

1 Linguistic contributions to the study of mind: past

In these lectures, I would like to focus attention on the question, What contribution can the study of language make to our understanding of human nature? In one or another manifestation, this question threads its way through modern Western thought. In an age that was less self-conscious and less compartmentalized than ours, the nature of language, the respects in which language mirrors human mental processes or shapes the flow and character of thought – these were topics for study and speculation by scholars and gifted amateurs with a wide variety of interests, points of view, and intellectual backgrounds. And in the nineteenth and twentieth centuries, as linguistics, philosophy, and psychology have uneasily tried to go their separate ways, the classical problems of language and mind have inevitably reappeared and have served to link these diverging fields and to give direction and significance to their efforts. There have been signs in the past decade that the rather artificial separation of disciplines may be coming to an end. It is no longer a point of honor for each to demonstrate its absolute independence of the others, and new interests have emerged that permit the classical problems to be formulated in novel and occasionally suggestive ways – for example, in terms of the new perspectives provided by cybernetics and the communication sciences, and against the background of developments in comparative and physiological psychology that challenge long-standing convictions and free the scientific imagination from certain shackles that had become so familiar a part of our intellectual environment as to be almost beyond awareness. All of this is highly encouraging. I think there is more of a healthy ferment in cognitive psychology – and in the particular branch of cognitive psychology known as linguistics – than there has been for many years. And one of the most encouraging signs is that skepticism with regard to the orthodoxies of the recent past is coupled with an awareness of the temptations and the dangers of premature orthodoxy, an awareness that, if it can persist, may prevent the rise of new and stultifying dogma.

It is easy to be misled in an assessment of the current scene; nevertheless, it seems to me that the decline of dogmatism and the accompanying search for new approaches to old and often still intractable problems are quite unmistakable, not only in linguistics but in all of the disciplines concerned with the

2 Language and Mind

study of mind. I remember quite clearly my own feeling of uneasiness as a student at the fact that, so it seemed, the basic problems of the field were solved, and that what remained was to sharpen and improve techniques of linguistic analysis that were reasonably well understood and to apply them to a wider range of linguistic materials. In the postwar years, this was a dominant attitude in most active centers of research. I recall being told by a distinguished anthropological linguist, in 1953, that he had no intention of working through a vast collection of materials that he had assembled because within a few years it would surely be possible to program a computer to construct a grammar from a large corpus of data by the use of techniques that were already fairly well formalized. At the time, this did not seem an unreasonable attitude, though the prospect was saddening for anyone who felt, or at least hoped, that the resources of human intelligence were somewhat deeper than these procedures and techniques might reveal. Correspondingly, there was a striking decline in studies of linguistic method in the early 1950s as the most active theoretical minds turned to the problem of how an essentially closed body of technique could be applied to some new domain – say, to analysis of connected discourse, or to other cultural phenomena beyond language. I arrived at Harvard as a graduate student shortly after B. F. Skinner had delivered his William James Lectures, later to be published in his book *Verbal Behavior*. Among those active in research in the philosophy or psychology of language, there was then little doubt that although details were missing, and although matters could not really be quite that simple, nevertheless a behavioristic framework of the sort Skinner had outlined would prove quite adequate to accommodate the full range of language use. There was now little reason to question the conviction of Leonard Bloomfield, Bertrand Russell, and positivistic linguists, psychologists, and philosophers in general that the framework of stimulus-response psychology would soon be extended to the point where it would provide a satisfying explanation for the most mysterious of human abilities. The most radical souls felt that perhaps, in order to do full justice to these abilities, one must postulate little *s*'s and *r*'s inside the brain alongside the capital *S*'s and *R*'s that were open to immediate inspection, but this extension was not inconsistent with the general picture.

Critical voices, even those that commanded considerable prestige, were simply unheard. For example, Karl Lashley gave a brilliant critique of the prevailing framework of ideas in 1948, arguing that underlying language use – and all organized behavior – there must be abstract mechanisms of some sort that are not analyzable in terms of association and that could not have been developed by any such simple means. But his arguments and proposals, though sound and perceptive, had absolutely no effect on the development of the field and went by unnoticed even at his own university (Harvard), then the leading center of psycholinguistic research. Ten years later Lashley's contribution began to be

appreciated, but only after his insights had been independently achieved in another context.

The technological advances of the 1940s simply reinforced the general euphoria. Computers were on the horizon, and their imminent availability reinforced the belief that it would suffice to gain a theoretical understanding of only the simplest and most superficially obvious of phenomena – everything else would merely prove to be “more of the same,” an apparent complexity that would be disentangled by the electronic marvels. The sound spectrograph, developed during the war, offered similar promise for the physical analysis of speech sounds. The interdisciplinary conferences on speech analysis of the early 1950s make interesting reading today. There were few so benighted as to question the possibility, in fact the immediacy, of a final solution to the problem of converting speech into writing by available engineering technique. And just a few years later, it was jubilantly discovered that machine translation and automatic abstracting were also just around the corner. For those who sought a more mathematical formulation of the basic processes, there was the newly developed mathematical theory of communication, which, it was widely believed in the early 1950s, had provided a fundamental concept – the concept of “information” – that would unify the social and behavioral sciences and permit the development of a solid and satisfactory mathematical theory of human behavior on a probabilistic base. At about the same time, the theory of automata developed as an independent study, making use of closely related mathematical notions. And it was linked at once, and quite properly, to earlier explorations of the theory of neural nets. There were those – John von Neumann, for example – who felt that the entire development was dubious and shaky at best, and probably quite misconceived, but such qualms did not go far to dispel the feeling that mathematics, technology, and behavioristic linguistics and psychology were converging on a point of view that was very simple, very clear, and fully adequate to provide a basic understanding of what tradition had left shrouded in mystery.

In the United States at least, there is little trace today of the illusions of the early postwar years. If we consider the current status of structural linguistic methodology, stimulus-response psycholinguistics (whether or not extended to “mediation theory”), or probabilistic or automata-theoretic models for language use, we find that in each case a parallel development has taken place: a careful analysis has shown that insofar as the system of concepts and principles that was advanced can be made precise, it can be demonstrated to be inadequate in a fundamental way. The kinds of structures that are realizable in terms of these theories are simply not those that must be postulated to underlie the use of language, if empirical conditions of adequacy are to be satisfied. What is more, the character of the failure and inadequacy is such as to give little reason to believe that these approaches are on the right track. That is, in each case it

4 Language and Mind

has been argued – quite persuasively, in my opinion – that the approach is not only inadequate but misguided in basic and important ways. It has, I believe, become quite clear that if we are ever to understand how language is used or acquired, then we must abstract for separate and independent study a cognitive system, a system of knowledge and belief, that develops in early childhood and that interacts with many other factors to determine the kinds of behavior that we observe; to introduce a technical term, we must isolate and study the system of *linguistic competence* that underlies behavior but that is not realized in any direct or simple way in behavior. And this system of linguistic competence is qualitatively different from anything that can be described in terms of the taxonomic methods of structural linguistics, the concepts of S-R psychology, or the notions developed within the mathematical theory of communication or the theory of simple automata. The theories and models that were developed to describe simple and immediately given phenomena cannot incorporate the real system of linguistic competence; “extrapolation” for simple descriptions cannot approach the reality of linguistic competence; mental structures are not simply “more of the same” but are qualitatively different from the complex networks and structures that can be developed by elaboration of the concepts that seemed so promising to many scientists just a few years ago. What is involved is not a matter of degree of complexity but rather a quality of complexity. Correspondingly, there is no reason to expect that the available technology can provide significant insight or understanding or useful achievements; it has noticeably failed to do so, and, in fact, an appreciable investment of time, energy, and money in the use of computers for linguistic research – appreciable by the standards of a small field like linguistics – has not provided any significant advance in our understanding of the use or nature of language. These judgments are harsh, but I think they are defensible. They are, furthermore, hardly debated by active linguistic or psycholinguistic researchers.

At the same time there have been significant advances, I believe, in our understanding of the nature of linguistic competence and some of the ways in which it is put to use, but these advances, such as they are, have proceeded from assumptions very different from those that were so enthusiastically put forth in the period I have been discussing. What is more, these advances have not narrowed the gap between what is known and what can be seen to lie beyond the scope of present understanding and technique; rather, each advance has made it clear that these intellectual horizons are far more remote than was heretofore imagined. Finally, it has become fairly clear, it seems to me, that the assumptions and approaches that appear to be productive today have a distinctly traditional flavor to them; in general, a much despised tradition has been largely revitalized in recent years and its contributions given some serious and, I believe, well-deserved attention. From the recognition of these facts flows the general and quite healthy attitude of skepticism that I spoke of earlier.

In short, it seems to me quite appropriate, at this moment in the development of linguistics and psychology in general, to turn again to classical questions and to ask what new insights have been achieved that bear on them, and how the classical issues may provide direction for contemporary research and study.

When we turn to the history of study and speculation concerning the nature of mind and, more specifically, the nature of human language, our attention quite naturally comes to focus on the seventeenth century, “the century of genius,” in which the foundations of modern science were firmly established and the problems that still confound us were formulated with remarkable clarity and perspicuity. There are many far from superficial respects in which the intellectual climate of today resembles that of seventeenth-century Western Europe. One, particularly crucial in the present context, is the very great interest in the potentialities and capacities of automata, a problem that intrigued the seventeenth-century mind as fully as it does our own. I mentioned above that there is a slowly dawning realization that a significant gap – more accurately, a yawning chasm – separates the system of concepts of which we have a fairly clear grasp, on the one hand, and the nature of human intelligence, on the other. A similar realization lies at the base of Cartesian philosophy. Descartes also arrived, quite early in his investigations, at the conclusion that the study of mind faces us with a problem of quality of complexity, not merely degree of complexity. He felt that he had demonstrated that understanding and will, the two fundamental properties of the human mind, involved capacities and principles that are not realizable by even the most complex of automata.

It is particularly interesting to trace the development of this argument in the works of the minor and now quite forgotten Cartesian philosophers, like Corde-moy, who wrote a fascinating treatise extending Descartes’ few remarks about language, or La Forge, who produced a long and detailed *Traité de l’esprit de l’homme* expressing, so he claimed with some reason, what Descartes would likely have said about this subject had he lived to extend his theory of man beyond physiology. One may question the details of this argument, and one can show how it was impeded and distorted by certain remnants of scholastic doctrine – the framework of substance and mode, for example. But the general structure of the argument is not unreasonable; it is, in fact, rather analogous to the argument against the framework of ideas of the early postwar years, which I mentioned at the outset of this lecture. The Cartesians tried to show that when the theory of corporeal body is sharpened and clarified and extended to its limits, it is still incapable of accounting for facts that are obvious to introspection and that are also confirmed by our observation of the actions of other humans. In particular, it cannot account for the normal use of human language, just as it cannot explain the basic properties of thought. Consequently, it becomes necessary to invoke an entirely new principle – in Cartesian terms, to postulate a second substance whose essence is thought, alongside of body,

6 Language and Mind

with its essential properties of extension and motion. This new principle has a “creative aspect,” which is evidenced most clearly in what we may refer to as “the creative aspect of language use,” the distinctively human ability to express new thoughts and to understand entirely new expressions of thought, within the framework of an “instituted language,” a language that is a cultural product subject to laws and principles partially unique to it and partially reflections of general properties of mind. These laws and principles, it is maintained, are not formulable in terms of even the most elaborate extension of the concepts proper to the analysis of behavior and interaction of physical bodies, and they are not realizable by even the most complex automaton. In fact, Descartes argued that the only sure indication that another body possesses a human mind, that it is not a mere automaton, is its ability to use language in the normal way; and he argued that this ability cannot be detected in an animal or an automaton which, in other respects, shows signs of apparent intelligence exceeding those of a human, even though such an organism or machine might be as fully endowed as a human with the physiological organs necessary to produce speech.

I will return to this argument and the ways in which it was developed. But I think it is important to stress that, with all its gaps and deficiencies, it is an argument that must be taken seriously. There is nothing at all absurd in the conclusion. It seems to me quite possible that at that particular moment in the development of Western thought there was the possibility for the birth of a science of psychology of a sort that still does not exist, a psychology that begins with the problem of characterizing various systems of human knowledge and belief, the concepts in terms of which they are organized and the principles that underlie them, and that only then turns to the study of how these systems might have developed through some combination of innate structure and organism – environment interaction. Such a psychology would contrast rather sharply with the approach to human intelligence that begins by postulating, on a priori grounds, certain specific mechanisms that, it is claimed, *must* be those underlying the acquisition of all knowledge and belief. The distinction is one to which I will return in a subsequent lecture. For the moment, I want merely to stress the reasonableness of the rejected alternative and, what is more, its consistency with the approach that proved so successful in the seventeenth-century revolution in physics.

There are methodological parallels that have perhaps been inadequately appreciated between the Cartesian postulation of a substance whose essence was thought and the post-Newtonian acceptance of a principle of attraction as an innate property of the ultimate corpuscles of matter, an active principle that governs the motions of bodies. Perhaps the most far-reaching contribution of Cartesian philosophy to modern thought was its rejection of the scholastic notion of substantial forms and real qualities, of all those “little images fluttering

through the air” to which Descartes referred with derision. With the exorcism of these occult qualities, the stage was set for the rise of a physics of matter in motion and a psychology that explored the properties of mind. But Newton argued that Descartes’ mechanical physics wouldn’t work – the second book of the *Principia* is largely devoted to this demonstration – and that it is necessary to postulate a new force to account for the motion of bodies. The postulate of an attractive force acting at a distance was inconsistent with the clear and distinct ideas of common sense and could not be tolerated by an orthodox Cartesian – such a force was merely another occult quality. Newton quite agreed, and he attempted repeatedly to find a mechanical explanation of the cause of gravity. He rejected the view that gravity is “essential and inherent to matter” and maintained that “to tell us that every species of things is endowed with an occult specific property (such as gravity) by which it acts and produces manifest effects, is to tell us nothing.” Some historians of science have suggested that Newton hoped, like Descartes, to write a *Principles of Philosophy* but that his failure to explain the cause of gravity on mechanical grounds restricted him to a *Mathematical Principles of Natural Philosophy*. Thus, to the common sense of Newton as well as the Cartesians, physics was still not adequately grounded, because it postulated a mystical force capable of action at a distance. Similarly, Descartes’ postulation of mind as an explanatory principle was unacceptable to the empiricist temper. But the astonishing success of mathematical physics carried the day against these common-sense objections, and the prestige of the new physics was so high that the speculative psychology of the Enlightenment took for granted the necessity of working within the Newtonian framework, rather than on the Newtonian analogy – a very different matter. The occult force of gravity was accepted as an obvious element of the physical world, requiring no explanation, and it became inconceivable that one might have to postulate entirely new principles of functioning and organization outside the framework of what soon became the new “common sense.” Partly for this reason, the search for an analogous scientific psychology that would explore the principles of mind, whatever they might be, was not undertaken with the thoroughness that was then, as now, quite possible.

I do not want to overlook a fundamental distinction between the postulation of gravity and the postulation of a *res cogitans*, namely the enormous disparity in the power of the explanatory theories that were developed. Nevertheless, I think it is instructive to note that the reasons for the dissatisfaction of Newton, Leibnitz, and the orthodox Cartesians with the new physics are strikingly similar to the grounds on which a dualistic rationalist psychology was soon to be rejected. I think it is correct to say that the study of properties and organization of mind was prematurely abandoned, in part on quite spurious grounds, and also to point out that there is a certain irony in the common view that its abandonment was caused by the gradual spread of a more general “scientific” attitude.

8 Language and Mind

I have tried to call attention to some similarities between the intellectual climate of the seventeenth century and that of today. It is illuminating, I think, to trace in somewhat greater detail the specific course of development of linguistic theory during the modern period, in the context of the study of mind and of behavior in general.¹

A good place to begin is with the writings of the Spanish physician Juan Huarte, who in the late sixteenth century published a widely translated study on the nature of human intelligence. In the course of his investigations, Huarte came to wonder at the fact that the word for “intelligence,” *ingenio*, seems to have the same Latin root as various words meaning “engender” or “generate.” This, he argued, gives a clue to the nature of mind. Thus, “One may discern two generative powers in man, one common with the beasts and the plants, and the other participating of spiritual substance. Wit (*Ingenio*) is a generative power. The understanding is a generative faculty.” Huarte’s etymology is actually not very good; the insight, however, is quite substantial.

Huarte goes on to distinguish three levels of intelligence. The lowest of these is the “docile wit,” which satisfies the maxim that he, along with Leibnitz and many others, wrongly attributes to Aristotle, namely that there is nothing in the mind that is not simply transmitted to it by the senses. The next higher level, normal human intelligence, goes well beyond the empiricist limitation: it is able to “engender within itself, by its own power, the principles on which knowledge rests.” Normal human minds are such that “assisted by the subject alone, without the help of anybody, they will produce a thousand conceits they never heard spoke of . . . inventing and saying such things as they never heard from their masters, nor any mouth.” Thus, normal human intelligence is capable of acquiring knowledge through its own internal resources, perhaps making use of the data of sense but going on to construct a cognitive system in terms of concepts and principles that are developed on independent grounds; and it is capable of generating new thoughts and of finding appropriate and novel ways of expressing them, in ways that entirely transcend any training or experience.

Huarte postulates a third kind of wit, “by means of which some, without art or study, speak such subtle and surprising things, yet true, that were never before seen, heard, or writ, no, nor ever so much as thought of.” The reference here is to true creativity, an exercise of the creative imagination in ways that go beyond normal intelligence and may, he felt, involve “a mixture of madness.”

Huarte maintains that the distinction between docile wit, which meets the empiricist maxim, and normal intelligence, with its full generative capacities, is the distinction between beast and man. As a physician, Huarte was much

¹ For additional details and discussion, see my *Cartesian Linguistics* (New York: Harper & Row, 1966) and the references cited there.

interested in pathology. In particular, he notes that the most severe disability of wit that can afflict a human is a restriction to the lowest of the three levels, to the docile wit that conforms to empiricist principles. This disability, says Huarte, “resembles that of Eunuchs, incapable of generation.” Under these sad circumstances, in which the intelligence can only receive stimuli transmitted by sense and associate them with one another, true education is of course impossible, since the ideas and principles that permit the growth of knowledge and understanding are lacking. In this case, then, “neither the lash of the rod, nor cries, nor method, nor examples, nor time, nor experience, nor anything in nature can sufficiently excite him to bring forth anything.”

Huarte’s framework is useful for discussing “psychological theory” in the ensuing period. Typical of later thought is his reference to use of language as an index of human intelligence, of what distinguishes man from animals, and, specifically, his emphasis on the creative capacity of normal intelligence. These concerns dominated rationalist psychology and linguistics. With the rise of romanticism, attention shifted to the third type of wit, to true creativity, although the rationalist assumption that normal human intelligence is uniquely free and creative and beyond the bounds of mechanical explanation was not abandoned and played an important role in the psychology of romanticism, and even in its social philosophy.

As I have already mentioned, the rationalist theory of language, which was to prove extremely rich in insight and achievement, developed in part out of a concern with the problem of other minds. A fair amount of effort was devoted to a consideration of the ability of animals to follow spoken commands, to express their emotional states, to communicate with one another, and even apparently to cooperate for a common goal; all of this, it was argued, could be accounted for on “mechanical grounds,” as this notion was then understood – that is, through the functioning of physiological mechanisms in terms of which one could formulate the properties of reflexes, conditioning and reinforcement, association, and so on. Animals do not lack appropriate organs of communication, nor are they simply lower along some scale of “general intelligence.”

In fact, as Descartes himself quite correctly observed, language is a species-specific human possession, and even at low levels of intelligence, at pathological levels, we find a command of language that is totally unattainable by an ape that may, in other respects, surpass a human imbecile in problem-solving ability and other adaptive behavior. I will return later to the status of this observation, in the light of what is now known about animal communication. There is a basic element lacking in animals, Descartes argued, as it is lacking in even the most complex automaton that develops its “intellectual structures” completely in terms of conditioning and association – namely Huarte’s second type of wit, the generative ability that is revealed in the normal human use of language as a free instrument of thought. If by experiment we convince ourselves that

another organism gives evidence of the normal, creative use of language, we must suppose that it, like us, has a mind and that what it does lies beyond the bounds of mechanical explanation, outside the framework of the stimulus-response psychology of the time, which in relevant essentials is not significantly different from that of today, though it falls short in sharpness of technique and scope and reliability of information.

It should not be thought, incidentally, that the only Cartesian arguments for the beast-machine hypothesis were those derived from the apparent inability of animals to manifest the creative aspect of language use. There were also many others – for example, the natural fear of population explosion in the domains of the spirit if every gnat had a soul. Or the argument of Cardinal Melchior de Polignac, who argued that the beast-machine hypothesis followed from the assumption of the goodness of God, since, as he pointed out, one can see “how much more humane is the doctrine that animals suffer no pain.”² Or there is the argument of Louis Racine, son of the dramatist, who was struck by the following insight: “If beasts had souls and were capable of feelings, would they show themselves insensible to the affront and injustice done them by Descartes? Would they not rather have risen up in wrath against the leader and the sect which so degraded them?” One should add, I suppose, that Louis Racine was regarded by his contemporaries as the living proof that a brilliant father could not have a brilliant son. But the fact is that the discussion of the existence of other minds, and, in contrast, the mechanical nature of animals, continually returned to the creative aspect of language use, to the claim that – as formulated by another minor seventeenth-century figure – “if beasts reasoned, they would be capable of true speech with its infinite variety.”

It is important to understand just what properties of language were most striking to Descartes and his followers. The discussion of what I have been calling “the creative aspect of language use” turns on three important observations. The first is that the normal use of language is innovative, in the sense that much of what we say in the course of normal language use is entirely new, not a repetition of anything that we have heard before and not even similar in pattern – in any useful sense of the terms “similar” and “pattern” – to sentences or discourse that we have heard in the past. This is a truism, but an important one, often overlooked and not infrequently denied in the behaviorist period of linguistics to which I referred earlier, when it was almost universally claimed that a person’s knowledge of language is representable as a stored set of patterns, overlearned through constant repetition and detailed training, with innovation being at most a matter of “analogy.” The fact surely is, however, that the number of sentences

² These examples are taken from the excellent study by Leonora Cohen Rosenfield, *From Beast-Machine to Man-Machine* (New York: Oxford University Press, 1941). The quotes are her paraphrases of the original.