

Chapter 4

Science and the Idea of Culture

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Abstract

This chapter argues that the conflict between the sciences and the humanities is best understood not in terms of local cultural differences between scientists and humanists (C. P. Snow's "two cultures"), but rather in terms of the more fundamental problem of language origin. Is language an extension of animal communication systems, or is it something radically different? Is it explainable in purely Darwinian terms, or is it an evolutionary anomaly without precedent in history? The view of culture we adopt depends on how we answer this basic anthropological question.

A major theme running through all the essays in this volume is the influence of culture and society on science. Maarten Boudry and Massimo Pigliucci are merely more explicit than most when they conclude their contribution by saying that "science is social to the bone." Like all the authors in this volume, I take it as given that science exists only within the context of human beings and therefore deserves to be considered from a specifically anthropological perspective. More precisely, I think we can sharpen the debate about the cultural and social foundations of science by considering it within the context of the debate about the origin and function of culture. If culture is indispensable to science, then the success of the latter is tied to the success of the former. But what is culture and how do we explain its historical success? This is a specifically anthropological question—and it deserves a specifically anthropological answer.

It is tempting to superimpose our anthropological intuitions about culture onto our idea of science. Isn't science itself a kind of culture? After all, scientists have to interact with one another, and the concepts they use tend to be highly specific to the research communities they inhabit. Surely we can therefore speak of scientists as possessing a distinct culture, one that is not readily understood by outsiders unfamiliar with the specialized knowledge of the scientific community.

That scientists do possess a distinct and specialized culture was the view of C. P. Snow in his much discussed and now classic 1959 lecture at Cambridge University on the "Two Cultures." Snow pitted scientists against humanist intellectuals. What Snow regarded as regrettable was the mutual distrust and suspicion between the two groups. Humanists spoke one language, scientists another. Snow's sympathies were firmly with the scientists. They were the more progressive community—not in any political sense, but in the sense that history was on their side. It is often forgotten that the underlying theme of Snow's essay was not the rather toothless idea that humanists and scientists needed to start talking to one another. Rather, it was the notion that humanists had become obsolete in a world driven by science and technology. Snow's essay was an attempt to historicize and explain this situation. Of course, there was a moral point to Snow's discussion. The scientific and technological revolutions of the West had brought unprecedented prosperity to those lucky enough to be living in that part of the world that had undergone the miracle of industrialization and the subsequent consumer revolution. How could undeveloped countries catch up with their more technologically advanced counterparts so that they too could share in the wealth, comfort, and convenience of modern culture? Seen against the backdrop of this larger picture, humanist intellectuals came off as rather complacent, if not downright backward, in their attachment to a conception of culture that seemed strangely at odds with the wonders of modernization.

In this sense one must regard F. R. Leavis's attack on Snow as unsurprising. A lecturer in English at Cambridge, Leavis had remained silent in the immediate aftermath of Snow's lecture, despite the national and international attention the talk had attracted. But in 1962, on the occasion of the Richmond Lecture at Downing College, he could contain himself no longer. In a scathing riposte (later published in *The Spectator* as "The Significance of C. P. Snow: The Two Cultures?"), Leavis described Snow as "portentously ignorant" (53) and a "non-entity" (57), a man who had absolutely no talent or originality for either science or culture (Snow was a novelist as well as a scientist), but was instead a mere cipher for larger forces which he did not understand and therefore could not explain. In short, Snow was a fraud and an impostor.

Leavis's ad hominem attack was unnecessary (and indeed quite beside the point), but the notion that Snow was riding the wake of a wave he did not create and therefore could not take credit for was certainly accurate. In pointing out the superior cognitive power of science over the humanities, Snow was stating the obvious. The merit of his discussion was less in making this particular claim, which was self-evidently true, than in the minimal fuss with which the claim was presented. Unlike Leavis's assessment of the situation, there was nothing ill-tempered or defensive about Snow's recognition of the imbalance between the sciences and humanities. Of course, once this imbalance is recognized and owned up to, anxiety is inevitable. Self-doubt and self-justification set in. What is the point of the humanities? Despite their very different temperaments, both Snow and Leavis were responding to the same general anxiety about the function of the humanities in a scientific culture. Science generates no similar anxiety or hand-wringing. Its long list of achievements in producing prosperity has secured its position at the leading edge of serious cognition in society.

Next to this list of achievements, the record of humanists is much less impressive. What concepts do humanists possess that guarantee their indispensability? Snow strongly implied that there were in fact no equivalently powerful humanist concepts. This was indeed the point of Leavis's heated attack. As far as Leavis was concerned, Snow was an ignoramus who hadn't the faintest clue about what constituted genuine cultural value. The aggressiveness of Leavis's position was of a piece with his aesthetic modernism. Modernists tended to see themselves as the last guardians of high culture in a world polluted by the sentimentality and clichés of consumer culture. Hence they defined themselves in opposition to the cultural products of the marketplace. Whatever culture is, it is most definitely not that.

Here it is necessary to define the notion of culture more precisely. The concept remains rather ill-defined in Snow's essay. It is, for example, not at all clear whether it is helpful to speak of scientists as possessing a culture that can be opposed to the culture of humanists. While it is obvious that the concepts underpinning scientific knowledge are quite different from those underpinning humanist knowledge, the nature of this difference needs to be clarified.

In a book published five years after Snow's lecture, the anthropologist and philosopher Ernest Gellner took up the same topic in the context of a discussion of the wider philosophical implications of the historical transformation Snow had identified. In *Thought and Change* (1964), Gellner describes the difference between the sciences and the humanities in a characteristically stark and lucid fashion. The concepts of science, he says, are technical and difficult for a

nonspecialist to understand; but they are cognitively powerful (i.e., they are demonstratively powerful in explaining nature, thus enabling us to manipulate it with increasing precision and effectiveness). The concepts of the humanities, on the other hand, are nontechnical and relatively easy to understand, but they are “cognitively feeble” (203) (i.e., humanist knowledge is powerless when it comes to explaining and manipulating the physical world). More to the point, the fundamental concepts underlying humanist knowledge are easily accessible because they concern all humanity.

This point is perhaps too easily forgotten. Humanists, in their haste to emulate scientists, have been quick to produce their own kinds of specialized knowledge. This is understandable, but the situation is not really analogous to scientific knowledge. There is nothing to be gained in cognitive or explanatory power by adding layers of technical concepts or specialized jargon to humanist knowledge. It is for this reason that Snow’s idea of the two cultures is inadequate as an attempt to describe the difference between the two kinds of knowledge. What is needed is not merely a sense of science and the humanities as two different cultures, but an awareness of the anthropological origin of culture itself. Missing from Snow’s discussion is the idea that culture defines not merely a community of like-minded individuals, whether they be humanists or scientists, but the role of culture in our very definition of humanity. Leavis, it must be admitted, understood this aspect of the problem better than Snow. But Leavis’s conception of culture remains too bound to the high cultural tradition to provide us with a theory adequate to the task of explaining the cultural origins of humanity. Hence Leavis’s rebuttal merely had the effect of accentuating the very difference Snow emphasized in his lecture.

How then are we to explain not just the differences between particular cultures but the origin of culture upon which those differences are based? Compared to other animals, humans are notoriously unconstrained by their biology when it comes to their social behavior. You can take an infant from one kind of society, say, modern industrial society, and place it in another kind of society, say, an Amazonian tribe, and it will easily acquire the cultural behavior of that particular community. Obviously, the situation can be reversed: the tribal baby could be adopted into the home of well-to-do lawyers in London. It could then make its expected passage through Eton and Oxford and become a successful barrister. There are no biological constraints on whether the baby becomes a tribal shaman or a barrister.

This kind of biological or genetic flexibility is rather unusual. It does not exist in insect societies and it exists only very minimally among social animals such as

chimpanzees. For example, chimpanzees use certain kinds of rudimentary tools. They fish for termites with sticks and they crack open nuts with stones. The sticks must be slender enough and long enough to reach deep into the termite mound, and the stones must be carefully selected for their appropriateness for the task of hammering nuts. Tool use is not something that is given by the chimpanzee's biology; it is a learned behavior, and this creates the conditions for some minimal or incipient variation in behavior among individuals (i.e., some individuals will be more adept at using these tools than others). In some groups we can assume that more efficient habits of termite fishing or nut cracking will catch on, and these groups will be selected for in the Darwinian contest of survival. Surely the origin of human culture is to be found in these kinds of examples from chimpanzee life.

There is one major difficulty with this view and it concerns the appropriateness of the analogy itself. Can one really describe chimpanzee tool use as analogous to human culture? Are not the differences more striking than the similarities? For instance, why does chimpanzee culture remain obstinately stuck at the level of fishing for termites and cracking nuts with stones? What prevents chimpanzees from building on this rudimentary technology in the same way humans do? It is an obvious fact that cultural variation among humans is immense. There is a big difference between a stone chopper and a computer. Why don't we observe the same kind of variation among chimpanzees?

In his classic anthropological study of religion, *The Elementary Forms of Religious Life*, Émile Durkheim argued that the purely instrumental or positivist approach was the wrong way to go about explaining human culture. Culture is not a technology that allows humans to manipulate their environment more effectively. Rather, it is a way of constraining individual behavior by imposing on the world of everyday perception a symbolic reality that exists only relative to the group of which the individual is a participating member. This is how Durkheim defined the sacred. The sacred is what the individual is initiated into by virtue of membership in the community. Durkheim called this process "collective representation." Psychologists today call it "collective intentionality." Whatever we choose to call it, it appears to be unique to humans.

How did this collective imposition of the sacred onto the world of individual experience originate? This is a much less easy question to answer. But the question is worth asking because it allows us to see in a particularly vivid fashion the relevance of the humanities to fundamental anthropological inquiry.

The scientific answer to this question has already been given. Human culture is an amplification of the many learned behaviors observable in other social

species. With sufficient time, no doubt the chimpanzees, too, will start modifying their sticks and stones into more complex technological forms and, presto, eventually they too will have cultures as variable and complex as humans. The trouble with this answer is that there is absolutely no evidence for it. Chimpanzees have been studied intensively for the last fifty years or so, but revealing though these studies have been, they have not led to the discovery of the “missing link” between humans and apes. Durkheim did not have the benefit of the ethnological data available to scientists today, but his basic intuition about the anomaly of human culture when compared to animal social systems remains as relevant today as it was when he inveighed against the uncritical empiricism of Max Müller and the Victorian anthropologists. Language simply does not work in the same way that animal signal systems work. Words are not created by generalizing from one’s perceptual experiences. A prelinguistic infant left to grow up alone on a desert island will not acquire language from its solitary perceptual experiences.

One of the best recent explanations of the difference between language and animal communication systems comes from the evolutionary anthropologist and neuroscientist Terrence Deacon. In *The Symbolic Species* (1997), Deacon argues that all communication systems use iconic and indexical reference strategies, but only one (language) makes use of symbolic reference. For example, in order to interpret smoke as an index of fire, one must be able to generalize from previous experiences of smoke and fire. The perception of smoke is iconic of previous experiences of smoke. The index is an abstraction from previous iconic experiences. That is, on the basis of only a limited amount of information (smoke), one infers the presence of the missing element (fire). Smoke indicates not just earlier perceptual experiences of smoke (smoke is iconic of smoke), but something which is perceptually absent (fire).

Indexical signal systems can be quite powerful. The famous case of vervet monkey alarm calls, for example, is wholly describable within the framework of indexical and iconic reference. These calls have evolved to refer to distinct categories of predator: leopard, eagle, and snake. Each call generates a distinct flight response in the monkey. Leopards can be evaded by climbing into the outer branches of a tree where the leopard is too large to follow. But this is the worst place to go if an eagle is attacking, so an eagle alarm call prompts the monkey to hide in the denser foliage at the center of the tree where eagles cannot fly. Meanwhile, the best response to the alarm call for a snake is to stand still and scour the ground to look for the offending animal (vervet monkeys do this by standing upright on their hind legs).

It is tempting to interpret these alarm calls as precursors of words because they appear to possess two key features of words: arbitrariness and displacement. There is no necessary connection between the call and its referent (arbitrariness), and the sign works independently of the presence of the predator (displacement). When researchers play a tape recording of the call, the monkeys respond with the appropriate flight pattern. As Deacon shows, however, these calls are still fundamentally indexical in structure. They have evolved over many generations to produce a highly predictable response pattern in the monkey. Deacon also shows that indexical calls can be genetically assimilated. That is, these calls are hard-wired into each individual vervet brain. Juvenile vervets do not learn to produce alarm calls by imitating other vervets. In this sense vervet alarm calls are more like screams than words. If for some reason leopards, eagles, and snakes were to vanish from the habitat of vervet monkeys, the reference power of these calls would disappear because there would be no selection pressure on them. Notice that this is not the same for words, which continue to exist even when they cannot be verified. How many of us can claim to have seen or spoken to God? Despite the poverty of the stimulus, we still seem to be able to understand the word.

According to Deacon, the key to understanding the difference between a word and a vervet monkey alarm call is the way in which reference is structured in each case. What makes the alarm call “stick” to its object is the physical contiguity between sign and object. Researchers can dupe the monkey into believing that there is a leopard present in the bushes by reproducing the appropriate alarm call on a tape recorder, but this deception functions against the background of the real call which must refer to real leopards if the call is to survive over the course of multiple generations. In contrast, what keeps the reference of words in place is not a one-to-one correlation between the sign and its worldly object. It is something much more abstract. A word has meaning; it points to a general idea. But what keeps the idea in place? The idea is kept in place by the relationships among the words themselves. Words possess a grammar or syntax—a set of combinatorial rules—that guide reference to the external world. Thus words possess a dual reference. They refer to objects in the real world. But the way in which they refer to the world is not via a one-to-one indexical correlation between sign and referent but by the relationships among the words themselves. This is what Deacon means by symbolic reference. Symbolic reference is the relationship among abstract symbols or tokens that in the course of human ontogeny takes increasing precedence over the more basic indexical and iconic reference strategies of our perceptual systems.

But how did this type of reference system ever get off the ground in the first place? This is a problem very few of the scientific specialists regard as a problem at all. Deacon is a rare exception. Almost alone among scientists, he sees that humanity is a radical outlier when it comes to its use of symbolic reference strategies. This presents a genuine problem for science, and for evolutionary theory in particular. In adopting such an anomalous reference system, humans are not just a super-intelligent ape but a whole new phylum. Deacon insists on this point: "It is not just the origins of our biological species that we seek to explain, but the origin of our novel form of mind. Biologically, we are just another ape. Mentally, we are a new phylum of organisms. In these two seemingly incommensurate facts lies a conundrum that must be resolved before we have an adequate explanation of what it means to be human" (*Symbolic Species* 23).

Deacon sees with great clarity the anomaly of human origin. From a strictly biological point of view, there is no anomaly. Humans originated the way all species originated, that is, through a relatively slow process of genetic change and selection. Hence the intense interest today in chimpanzees and other nonhuman primates. They represent our closest living link to our hominid ancestors. But at some point in human evolution, genetic change was superseded by cultural change. This change gave birth to a whole new category of being, namely, human consciousness. To what extent is this new consciousness describable by the sciences of biology, chemistry, and physics?

This question takes us back to the debate between Snow and Leavis concerning the use of the humanities. Despite the more up-to-date terms in which I have presented the question, the debate has not changed a great deal in its overall tone. Science continues to be progressive, which is to say, it continues to make discoveries which unlock more and more of nature's secrets. Meanwhile, the humanities continue to suffer from an inferiority complex, which tends to manifest itself in various forms of science envy and pseudoscience. Indeed, I think the inferiority complex of humanists is a great deal more pronounced today than it was when Snow first delivered his lecture on the two cultures. (For an excellent account of the invidious creep of scientism into the humanities, see Raymond Tallis's *Aping Mankind*.)

What the reference to the problem of human origin enables us to see more clearly is the limits of science when it comes to explaining human consciousness. It is in the nature of the case that human origin cannot be explained exclusively on the basis of human biology. And the reason for this is that human origin is defined by human culture, and human culture is not reducible to the genetic mechanisms of evolutionary theory. More specifically, human culture

is not reducible to the genetically assimilable indexical sign systems used by all other animals, including our closest living relatives, chimpanzees. As Deacon shows, symbolic learning strategies are massively counterintuitive for chimps. It requires considerable external social support from their human trainers to get chimpanzees to set aside their indexical reference strategies in order to adopt the counterintuitive reference strategy of symbols.

These language-training experiments are highly illuminating because they show that, contrary to the Chomskian view that there must be some preexisting “language module” in the brain, the brain is actually not the key factor in the origin of language. Rather, it is the outside-the-brain context of human social organization. Early hominid ecology provided the social conditions in which it became possible to ignore the exigencies of indexical reference. This set up a feedback loop in which the ability to use symbols was selected for genetically. As Deacon nicely expresses the process of brain-language coevolution, language adapted itself to the hominid brain and the hominid brain adapted itself to language. But the crucial factor in starting the entire coevolutionary process was the internal social arrangement of the human community itself. As Eric Gans has suggested, only a species for whom the most urgent problem was internal conflict between group members rather than external competition with other species could make the shift from indexical to symbolic reference strategies (*The Scenic Imagination* 202–09). Unlike vervet alarm calls, words are not directed in the first place toward external threats. Rather, they are directed toward the group itself. As Durkheim realized, the symbols of human culture are in the first place symbols of group membership. They indicate the individual’s attachment to a community of others who share the same collective view. These symbols of membership convert individual intentionality into collective intentionality, the “me” into a “we.”

As an example of what I am talking about, consider the elementary gesture of ostensive pointing. It is commonly believed that pointing is a natural gesture that comes as easily to chimpanzees and dogs as it does to humans. This is not the case. Human pointing is not an index. When a dog points its nose in the direction of a duck in the reeds, its stance can be interpreted as an indexical sign of the duck. Likewise, when a chimpanzee reaches for a banana, its reach can be interpreted as an index of the banana. Laboratory chimpanzees, just like trained dogs, frequently use such gestures to indicate their desire for something. The chimp will point to the candy it wants, just as the dog will scratch at the door to indicate that it wishes to go outside. But only humans engage in pointing in order to share information for someone else’s benefit. This is what we mean by

pointing. When the baby reaches for its bottle, it is not pointing in this sense. Rather, it is expressing its desire, in the same manner as the dog that wishes to go outside, or the chimp that wants the candy. But when the child points to the car keys under the table, she is not expressing her desire for the keys but indicating the presence of something she believes her mother to be looking for.

The cognitive psychologist Michael Tomasello notes that this kind of pointing assumes a fairly high level of intersubjective complexity. More precisely, it requires both child and mother to engage in scenes of joint attention and joint intentionality (*Human Thinking* 32–79). The child must be able to differentiate her perspective from that of her mother. Furthermore, she must be able to adopt her mother's point of view. She must be able to put herself in her mother's shoes, and imagine what she is thinking. While trained chimpanzees frequently point to indicate that they want something, they never engage in cooperative pointing with either their trainers or other chimpanzees. For example, when a chimpanzee is faced with the task of guessing which bucket has food in it, it will not respond to the trainer who points to the bucket with the food. Instead it selects randomly. As Tomasello explains, the chimpanzee doesn't understand cooperative pointing because it does not engage in scenes of joint attention and joint intention (52). Chimpanzees have no conception of the "we" of collective intentionality. In order to see that you are trying to indicate the presence of something for my benefit, I must be able to distinguish between your perspective and mine and, what is more, that you are aware of this and wish to help me. But this is possible only if we collectively represent the food as a shared goal of our activity. Human pointing is an elementary form of symbolic reference, and therefore of language.

We are now in a position to see the inadequacy of Snow's idea of science as a self-contained culture. Culture, as Durkheim recognized, is concerned with establishing solidarity and community. Science cannot be described as having this as one of its aims. On the contrary, science is (notoriously) free of such explicit social or moral aims. Science is a method rather than a religion, philosophy, or moral worldview. The question one should therefore ask is not, "Is science a kind of culture?" but "What kind of society is capable of relaxing its cultural attachments sufficiently to allow for science?" For better or worse, this is the kind of society in which we now live. It is a pluralistic society that lacks a clearly defined common culture to which all of its members can feel a cozy moral kinship. This is one of its problems. The sense of belonging is faint, if not completely absent. But in this kind of society, science can flourish. When concepts are not graded by

their proximity to the sacred or the Great Chain of Being, when they are graded by their correspondence to reality rather than their correspondence to what the chief or king or priest says, then cognition can separate itself from the sacred. But this is not the same thing as saying that science is a kind of culture. The fact that science flourishes only in a society that equalizes the relationships among concepts is, of course, enormously significant. But this equalization of concepts is not something that science itself can take credit for. Moral equalization is a product of the culture that preceded the scientific and technological revolutions in the West. Why this occurred when it did is a complex story. What concerns us here, however, are not the details of that story but the results.

As a general rule, culture is concerned with constraining individual desire. This is true of both hunter-gatherer societies and agrarian societies. Industrial or scientific society is exceptional in the sense that ethical and conceptual constraint is significantly relaxed. The cognitive ethic of agrarian society is rigidly hierarchical. Social stability is prized above all else. In contrast, industrial society is highly mobile and egalitarian. Individual identities are not rigidly tied to kinship or social status. Instead they are open and changing. This mobility reflects the opening of the cognitive and economic spheres to experimentation and choice. What is sacralized is method rather than concepts. Indeed, the sacralization of concepts takes a backseat to method. Gellner associates this liberation of cognition and production with “a rather special new and inwardly imposed restraint” (*Anthropology* 59). This new form of internal constraint is a “second-order sacralization of procedural propriety,” which Gellner describes as “the rule of treating like cases alike, of conceptual tidiness, of the unification of referential concepts in an ideally unified system, and of their separation, to a remarkable extent, from the markers delimiting social conduct” (*Anthropology* 60).

The consequence of this liberation of cognition from cultural constraint is that our social rituals are no longer taken very seriously. Serious cognition today is associated with science, not with moral philosophy or theological doctrine. Yet science cannot tell us how to live. We still use the old rituals and ethical concepts, even if these no longer have the authority they once used to. As Gellner puts it, the link between serious cognition and daily life is “wobbly,” because “the superior kind of truth available in science is both unstable and largely lacking in any clear social implications” (*Conditions* 94).

So we continue to use the ethical concepts inherited from our prescientific cultural traditions but in a climate where respect for these cultural concepts is not automatic. One may speak of the decline of religious culture, but this process

is better described as an internalization of the sacred rather than a decline. As Snow pointed out, when disease and famine are no longer the pressing social concerns they used to be (thanks to modern science and technology), cultural constraint on desire begins to look rather quaint.

But this is not quite to concede a total victory for the sciences. When it comes to explaining culture, science will inevitably press up against its limits. For the concept of culture is meaningful only to those who also participate in it. This is the central paradox of culture. Culture depends upon biology because culture requires brains and brains are the products of biological evolution. But culture is also an institutional fact, in the sense described by John Searle. Searle distinguishes between the “brute” facts of physics, chemistry, and biology and the “institutional” facts of our social systems. Institutional facts occur when a social function is imposed on a brute fact. Searle’s favorite example is money, but the key evolutionary step occurs with the origin of collective intentionality: “the truly radical break with other forms of life comes when humans, through collective intentionality, impose functions on phenomena where the function cannot be achieved solely in virtue of physics and chemistry but requires continued human cooperation in the specific forms of recognition, acceptance, and acknowledgment of a new *status* to which a *function* is assigned” (*Construction* 40).

As Searle makes clear, institutional facts require language. An increasing number of scientists are beginning to realize this fact about human culture. “It is simply not possible,” Deacon writes, “to understand human anatomy, human neurobiology, or human psychology without recognizing that they have all been shaped by something that could best be described as an idea: the idea of symbolic reference. Though symbolic thinking can be entirely personal and private, symbolic reference is intrinsically social. Not only do we individually gain access to this powerful mode of representation through interactions with other members of the society in which we are born, but symbols themselves can be traced to a social origin” (409–10).

Snow criticized humanists for failing to take an interest in the work of their colleagues in the sciences. For the reasons Gellner states, genuine dialogue between humanists and scientists is rare. But there is one area in which dialogue seems both desirable and necessary. The problem of human origin concerns both parties alike. The sooner humanists recognize their stake in this fundamental question, the sooner they will be able to overcome their anxiety about the function of the humanities in a culture that privileges science as the only form of serious cognition.

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