius. If contemporary accounts are to be believed, both Banks and Morocco were burned upon orders of the Pope, as alluded to by Ben Jonson in one of his *Epigrams*: "Old Bankes the juggler, our Pythagoras,/Grave tutor to the learned horse, Both which,/ Being, beyond sea, burned for one witch..." (1616). Pepys witnessed just such a horse, operated for profit nearly a century

later, as noted in his *Diary* for September 1, 1668: "So to the Fair, and there saw several sights; among others, the mare that tells money, and many things to admiration; and, among others, come to me, when she was bid to go to him of the company that most loved a pretty wench in a corner. And this did cost me 12 *d.* to the horse, which I had flung him before, and did give me the occasion to baiser a might belle fille that was in the house that was exceeding plain, but forte belle." And Christopher (1970, Ch. 3) entertainingly relates the adventures of "the most discussed animal marvel of recent times," a mare named Lady, and her operator, Mrs. Claudia Fonda.[3] Although Dr. Joseph Banks Rhine declared Lady "the greatest thing since radio,"[4] and that she possessed ESP, the skillful conjuror and historian of magical entertainment exposed the technique used by Mrs. Fonda, an obvious trick—obvious, that is, to mentalists—sometimes employed by mediums and known as pencil reading.

Christopher's key sentence reads (*ibid.* 45): "If Dr. Rhine was interested in testing for ESP, he should have ignored the horse and studied Mrs. Fonda." He is restating here a basic principle, explicitly recognized already in 1612 by a certain Samuel Rid, the author of a wondrously sophisticated instructional manual, or how-to-do-it book, of whom, alas, nothing further is known. This book, *The Art of Juggling*, ought to be made required reading for all would-be semioticians; here I will reproduce only a brief passage of commentary on the exploits of a performing horse, presumably Morocco:

[3] As recently as 1975, one still finds books on communication between man and horse imbued with the Clever Hans Fallacy. Thus Blake (1975, Ch. 10) devotes an entire chaotic chapter to "telepathy in horse language." He describes, no doubt, accurately, his experiences with a horse, Weeping Roger (*ibid.*, Ch. 7), but goes on to imply an absurd explanation: "I discovered that I could direct [this stallion] where I wanted to go just by thinking it. I would steer him to the left or right or straight ahead simply by visualizing the road. This was the first time I had consciously experienced telepathy with a horse" (*ibid.* 126). Elsewhere (*ibid.* 94), he remarks, "I was always at one with him." Plainly, all the constituents for a Clever Hans setup are present, but Blake still finds it necessary to resort to ESP instead of the correct semiotic explanation, which he apparently knows nothing of.

[4] Perhaps echoing Upton Sinclair's (1930:4) technologically puerile yet by virtue of that very fact endearing simile, comparing ESP to "some kind of vibration, going out from the brain, like radio broadcasting." This imagery has its ultimate source in Democritus.

"As, for ensample, His master will ask him how many people there are in the room? The horse will paw with his foot so many times as there are people. And mark the eye of the horse is always upon his master, and as his master moves, so goes he or stands still, as he is brought to it at the first. As, for ensample, his master will throw you three dice, and will bid his horse tell you how many you or he have thrown. Then the horse paws with his foot whiles the master stands stone still. Then when his master sees he hath pawed so many as the first dice shews itself, then he lifts up his shoulders and stirs a little. Then he bids him tell what is on the second die, and then of the third die, which the horse will do accordingly, still pawing with his foot until his master sees he hath pawed enough, and then stirs. Which, the horse marking, will stay and leave pawing. And note, that the horse will paw an also that nothing can be done but he sees his master stir. And note also that nothing can be done but his master must first know, and then his master knowing, the horse is ruled by him by signs. This if you mark at any time you shall plainly perceive."

Let me underscore Rid's last sentence: "This if you mark at any time you shall plainly perceive." The point is that, until the advent of Oskar Pfungst (1965 [1907]), no scientist that we know of had the insight to ask an animal—in this instance, Clever Hans, the horse of Herr von Osten—a question to which the inquirer himself did not know the answer. It turned out that, no matter how severely skeptical the audience, whether unschooled or expert, was, it was the observer who had involuntarily and unknowingly signed to the observed to stop tapping at the precise instant where the message destination—alive to the correct answer—expected the message source to cease emitting. "This," Polanyi (1958:169-170) says, "is how they made the answers invariably come out right" (continuing: "this is exactly also how philosophers make their descriptions of science, or their formalized procedures of scientific inference, come out right").

Actually, Lord Avebury, in the 1880s, came very close to rediscovering the correct solution in his experiments with Van, his black poodle, supplemented by his casual inspection of other dogs, some score of years before Pfungst, who himself regarded Van "as a predecessor of our Hans" (1965:178). Avebury had the right attitude to begin with, "that hitherto we have tried to

teach animals, rather than to learn from them: to convey our ideas to them, rather than to devise any language or code or signals by means of which they might communicate theirs to us" (Lubbock 1886: 1089). He sensitively discerned that when a dog—or a chimpanzee (see Thomson 1924: 132) for that matter—is taught how to "count," the operator need not, in fact, ordinarily does not, "*consciously* give the dog any sign, yet so quick [is] the dog in seizing the slightest indication that he [is] able to give the correct answer... Evidently, the dog seize[s] upon the slight indications unintentionally given" (*ibid.* 1091).

Avebury, furthermore, shrewdly connected these observations "with the so-called 'thought-reading'" (*ibid.*) one variant of which, commonly known as "muscle reading," came eventually to be investigated in painstaking detail by three prominent Berkeley psychologists, Edward C. Tolman among them. "Muscle reading" was shown to hinge crucially on the performer's perception of motor signs of an exceedingly delicate character, signs, moreover, "unintentionally" communicated to him "by each of the persons who acted as his guide" (Stratton 1921; discussed further in Sebeok 1977 b: 200-201).[5] It is established by now beyond serious doubt that the working ingredient of many other mind reading acts—much in the manner of the children's game of Hot and Cold—consists of unwitting and inadvertent nonverbal signs transmitted from audience to "psychic"; nor is this surprising, "since people constantly pass nonverbal signals to each other through such things as changes in their tones of voice and body movements. In fact, this nonverbal communication forms the basis of a well-known magic act. One performer, for example,

[5] On "muscle reading" as explanation for other pseudo-occult phenomena, such as the movement of a Ouija board, table tipping, and automatic writing, see Gardner (1957: 109), who speaks of the "unwitting translation of thoughts into muscular action..." See also Vogt and Hyman (1959, Ch. 5). Regarding the most flashy of contemporary "psychics," the Israeli stage-performer Uri Geller, see Marks and Kamman (1977: 17), who similarly conclude that "[p]arsimony dictates the choice of normal explanations for the phenomena described... Geller's procedures allow him to use ordinary sensory channels and ordinary motor functions." Incidentally, James ("The Amazing") Randi, a top flight Canadian conjurer, has publicly duplicated all of Geller's feats. Concerning Peirce's disapprobation of telepathy, "with its infrequency and usual deceptiveness" (Peirce 7.686), and of kindred psychic doctrines and claims, see his extended if apparently incomplete essay on "Telepathy and perception" (*ibid.* 597-686).

asks to have his check in payment for a show hidden in the auditorium in full view of his audience. He then comes on stage and finds the check by reading the nonverbal cues of the audience as he wanders closer to or farther from the check" (Kolata 1977: 283, interviewing Persil Diaconis, who is both a prominent mathematician and magician; the identical illusion is discussed, in his somewhat hokey style, by Kreskin [1973:80-84], describing how "I concentrate on reading every direction, every clue, and sensitize myself to hear or see any supportive factors beyond the perceived thought... It can be likened to a highly stimulating game of charades..."). This example is far from insignificant, since, as Diaconis emphasizes (*ibid.*), it suggests an enormous problem area of "how much usable information is being transmitted in this way and what the best guessing strategy is," and which arises in many contexts other than parapsychology—in fact, whenever and wherever organisms interact.

As to the mental operation of guessing, it was none other than Peirce (1929:269-270) who had emphasized that "[i]ts full powers are only brought out under critical circumstances," a claim he went on to substantiate in a colorful extended narrative of a true personal incident in which the great philosopher was metamorphosed into a master sleuth (for the full story, see *loc. cit.* 267-282).[6] As one of his editors summarizes the anecdote, it concerned "the theft of [Peirce's] coat and a valuable watch from his stateroom on a Boston to New York boat. He says that he made all the waiters stand in a row and after briefly talking with each, but without consciously getting any clue, he made a guess as to which one was guilty. The upshot of the story is that after many difficulties, and by making more successful guesses, he proved that his original guess had been correct" (Peirce 7.40n15; cf. 7.45). What Peirce attempted to do by talking briefly with each man in turn was, as he put it, "to detect in my

[6] Peirce's detectival procedure is compared in detail, in a recent paper by Sebeok and Umiker-Sebeok (1979), with the famous "method" of Sherlock Holmes, wherein the similarity is accounted for by virtue of their common roots in Natural Semiotics (including medical). Kreskin (1973:27-28) incidentally sketches a stage illusion, *Guilty*, which unfolds precisely according to the strategy devised by Peirce, in applying which, Kreskin claims, it is "impossible for the 'guilty' person not to give himself away..." For a flagrant case of real life abuse of "telepathy" in law enforcement, seemingly motivated by social prejudice, see Posinsky (1961).

consciousness some symptoms of the thief" (*loc. cit.* 281). His expectation was that the crook would emit some unwitting index, but Peirce also stressed that his own perception of telltale signs, while he held himself "in as passive and receptive a state" (*ibid.*) as he could, had to be unconscious, or, to use a preferred term he suggested, unself-conscious, "a discrimination below the surface of consciousness, and not recognized as a real judgment, yet in very truth a genuine discrimination..." (*loc. cit.* 280). He mentions two conjectural principles that may furnish at least a partial explanation for his successful application of "this singular guessing instinct. I infer in the first place," he concluded, "that man divines something of the secret principles of the universe because his mind has developed as a part of the universe and under the influence of these same secret principles; and secondly, that we often derive from observation strong intimations of truth, without being able to specify what were the circumstances we had observed which conveyed those intimations" (*loc. cit.* 281-282). In Peirce's incomparably insightful fashion, the first principle adduced provides the ultimate evolutionary rationale for the workings of the Clever Hans effect, while the other addresses its specifically semiotic roots.

The work on deception by illicit communication in the laboratory recently adumbrated by Pilisuk and his collaborators (1976) surely is on the right track, but merely scratches the surface of deception being a pervasive fact of life characteristic of experimental studies of human and animal behavior; Rosenthal (1976:156), for instance, admits that "[d]eception is a necessary commonplace in psychological research," although I believe that he tends to underestimate substantially (*ibid.* 388) potentially harmful consequences, particularly in the context of placebos, which may have decided toxic effects and even the power to produce gross physical change (cf., e.g., Beecher 1955:1606), as well as of the dubious role of double-blind "controls."[7]

[7] Cf. fn. 2, above; I intend to return in much more depth elsewhere to these complex semiotic topics, which I had occasion to discuss but briefly before (Sebeok 1977b:196-197, and 1978). See especially my paper, "The Ultimate Enigma of 'Clever Hans': The Union of Nature and Culture," to be published, in 1980, in the *Annals of the New York Academy of Sciences,* constituting the procedings of a conference/workshop on "The Clever Hans Phenomenon: Communication Processes Among Horses, Whales, Apes, and People."

The first general lesson of the Pavlov episode thus boils down to this: be ever on the lookout against deception, but beware, above all, of self-deception. The second moral is expressly methodological, and may be best understood in a semiotic frame. It has been formulated, as we saw, in more or less the same way by Rid, Avebury, Pfungst, Christopher, and stated perhaps most comprehensively in the title of this article. Pfungst (1965:xxx) and his chief, the eminent psychologist Carl Stumpf, distilled the essence of their investigation by recognizing and admitting that the Hans Commission made the initial mistake of "looking for, in the horse, what should have been sought in the man." In physics, one speaks of couplings between the observer and the observed, and keeps asking how the former affects the latter. In psychological jargon, the experimenter becomes a proxy for "man," while "horse" can stand for any subject, whether human or animal (Rosenthal 1976). In anthropological, folkloristic (Fine and Crane 1977), and even linguistic (Sebeok 1977b:196), fieldwork, we are concerned with the distorting influence of elicitor upon native informant. In a clinical setting, we are interested in what the agentive physician's (or quack's or shaman's) personality and paraphernalia contribute towards the healing of the patient/client (Sebeok 1977b:196-197; *id.* 1978). In the argot of the con, the police wants to know how does the operator "take" the mark? All of these dynamic/dyadic relationships between living systems have specific commonalities ultimately modeled on, or, more exactly, programmed after, the one universal dependence relationship which must be both basic and paradigmatic: the cybernetic cycle that prevails between mother (or other caretaker) and child. The nature of this system, "in which one partner assumes the functions of sensor and regulator for the other one and vice versa," was first outlined by Th. von Uexküll (forthcoming), in an attempt to account for the efficaciousness of placebos. All of us are assumed to be reliving and reiterating the early months of our extrauterine existence, when gesturing, posturing, vocalizing, and eventually articulating wicca words like "mama," produced something from nothing—milk and toys, for instance—"out of the blurry, remote world of the adult gods," in Wagoner's (1976:1598) apt and evocative conceit.

Although von Uexküll states his hypotheses in exceedingly

fruitful semiotic terms, it is likewise in obvious conformity with psychoanalytic theory, which suggests consideration of this primal program as a reactivation of a pivotal early experience and one which "may be a permanent available pattern of social interchange in human life, which is not confined only to child-mother or patient-doctor relationship." Plausible as this formula appears, it nevertheless leaves the question most often asked about the seemingly miraculous placebo effect and comparable forms of therapy—say, the "laying on of hands" (currently taught at the graduate level at the New York University School of Education, Health, Nursing Arts and Professions) or "mother's kiss or voodoo drums, leeches, purgatives, poultices, or snake oil" (Moertel *et. al.* 1976:96)—or, indeed, the workings of one's belief in Christian Science (Sebeok 1978): namely, how are the semiotic agencies and habiliments transmuted into physiologically operational mechanisms? The answer was foreshadowed in Janet's (1925:1:43-53) discussion of the value of miraculous methods of treatment, from the shrine of Aesculapius to Lourdes. Cannon's classic article (1942) on the cause of "voodo" death notwithstanding,[8] much fascinating research remains to be done at the borders of the sign science with the life science before this problem can be wholly resolved.

Another area of role-demand where the von Uexküll paradigm is palpably manifested is in hypnotic and posthypnotic responsiveness. As in the placebo effect—for, as Paul Sacerdote emphasizes, "hypnosis may be in many ways the most powerful of placebos" (Holden 1977:808)—the audience, or, using a semiotic term with a broader charge, context (cf. Fisher 1965:85), serves at least four functions that combine to reinforce the realization and maintenance of so-called hypnotic behavior; these were conveniently summarized by Sarbin and Coe (1972:96-97), but may be assigned to a wider category of effects sometimes called

[8] Huxley, who professes to believe in the existence of ESP (1967:282), and appears perversely unaware of Cannon's highly significant study of a quarter of a century earlier than his, nevertheless gropes toward an analysis of voodoo in semiotic terms: "Is it... possible that symbols," he asks, meaning icons, "by containing the field of relationships and providing the ground of consciousness, are responsible for what we call ESP?" (*ibid.* 302). Discussion of the etiology of voodoo death continues in anthropological and other circles; for a summary of the recent literature and latest interpretations, see Lex 1974.

artifacts, such as increased motivation and role-playing, in contrast to *essence*, which, if it really exists, refers to what is more or less vaguely known as "an altered state of consciousness," or sometimes "cortical inhibition" or "dissociation" (Orne 1959). Artifacts are systematic errors stemming from specifiable uncontrolled conditions—a bouquet of subtle cues emanating from both the experimental procedure and the experimenter. Thus investigation has revealed that the paraphonetic features selected by the source—viz., forceful or lethargic tone of voice—constitutes a ruling variable which must, if feasible, be carefully controlled (Barber and Calverley 1964). The hypnotized subject exhibits the behavior which he thinks the hypnotist expects of him, or, more accurately, what he thinks hypnosis is. The phrase "demand characteristics" is applied to this invigorating idea in the history of hypnosis research (Sheehan and Perry 1976), to which Jaynes' (1977:385) notion of the "collective cognitive imperative" corresponds exactly.

The intimate mutual gaze of lovers furnishes one example among many of how this fundamental paradigm is played out in young adulthood: the reason why both a boy and a girl spend so much time peering closely into each other's eyes is that '[t]hey are unconsciously checking each other's pupil dilations. The more her pupils expand with emotional excitement, the more it makes his expand, and vice versa" (Morris 1977:172). The pupil response is, as a rule, unknowingly emitted as well as, even more often, unknowingly perceived (Janisse 1977; Sebeok 1977:a1067-1068). Hip dudes, metaphoric "cats," wear dark glasses, or "shades," like the Chinese jade dealers of yore, to conceal their excited pupil dilation and thus to project a cool look—one that demands heightened participation of their "transparent" interlocutors.[9]

Semiotics, which is commonly defined as the study of any messages whatsoever, whether verbal or not, must be equally concerned with the successive processes of generation and encoding on the part of the most various sources, whether human or not; with the transmission of any string of signs through all possible

[9] See Umiker-Sebeok (1978) for a detailed treatment of the elaborate semiotic code for partial or total eye concealment by means of eyeglasses and other devices in American culture.

channels; and with the successive processes of decoding and interpretation on the part of the most various destinations, whether human or not. What the Pavlov tale reminds us of is the peculiar force of the linkage joining any source with any destination. In marveling at the accomplishments of animals—especially hand-reared dolphins in the 1960s and great apes in the 1970s—trained to engage in two-way communication with man, attention to the behavior of the human has all too often been either shunted aside by deliberate misdirection (imposture) or ignored in innocence (self-deception). Thus many people cherish the belief that police dogs are infallible as trackers, enabling them to recognize the trail of a stranger after getting the scent. However, in one historic experiment (Katz 1937:8-10), it turned out that the man in charge of the police dogs had provided unwitting cues: in other words, "it was not the dog guiding the man, but the man guiding the dog owing to his preconceived opinion about the result to be expected."[10]

Those who stage-manage the circus antics of apes have known for centuries what scientists who aim to instill manually encoded and visually decoded verbal communicative skills in such animals have still scarcely grasped. It is widely imagined, for example, that imitation of the human model in learning situations of this sort is critical. On this issue, Hachet-Souplet (1897:83-84, 91), author of the standard textbook on dressage, quotes Buffon: "'Le singe, ayant des bras et des mains, s'en sert comme nous, mais sans songer à nous; la similitude des membres et des organes produit nécessairement des mouvement qui ressemblent aux nôtres; étant confermé comme l'homme, le singe ne peut se mouvoir

[10] One side effect of this 1913 experiment was a decisive improvement in the training of police dogs and in their consequent accuracy in tracking. Katz's conclusion is, of course, equally applicable to any "muscle reading" act. The performer may have a spectator take hold of his hand believing that "he is being led by the magician, but actually the performer permits the *spectator to lead him* by unconscious muscular tensions" (Gardner 1957:109). The best muscle readers, like the famous Eugen de Rubini (whose case I discussed in Sebeok 1977b:200-201), may dispense with physical contact altogether, relying on far more illusive guiding cues, such as tremors of the floor, faint sounds of feet, movements of arms and clothing, and/or those made by changes in breathing (Rinn 1950:531). The workings of several variants of the Clever Hans theme were known to scientists of the stature of Michael Faraday (table turning) and Michel Eugene Chevreul (the magic pendulum) by at least the early 1850s (Hansel 1966:33-34).

que comme lui; mais se mouvoir de même n'est pas agir pour imiter'... Du reste," the canny author concludes, "le public se laissait prendre à cette ruse innocente." When the subject patently fails to imitate the trainer, this imperfection, too, is reinterpreted to fit with the anticipated design. Patterson (1977), for instance, instructed Koko to smile for a photograph. Her gorilla signed "frown" or "sad." The psychologist's explanation of this contrary behavior was not at all that Koko responded erroneously; Patterson's preconception of her design constrained her to assert that negative occurrences of this sort "demonstrate [the ape's] grasp of opposites." With dialectic unfolded in this vein how can you lose?[11]

What actually happens, as Hediger (1974:40) keeps patiently repeating, is that whoever poses the question about the linguistic accomplishment of apes "often already has preconceived ideas about the outcome of the experiments, indeed, he must frequently have possessed such ideas before being able to set up the experiment in the first place. Another factor is the choice of suitable experimental animals. It is up to him to choose a suitable species and individuals, treat and prepare them in a definite way. In this, the 'context'..., are already included many possibilities of influence by channels still largely unknown to us." The modish mirage of the Pathetic Fallacy, or the attribution of human characteristics to objects in the natural world, especially to the speechless creatures populating it, reinforced in ways that are more or less well understood (cf. Sebeok 1977b:197-199, 201-202n3), is so powerful that observers are not uncommonly prone to report a Barmecidal feast of signs where the more candid among them admit to having perceived none. Thus Stokoe (1977: 1)—a leading expert on Ameslan—remarks about some infant chimpanzees: "These baby chimps sign as they move—very

[11] Parents who act on the assumption that their child is bright appear to proceed in just this way. I recently observed an infant of 17 months being fed beef. Her mother interrogated her, "What's this?" The daughter replied, "Chick en." The mother observed, "She loves to tease me!" She then followed this remark up with a further unsubstantiated general comment: "She enjoys making a game out of oppositions." Bingham (1971) has shown that preverbal children are addressed in a carefully accommodated register by mothers who judge that *their* infants have the capacity to understand quite a bit, but not by mothers who set a lower estimate on *their* infants' capacity.

rapidly; and we often found that we had seen a sign or a sequence of two or three signs without consciously realizing that we had in fact seen it." Stokoe's encounter with baby Dar and bantling Tatu is disturbingly reminiscent of my own experience in the early 1960s with dolphins in Miami's long defunct Communication Research Institute. In that laboratory, *Tursiops* was being trained to mimic the speech of a human investigator by standard operant conditioning technique. Numerous rumors and some reports were put in circulation to the effect that the animals, especially Elvar and Chee-Chee, were indeed capable of reproducing words "appropriately." Of Elvar, it was evouched, for instance (Lilly 1963: 114): "He does not reproduce a word in 'tape-recorder' fashion or in the fashion of a talking bird. In one's presence he literally [*sic*] analyzed acoustic components of our words and reproduced various aspects in sequence and separately." Perhaps mistaken for a mark, I was permitted to observe one training session, and later to listen to recordings of several previous sessions. I heard only random dolphin noises, no dialogue. My puzzled demurral was countered by the assertion that these coastal porpoises articulated much too fast for their emissions to be interpreted by the human ear unaided: understanding presupposed analysis by means of the sound spectrograph and oscillographic methods. It was shown a decade or so afterwards that the papers published in scientific journals by this Florida research group "provided no solid evidence in support of [such] speculations" (Wood 1973: 91). The project was, accordingly, scratched, in 1968, altogether. The long shadow of Clever Hans darkened that undertaking from the start, as is perfectly patent from a sentence the principal had printed in italic type: "*And he* [i.e., Elvar] *first did it* [i.e., spoke] *when and only when we believed he could do it and somehow demonstrated our belief to him*" (Lilly 1963, *ibid.*).

Stokoe (1977, *ibid.*) drew another methodological conclusion from his observation in Nevada, or, more accurately, the lack of it: videotape or film "can never be an adequate substitute for trained live observation..." This, however, holds only if the inevitability of voluntary and involuntary influence upon the animals being experimented upon is objectively and critically recognized and assessed at every turn, and if all conceivable media

of communication between men and animals are kept in constant view. Concerning the work Stokoe describes, and the like, it is not enough to exclaim in awe on what the chimps do; the real challenge is to uncover—the relationship being reciprocal—what the University of Nevada team, for one, is up to.

The use of recording devices is no panacea, of course. As F.J.J. Buytendijk's scrutiny of a film of a fight between a mongoose and a cobra established, the reaction time of their coordinate exchange of some messages is so short that it can neither be viewed by human observers nor re-viewed even in slow motion. This is explicable in terms of the concept of zero signifier (Sebeok 1976:118): "these dissimilar combatants behaved part of the time like a pair of dancers, in which each anticipated the other's next movement" (Hediger 1974:38), that is, their reaction time was reduced to naught. Hediger believes that something similar takes place in the circus, for example, between a skilled trainer causing a panther sitting on a pedestal to strike out with a forepaw and withdrawing in exquisite accord with that movement, or a springboard acrobat adjusting his leap to the blow of the elephant's foot at the other end of the plank. In his keen observations on movement coordination, or microsynchrony, in human social interaction, Kendon (1977:75) has noted the same kind of foreknowledge: "The precision with which the listener's movements are synchronized with the speaker's speech means that the listener is in some way able to anticipate what the speaker is going to say..."

Hediger's mention of channels focuses attention on yet a third dimension of the Pavlov yarn. It is insufficient to shift one's attention back from the destination to the source. It is essential to consider, as well, the means whereby the two are conjoined. Although the visual, auditory, tactile, and chemical mechanisms of rodent communication, for instance, are understood to a degree (Eisenberg and Kleiman 1977:637-649), no one, least of all the principals, had the slightest idea how, precisely, Studentsov unwittingly disciplined Pavlov's mice; neither was Rosenthal (1976:178) able to determine to his satisfaction how his "bright" and "dull" rat subjects were differentially educated by his naive students: "we cannot be certain of the role of handling patterns as the mediators of the experimenters' expectancies, nor of

whether such other channels as the visual, olfactory, and auditory were involved." As to this, we can but reiterate Hediger's query and observation (1974:39): "How many channels exist between man and animal? We know little more today than we did half a century ago, i.e., that many other channels exist besides those of optic and acoustic question and answer. On account of the inadequacy of our sense organs and the apparatus at our disposal, such channels remain for the moment unknown. It is known, however, that many apparently quite objective laboratory experiments have given, and continue to give, false results for the very reason that many experimenters believe themselves aware of and able to control all the channels of communication existing between those conducting the experiment and the animal involved."

The following principles deserve, in consequence, attentive consideration:

1) Any form of physical energy propagation can be exploited for communication purposes (Sebeok 1972:40, 67, 124).

2) Channel selection is governed and constrained by the source encoder's sensorium. The source decoder will generate an acceptable reproduction of the source output if endowed (at least in part) with a correspondingly functioning sensorium.

3) It is reasonable to assume that messages are routinely transmitted between organisms through hitherto undiscovered or as yet scarcely discerned channels. One arresting case in point is the electrical channel, "a new modality" (Hopkins 1977:286), the multifaceted communicative functions of which are in the process of being actively disclosed.

4) The range of each of man's sense organs is significantly exceeded by those of a host of other animals. Hediger (1974: 32) cites Pfungst as having demonstrated that the horse is capable of perceiving movements in the human face of "less than one fifth of a millimetre." Pierce and David (1958:102-103) relate amusingly how a trio of electronics experts learned about the ultrasonic stridulation of crickets, drawing from this story the moral "that we hear only what we can hear, and that there may be a great many obvious differences among sounds which must forever escape our ears," wisely adding: "[t]o some degree

we hear what we expect to hear." Parallel comparisons can be adduced, *mutatis mutandis*, about the human eye, to say nothing of the olfactory field.

5) Man has invented a variety of technical aids to enhance the ineffectualness of his channel capacity. However, such intensifying equipment "has frequently been shown to have been a [further] source of error..." (Hediger 1974:30).

6) Before resorting to cheap *ad hoc* paranormal rationalizations, a sophisticated, if time consuming, research program must be conducted to pin down the mechanism actually at work in each instance. Elegant and exhaustive investigations of this character are illuminatingly inventoried in Vogt's and Hyman's (1959, Ch. 6) psychophysical exegesis of the movement of the dowsing rod in water witching (cf. Gardner 1957:101-103). The contrary is illustrated by the widely publicized case of Rosa Kouleshova (Pratt 1973:63), who was reputed to be capable of "seeing," particularly reading, through her fingertips. Astute press-agentry led to a global rash of other reported "dermooptical" manifestations (Sebeok 1977b:201), in the early 1960s, all of which turned out to be phony. "X-Ray Eye Act" is the professional designation of hoaxes of this nature,[12] where the performer can easily open his or her eyes and is able to look down both sides of the nose; blindfold magic can be achieved with seemingly impenetrable coverings like bread dough, silver dollars, wads of cotton, powder puffs, folded paper, sheets of metal, adhesive tape, and, of course, a variety of cloth shields.

The small but influential segment of mankind that can afford leisure for the contemplation of such matters longs to establish communication links in two opposite directions: with the rest of animate existence (plant forms, involving phytosemiosis, as well as animal forms, involving zoosemiosis), in the matrix of which our lives lie inalienably embedded; and with suppositious extraterrestrial civilizations. Leaving unearthly aspirations and efforts

[12] In part no doubt inspired by Jules Romains, the French writer, who was obsessed with "paroptic" vision, or "eyeless sight." His book on this subject (Romains 1920; American version, 1924) was widely read in the postwar years here and throughout Europe. On "dermo-optical" vision, see Gardnev's (1966) authoritative exposé.

aside (cf., e.g., Ponnamperuma and Cameron 1974; see pp. 213-215 for selected references to "interstellar communication languages"), one can confidently assert that the fundamentals of code-switching between our species and not a few others are adequately understood, not just intuitively—that kind of comprehension was the imperative semiotic prerequisite for domestication—but also scientifically, thanks, in the main, to Hediger's brilliantly creative lifelong spadework (cf., *inter alia*, Hediger 1974, and the references given in Sebeok 1976:219-220). Two-way zoosemiotic communications is thus not at issue, but such communication between man and animalkind by *verbal* means is quite another matter. The fascinating paradox of language-endowed speechless creatures has been iteratively resolved in myth and fiction, but not in reality. That search, for a resolution of the authentic kind, has lately taken a disturbingly pseudoscientific turn. An account of the socioeconomic reasons for this craze, interesting though it may be, of "humanizing" pets, quasi-feral terrestrial and marine mammals, and an occasional tame bird,[13] falls outside of the scope of this article.

Leo Szilard's satirical story about "The Voice of the Dolphins" (1961) and Robert Merle's thriller about *The Day of the Dolphin* (1976) are chimerical treatments of the same theme in what may well be called the Decade of the Dolphin. In the 1970s, writers have, fittingly, emerged from the brine. Peter Dickinson's "chimpocentric" tale of detection, *The Poison Oracle* (1974), where the action hinges on the linguistic capacity of an ape, and John Goulet's affecting book, *Oh's Profit* (1975), the hero of which, a gifted young signing gorilla, is pitted against the merciless forces of a singularly sinister coalition of linguists, are modern transfigurements of Jules Verne's diverting (if today seldom read) parodic science fiction pastiche, *The Great Forest* (originally published with his *Le Village aérien*, in 1901). This work was

[13] Chauvin-Muckensturm 1974:207 explicitly compares the drumming code she imparted to her Greated Spotted Woodpecker to the man-monkey performances variously shaped by the Gardners and Premack, stressing that "*le bec est au moins l'égal de la main du chimpanzé.*" This woodpecker is French. It will not have escaped notice, however, that the happily defunct myth of dolphin discourse, as well as the currently continuing promotion of primates to the status of a putatively (Limber 1977) productive *animal loquens*, have been confined, so far without a single exception, to the United States.

inspired by the genuine, if eccentric, exploits of Richard L. Garner, who, in 1892, left America on a field trip for Gabon, where he lived in Libreville for two years. He then proceeded upcountry, where he was sheltered at a mission of the Fathers of the Holy Ghost, located on the banks of the Ogowe. In due course, he published (Garner 1892) a book on the "speech" of monkeys. His studies were themselves an old mishmash of valuable observations, pure inventions, and colorful humbug: "Peut-être a-t-on souvenir de l'expérience à laquelle voulut se livrer l'Américain Garner dans le but d'étudier le langage des singes et de donner à ses théories une démonstration expérimental," Verne questions tongue-in-cheek, and then goes on to invent a lunatic proto-ethologist, one Dr. Johausen (obviously Garner, but in Teutonic guise), who journeys to Central Africa to seek out "le pretendu langage des singes." Predictably, he finds just what he was expecting to find—speaking monkeys—but with a difference: "Ce qui les distingue essentiellement des hommes [est qu'ils] ne parlaient jamais sans nécessité." In passing, Verne makes some exceedingly prescient observations about language and cognition, intelligence and verbal propensity, and animal communication in general. The story ends with an ironic twist: Johausen's expectations are indeed fulfilled, and he even rises to become the ruler of the beasts, Sa Majesté Msélo-Tala-Tala, but the cost he has to pay for his achievement is enormous: that price is the loss of his most precious possession, his own language, which is to say, his humanity: "Il est devenu singe..." Thus, in an unending cycle, does Pop Art burlesque scientific lore while Big Science apes (*le mot juste*) the presentiments of Pop Culture —no less in today's ecologically remorseful USA than in yesteryear's Lysenko-ridden USSR.

The road from Russian rodents to American apes is paved with good intentions, but for an innocent onlooker, trained in the sign science, at least three signposts pointing to a need for ventilation loom behind and ahead, each beckoning to as yet insufficiently explored byways at the dangerous intersection of two synergetic causes of error: the Clever Hans Fallacy and the Pathetic Fallacy. The trio of problems that seem, from a semiotic point of view, to cry out for immediate, impartial, intensive investigation are: the destructive pitfall of self-deception, the predominance, in

dyadic encounters, of the source over the destination, and the paucity of accurate knowledge about the multiplicity and range of natural channels connecting both extremities of the communication chain.[14]

[14] Several leading themes developed in this paper were touched upon in different lectures and seminars given, during the Fall of 1977, at the University of Kansas (week of October 10), Texas Tech University (October 17), and the University of Texas-Dallas (October 18). Some were also presented, in synoptic form, under the title "Natural Semiotics," at the 76th Annual Meeting of the American Anthropological Association, suited to the context of an all-day Symposium on the "Semiotics of Culture: Toward a New Synthesis in World Anthropology" (co-organized by Drs. D. Jean Umiker-Sebeok and Irene Portis Winner, and held in Houston, December 1). A substantially revised and expanded version of that talk will be published in a special 1979 issue of *Semiotica,* featuring the array of papers, linking sign theory with culture theory, delivered at this Symposium. For a probing critique of current experiments with the alleged linguistic propensity of African Great Apes, see our very detailed chapter, "Questioning Apes," in *Speaking of Apes,* eds. Thomas A. Sebeok and Jean Umiker-Sebeok, in press (New York: Plenum).

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