

ACROSS THE BOUNDARY

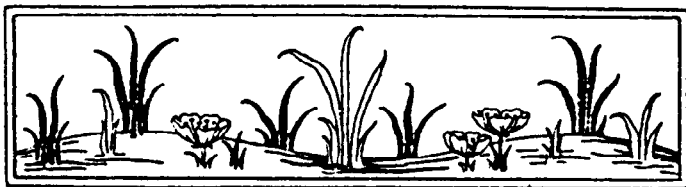
by

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THE CHICAGO LITERARY CLUB
9 December 1996

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Across the Boundary

I am standing at the edge of the cliff looking down some seventy-five feet at the perfect Mediterranean beach. On each side the cliff bends around, enclosing a perfect half-moon of white sand. At the far left a trickle of water runs down the rock. Where the two ends of the rock mark the seaward boundary of the beach there is a line of foam indicating that an underwater reef offers protection from heavy waves. I am consumed with a burning desire to camp on that beach.

I had spent the past eighteen months in Italy supervising a team of ten consultants in a study of the Italian machine-tool industry. The project had involved relationships with twenty-three Italian companies, a trade association, the Italian government, our government, and my own partners in Chicago, who never really understood it. If this were not enough, there was the stress of supervising a group of men while they dealt for the first time in their lives with the culture shock of living and working in a foreign country.

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Now I had sent my family home along with the other members of the team. I had wound up the final paper work with the authorities in Rome and was physically and emotionally drained. On the advice of an Italian friend I bought a backpacking outfit and took the ferry to this small island. My intention was to hike and camp along the deserted north coast, finally working my way inland to the resort hotel where I had made reservations. But now there was the problem of the cliff and that perfect beach.

There was a sensible way to get down by working around to the right and bushwacking through a tangle of vegetation and over a clump of boulders. The other way, of course, was down the cliff. This would be very imprudent indeed. Climbing down a cliff that one has not observed from below and located the holds is not at all sensible, particularly when one is alone. However, this is what I decided to do.

I lowered my outfit on a line and went over the edge. I was lucky. The rock was sound and the holds were good so I had no real trouble. I set up my little camp along the base of the cliff where the rock would radiate back the stored heat of the sun during the night. Then I sat and surveyed my little domain.

I quickly saw that the domain was not really mine. Actually, I was an intruder. High overhead a hawk circled, tracing over and over the exact perimeter of the beach. I realized that my perfect beach was that hawk's territory. Unless I made peace with her I would never be at rest.

What I did next was based mainly on instinct. I took off all my clothes and found the exact midpoint of the beach. I

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sat cross-legged and meditated until my mind was completely centered and clear. Then I made a conscious effort to send my attention up to where the hawk circled. I tried to become a hawk, to feel the rush and lift of the air on my body, the tilt and sway of the earth far below, the warmth of the sun on my back. And with all of this, I was conscious of a deep bonding and sympathy for this hawk and for all of her kin.

This went on for a long time, but finally the hawk stopped circling. She dipped down until she was much lower, then cut straight across and flew away. I interpreted this as a sign of approval and camped there for two more days. Each day the hawk came back briefly to check on me and then flew on. After the two days I climbed back up the cliff and left. I never told anyone the story of my adventure because I was not sure that there was a story. Did I really communicate with another life form? Or was it an artifact of my exhausted state? Or a coincidence? Or perhaps a dream?

Every beach is a boundary, an interface between the water and the land. Tidal estuaries represent two kinds of interface—between water and land on one hand, but also between the region of salt water and that of fresh. Several years ago I spent three weeks camping on such an estuary with members of the Cousteau organization. I learned that shrimp go through six larval stages as they move through different regions of salinity, and that this is characteristic of many forms of marine life. These tidal estuaries are enormously potent engines of biological and evolutionary devel-

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opment. And of course it was probably at one of these that our remote ancestor took the first step toward the great experiment of living on land and breathing air.

The lesson that we learn here is that important events are more likely to take place at the interface than at the center. The important events of our metabolism occur, not within the cell, but across the semi-permeable interface of the cell boundary. In our brains thought, memory, and emotion arise, not within the neurons, but in the synaptic connections where neuro-transmitters control the transfer of the electrochemical impulses. And in plant biology important changes take place at the boundaries between habitats where different life forms compete.

I believe that this principle has broad application, even in history and culture. Classical Greece was the geo-cultural interface between the expansionist Persian Empire and the very different barbarian cultures to the north. The resulting tension might explain much of Greek intellectual productivity. The same thing may have happened in the Balkans and in Spain as the boundary between the Muslim and Christian cultures moved back and forth during the centuries of Muslim expansion and retreat. And in our own early history the boundary created by the frontier was instrumental in forming American attitudes that persist to the present day.

The most problematic and controversial boundary of all is the one that divides humans from the rest of the animal kingdom. It is problematic because there is doubt that there

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is such a boundary. Are we not also animals, sharing the planet with other life forms? Over ninety-eight percent of our DNA is similar to that of a chimpanzee, our closest animal relative. We share much of our physiology and body structure with other mammals. And the organization of our brain and central nervous system is based on structures common to many animals, some of them much lower on the evolutionary chain.

In Eastern cultures such as Vedanta and Buddhism and in the religions of the native American tribes our close link to the rest of the animal world is recognized and honored. However, in Western civilization until very recently the general view has been that humans are utterly different. Animals were considered to lack rational intelligence, ethical sense, and even consciousness, to say nothing of a soul. They were granted very low moral status. In Genesis God gave Adam dominion over all the animals, apparently without any restrictions on what he could do. Augustine pointed out that Jesus caused the Gadarene swine to drown to show that we have no duties to the animals. Aquinas denied that we have any duty of charity to animals. Descartes believed that they were machines like clocks that moved and made sounds but had no feelings. Kant stated that animals were neither rational nor autonomous, so we had no obligation to be kind to them, except perhaps to train ourselves in kindly behaviour. In fact, it was not until Bentham in the eighteenth century that a major philosopher wrote that we should include animals in our ethical thinking.

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Beginning in the 1970's there was a major shift in Western thinking. Most educated people now believe that at least the higher animals display rational behaviour, are certainly conscious, and deserve our sympathetic consideration. However, this view is by no means universal. Many scientists explain that animal behavior is mediated almost entirely by instinct. Some even continue to deny that animals are conscious. In 1990 in his book *Language and Species*, David Bickerton wrote, "No one has shown that any other species has a consciousness that resembles ours."

This seems hard to understand. Haven't any of these writers really observed animals? Surely the criteria for conscious intelligence must include versatile adaptability to changing circumstances and challenges, a test that animals certainly meet. Observers have seen abundant evidence of learning and adaptability in a wide variety of vertebrate and even invertebrate animals. It is obvious that they want some things, fear others, and expect that their actions will produce results. Given favorable conditions they do a good job of managing their lives. Surely this kind of adaptive behaviour would be impossible without some degree of intelligence, memory, and consciousness.

Recent developments in neurophysiology and computer science have made a major contribution to this controversy by casting doubt on instinct as the primary explanation for animal behaviour. The trouble is that to meet the manifold problems of their life on the basis of instinct alone would require an enormous number of highly specific wired-in instructions. In simple animals, this requirement exceeds the

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processing capability of their central nervous system. Thinking, on the other hand, requires fewer and more general instructions. It is possible that animals with smaller brains may actually have greater need for simple conscious thinking. Conscious intelligence may extend much further down in the evolutionary scale than we had previously assumed.

That this view is controversial goes without saying. Throughout history our attitude toward our animal nature has been ambiguous and troubling. It has also been full of bias, wishful thinking, and the deliberate denial of obvious facts. Harvey Sarles has written, "To state that other animals cannot think . . . is to defend a prior view of human nature which is heavily laden with politics and theology." This may now be changing. David Premack writes, "The world that permitted the growth of a science in which man is intrinsically superior to the rest of nature, and is permitted to use nature as he wills, no longer exists."

There are two obvious differences that divide humans from animals and underlie the strong feeling that we are unique. One is that animals must accept their environment and live within it while humans have developed technology that enables us to control and modify the environment. The second difference is the source and explanation for the first. It is that we possess language. Language is the essential key that permits abstract thinking and leads to the development of science and technology.

It is important to distinguish language from communication. All social beings are in constant communication with

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members of their own species. Some of the systems that they use are highly sophisticated and complex. Honeybees use elaborate dance movements to communicate the existence and location of food. Whales and dolphins communicate with a code consisting of clicks and whistles. Vervet monkeys have an elaborate system of calls to warn of the direction of danger and the nature of the threat.

All of these systems of communication differ fundamentally from language in that they consist of *signals* rather than *symbols*. Signals convey information on emotional state and are usually instructions to act. Symbols, on the other hand, convey *meaning*. Failure to make this distinction has damaged many attempts to study animal-human communication.

These attempts have been numerous. In the early 1980's Pepperburg trained an African grey parrot to name and request forty different objects. If the wrong object was given to him he would say "No." Allen and Beatrice Gardner acquired an infant chimpanzee and taught it American sign language. Five years later the chimp knew 160 words. David Premack taught chimps to communicate by rearranging plastic tokens. There have been many other studies of this kind.

However, a careful study of these experiments indicates that what is involved is signal behaviour rather than language. That animals can learn to understand and respond to words is known to anyone who has had a dog. However, there is no evidence to date that any animal has constructed an original sentence of the sort that any two-year-old

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human could easily express. Only language and other similar symbolic behaviour seems to remain the sole, unique, and indisputable attribute of humans.

Recent discoveries in linguistics and neurophysiology provide a plausible explanation. Information from our senses is received in the brain and processed into a conceptual representation of reality that we recognize as consciousness. The brain mechanism responsible for this mapping has been called the primary representational system. In the case of humans there is a further mapping onto a secondary representational system that assigns linguistic meaning. The primary representational system allows us to experience what we see, hear, or feel; the secondary representational system puts it in language where it can be stored, retrieved, and manipulated. As far as we know no animal possesses this secondary system.

This explains many of the difficulties that have plagued efforts to teach animals to talk. As we have seen they can quickly learn to associate arbitrary elements and concepts. Apes can even distinguish between common and proper nouns. But they have no understanding of hierarchy and cannot be taught grammatical words. In other words, they can be taught vocabulary but not syntax, and so cannot produce original sentences.

It has been the traditional view going back to Aristotle that communication and problem-solving mental activity require consciousness and that consciousness requires language. Many scholars continue to believe this, including Noam Chomsky and Karl Popper.

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If this is true animals cannot think because they lack the brain connections to handle language and other symbolic procedures. Yet, as we have seen, they do think, so we are confronted with a paradox. The resolution of this problem would take us into areas that are beyond the scope of this paper and will have to wait for another time.

With this digression into theory out of the way, I want to return to a more careful examination of what happened on that Mediterranean beach. I have said that I acted on the basis of instinct, but it appears that there was a great deal of purpose behind my actions. Start with the fact that I took off my clothes.

We are connected to the rest of the universe by our skins. The retina of the eye, the eardrum, and the nasal mucosa are all evolutionary adaptations of the skin, specialized to receive communications within a narrow band, whereas the skin is the general receptor, which is why we should go naked as often as possible. The difficulty is that the messages we receive through our skin, if pleasant, are often interpreted as sexual, and since most people are afraid of sex, they go to great lengths to cover and anesthetize the skin.

When I walked out naked onto that beach, my thoughts were somewhat confused but they centered around two ideas. Since the skin was a sensitive receptor of radiant energy across a wide band of frequencies, it might also be a transmitter. Although admittedly a farfetched idea, why take the chance of covering up a potential medium of communication?

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The other reason was much more sensible. Animals have an uncanny ability to sense mood and intention from body movements, often when these are so minute as to be imperceptible to a human observer. A great deal of communication between animals is based on this ability. In discussing this faculty Konrad Lorenz writes: "In higher and social animals, the transmitting as well as the receiving apparatus . . . is much better developed and more highly specialized. Everybody who understands dogs knows with what uncanny certitude a faithful dog recognizes in its master whether the latter is leaving the room for some uninteresting reason, or whether the longed for daily walk is about to take place." This ability is also highly developed in horses. Horses can sense fear or uncertainty in a rider and become almost ungovernable. It is possible, as I will discuss later, that much more is involved in these kinds of communication than body language, but there is no question that body language is an important component.

You will recall that having seated myself on the beach I meditated. It seemed to me then, and still seems, that if there is any possibility of mind-to-mind communication with another life form, it is more likely to take place in the context of a meditative trance.

What we now call transcendental meditation is an ancient discipline with many advantages that have only recently been rediscovered. Its aim is to temporarily close down the process of conscious thinking, to shut off the chatter of half-formed ideas, fantasies, resentments, and daydreams that fill our minds when we are not asking them to deal with

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some task. This short circuits the secondary representational system with its language processing faculty. Our mind becomes much more similar to that of an animal.

Having cleared my mind through meditation, I concentrated on images of loving peace, expressed not in words but in strongly felt emotion. Here again I was moving closer to the mind of an animal.

Aristotle believed that animals could not feel emotion because they lack reason. What he did not know is that reasoning ability and emotion are processed in completely different areas of the brain. Reason, along with language, is a function of the cerebral cortex. Emotion arises in the limbic system, a much lower and earlier part of the brain. The principal structural elements of the limbic system are quite similar in humans and animals and the limbic system of much smaller animals is as large as our own. It seems reasonable to believe that animals feel emotions that are very much like ours. Communication between us, improbable on the basis of language, is much more likely at an emotional level.

We are now left with the last and most difficult puzzle of all: if we eliminate the possibility of body language, how did my message reach the hawk? This is the age-old problem of mind-to-mind communication, or telepathy. Many researchers now claim that its existence is well proven. Others strenuously object, citing the failure of many attempts to replicate experiments and the dubious nature of some of the statistical techniques. The central problem for many has been the lack of a proven medium of communication to carry the message.

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This is the old problem of action at a distance. Newton worried about this to the end of his life. He proved that heavenly objects exerted a force of attraction on each other. He could measure that force. However, he could not understand how the force could propagate itself through space if there was nothing in between. The mystery was finally resolved by Einstein. He showed that massive objects do not "pull" others, but instead create a gravitational field in which the other objects must move.

Some scientists now believe that consciousness might not be limited to the contents of our minds but could extend into space, creating a field similar to a gravitational or electromagnetic field. Such a field could very well account for the existence of telepathy. The biologist Rupert Sheldrake strongly believes this and has carried out experiments that would seem to demonstrate it. Further evidence comes from Princeton University at their PEAR unit (Princeton Engineering Anomalies Research). PEAR has shown that if a random-number generator is placed in a room where people are concentrating on a problem the output is no longer random. Here is strong evidence that conscious thought can influence an electronic machine at some distance. This experiment has been replicated in enough other laboratories so there is no doubt that this is a genuine phenomenon.

So boil all this down and what do we have? Coincidence, some rather dubious science, and a great deal of wishful thinking.

And yet, and yet. . . .

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Ten years later my wife and I were camping in a remote area of British Columbia. We had made our camp at the edge of a glacial lake and were exploring along a narrow animal trail that led through heavy brush. As we rounded a corner we came face to face with a female moose and her calf.

This is not a good situation to be in. Moose are very large animals, and every female is fiercely protective of her young. I told my wife to stand absolutely still and clear her mind of all thought, particularly that of fear. I did the same. I focused my mind on images of peaceful love for that moose and for her calf. The four of us stood still for what seemed an eternity. Finally, the moose turned aside and led her calf back along the trail. We waited for a while to let them get well away and then returned to our camp. I dug out that small bottle of scotch that we had been saving for just the right occasion. This seemed to be it.

This paper was written for The Chicago Literary Club
and read before the Club on Monday evening, the
ninth of December, Nineteen Hundred and Ninety-Six.
This edition of three hundred copies was printed for
the Club in the month of August, Nineteen Hundred
and Ninety-Eight.

PRINTED
IN U.S.A.