
The Three Prongs of the Cartesian Challenge

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THE EFFORTS of the philosophers to resolve the ultimate issue in the controversy about man falls far short of success. Neither side appears to be able to persuade the other that it has indisputable grounds for deciding the question whether the brain is the sufficient or only a necessary condition of conceptual thought. That, I presume, will not come as much of a surprise to those who have grown accustomed to the irresolution—even the irresolvability—of difficult philosophical issues. But what may come as a surprise is the possibility of circumventing the stalemate by taking another tack and submitting the opposed philosophical issues to the infirmative or confirmative effect of scientific evidence that may be forthcoming in the next half century or a little beyond.

Before I describe the logical detour that I have in mind, I think I can explain why it is likely that the well-developed argument for the immaterialist position, however cogent it may appear to be in its own terms, will fail to persuade the proponents of the identity hypothesis that brain action may be the necessary, but cannot be the sufficient, condition of conceptual thought. And, on the other side, I think I can also say why the identity hypothesis, no matter how well it is defended in its own terms, will appear to its opponents to have avoided or evaded the crux of the issue.

From the point of view of the moderate materialists who espouse and defend the identity hypothesis, the argument for the immateriality of conceptual thought rises from a nest of metaphysical subtleties and involves metaphysical distinctions and assertions that make its cogency questionable for anyone who is inclined to challenge the terms in which the argument is couched. If this is true of the condensed version of the argument presented in Chapter 12, it is even more true of the more elaborate formulation of the argument presented in Note 41 to that chapter. The problem of the universal (i.e., how and where universals exist) has always been one of the thorniest questions in the metaphysics of being and of knowledge; no less so is the problem of individuation; and when these problems are further complicated by questions about how the act of knowing relates the knower to the known, we cannot overestimate the difficulties and complexities of a theory that must solve these problems in order to reach a conclusion concerning conceptual thought in relation to mind and matter.

This would be so even if the pervasive attitude of contemporary thought were not anti-metaphysical—even if the argument were not beset by all the misunderstandings, dismissals, and puzzlements that would constitute the first line of criticism by those who have explicitly or implicitly adopted the principles of the analytic or linguistic philosophy that is regnant today. The contemporary frame of mind being what it is, it is very unlikely that the argument for the immateriality of conceptual thought can be sympathetically read by those among living philosophers who oppose the conclusion it reaches. Since it is philosophically possible to withhold assent from the conclusion even when the argument is understood in its own terms, how much more so is that the case when the argument is not understood or, worse, misunderstood.

From the point of view of the moderate immaterialists who oppose the identity hypothesis solely on the ground that conceptual thought cannot be identified with the action of the brain, the defense of the identity hypothesis simply misses the mark. One way or another, it bypasses the crucial question about the place of meanings or intentions in the scheme of things—the type of universal meanings or intentions that constitute conceptual

thought and that are the source of meaningfulness in everything else, especially the meanings acquired by the originally meaningless vocables or notations that comprise the common or general names in human language. If that which is meaningless cannot become meaningful except through that which is, in its very nature and existence, a meaning, the question about how and where meanings exist would seem to be an inescapable one. Yet, as the moderate immaterialists see it, this is precisely the question that the proponents and defenders of the identity hypothesis not only fail to answer, but also appear deviously to evade—either by calling it irrelevant, as Feigl does, or by suggesting, as do Sellars, Craik, Putnam, and Smart, that the language of computing machines holds out the hope for a purely mechanical solution of the problem of human language that will remove the immaterialist sting from the question about meanings or intentions.

Proponents of the Aristotelian and Thomistic theory of conceptual thought would certainly insist that the question of meanings or intentions, far from being irrelevant, is the very crux of the issue. They would dismiss the hope expressed by Sellars, Craik, Putnam, and Smart as a conjecture rather than an argument; in addition, they would regard the basis for it as *unsound in principle*. To use something like Chomsky's structural linguistics together with something like Ziff's empirical semantics as a means for devising a linguistic system, entirely devoid of meanings, that will make it possible for a computing machine to be programmed to perform linguistically *as if* it had concepts or meanings, even though it does not—to succeed in doing this, the opponents of the identity hypothesis would contend, proves nothing except that men are ingenious in the technological tricks they can perform with machines. [1] Of course, it is possible that they do not understand the treatment of meaning by the proponents of the identity hypothesis any better than the proponents of that hypothesis understand the Aristotelian and Thomistic argument for the immateriality of universal meanings or intentions. But, granting for the moment that they can and do understand it, it should be clear that, even so, they would find it unpersuasive.

This, then, is the stalemate to which we are brought by the best arguments that have so far been mustered on both sides of

the issue about whether man's difference in kind from other animals and from machines is radical or superficial. While allowing for the possibility that a better philosophical argument may be forthcoming in the future, one that will be so persuasive as to resolve the issue, I think it is fair to say that the philosophical dispute up to the present leaves the issue unresolved; and I would expect agreement on this point from anyone who understood both sides of the dispute well enough to understand why neither side is persuaded by the other.

What is our situation, then? Do we have to wait for that better philosophical argument to be invented and for that improvement in the intellectual atmosphere which would render its cogency and conclusiveness generally persuasive? I am happy to say that I think there is another way out of our present impasse. It lies in what I have called a logical detour that finds a way around the roadblock set up by opposed philosophical arguments, neither of which is yet prepared to yield to the other. If we can reach a conclusion that resolves the issue by taking another tack, we can then look back and see why the reasons on one or the other side of the philosophical dispute should have prevailed, if only we had understood them better.

The signpost pointing to this logical detour is nothing other than the principle of parsimony, on the force and relevance of which both sides of the philosophical dispute agree perfectly. Both sides agree that the immateriality of conceptual thought need not be posited *if* conceptual thought can be adequately explained in terms of purely material factors, such as the action of the brain or the action of mechanical devices; both sides agree that *unless* it can be so explained, there is justification for positing the immateriality of conceptual thought. In addition, both sides agree that material factors, such as are involved in the action of the brain, are *at least* a necessary condition of conceptual thought, and so contribute *in part, at least*, to explaining it. The crux of their disagreement, as we have seen, lies right here: the proponents of the identity hypothesis hold that brain action is *more than a necessary condition*; the proponents of the immateriality of conceptual thought deny that it is. Within the framework of these agreements, by what other means than philosophical argument can it be determined whether brain action is or is

not the sufficient condition and the adequate explanation of conceptual thought?

If one excludes divine revelation or religious dogma as the source of a conclusive answer to the question, the only other source to which we can turn is science and technology. But how can science and technology provide something like a resolution of the issue that opposed philosophical arguments have left unresolved? By finding experimental evidence or by devising mechanical artifacts that will bring the principle of parsimony into operation in one way or the other—either making it *unnecessary* or making it *unavoidable* to posit the immateriality of conceptual thought.

The philosophical insight that underlies this way of trying to resolve the issue was first expressed by Descartes when he resorted to a *reductio ad impossibile* form of argument in order to defend what he himself regarded as a clear and distinct idea, or self-evident truth; namely, that matter cannot think (i.e., cannot think conceptually). Since this proposition was for him axiomatic, he knew that no reasons need be or can be given for its truth: one does not try to prove what is self-evident; one cannot. But for anyone who holds a proposition to be axiomatic or self-evident, it is always possible to argue against those who fail to see its truth by challenging them to come up with empirical evidence showing that it is not true. Descartes challenged his opponents to do what he himself thought to be impossible—a form of argument that logicians describe as a *reductio ad impossibile*.

The force of the Cartesian challenge, as an indirect argument for the immateriality of conceptual thought, is in no way lessened by rejecting, as Aristotle and Aquinas would reject, the error Descartes made in supposing it to be a self-evident truth that matter cannot think. Even though Aristotle and Aquinas, and anyone else who shares their view, offer a direct argument for a conclusion that they regard as demonstrable, not self-evident, they would have no hesitation in employing the indirect argument concocted by Descartes for the purpose of persuading those who might not be persuaded by the direct argument, which certainly describes the condition of adherents of the identity hypothesis. The latter, for their part, gladly take up the challenge of the indirect argument, since they think that empirical

evidence is able to confirm their hypothesis and falsify the proposition that conceptual thought is immaterial. Certainly, to whatever extent they acknowledge their failure to persuade their opponents of the truth of the identity hypothesis by direct argument, they should try to overcome that failure by successfully meeting the challenge of the indirect argument.

The indirect argument, which I will henceforth refer to as the Cartesian challenge, has other advantages beyond circumventing the philosophical impasse. For one thing, its simplicity is comforting to those who have little taste or aptitude for philosophical disputation and metaphysical reasoning. For another, it should be immediately intelligible to the scientists who are concerned with this issue, intelligible in a way that the direct arguments *pro* and *con* are not likely to be. It speaks to them in their own terms and lays down the kind of challenge that they regard themselves as able to meet. Last but not least, the fact that the indirect argument aims at confirming one of the opposed philosophical conclusions and at falsifying the other, together with the fact that it seeks to do this by means of scientific data or technological results, shows more clearly than anything else that the question about how man differs is a mixed question, and not a purely philosophical one.

(2)

In Part V of the *Discourse on Method*, Descartes asserts that it is quite possible for a machine or automaton perfectly to simulate the behavior of subhuman animals of the highest order, such as the primates, precisely because in his view all animals except man lack the power of conceptual thought, to which Descartes gives the name "reason." "If there had been machines possessing the organs and outward form of a monkey or some other animal without reason, we should not have had any means of ascertaining that they were not of the same nature as those animals." [2] But, Descartes goes on to say, it is impossible for a machine or automaton perfectly to simulate the behavior of man. He gives two reasons for maintaining this, only the first of which need here be stated. It runs as follows:

If there were machines which bore a resemblance to our body and imitated our actions so far as it was morally [i.e., practically] possible to do so, we should always have two very certain tests by which to recognize that, for all that, they were not real men.

The first is that they could never use speech or other signs as we do when placing our thought on record for the benefit of others. For we can easily understand a machine's being constituted so that it can utter words, and even emit some responses to action on it of a corporeal kind, which brings about a change in its organs; for instance, if it is touched in a particular part, it may ask what we wish to say to it; if in another part, it may exclaim that it is being hurt and so on. But it [could] never happen that it [would] arrange its speech in various ways, in order to reply appropriately to everything that may be said in its presence, as even the lowest type of man can do. [3]

To which Descartes then adds the following cautionary remark: "We ought not to confound speech [i.e., propositional speech] with natural movements that betray passions and may be manifested by animals." [4]

We know that the reason why Descartes maintained that no machine will ever be built that can engage in human conversation, exhibiting thereby its power of conceptual thought, is one with his explanation of the fact that no animal except man has propositional speech; namely, the presence of an immaterial power in man that is absent from both machines and other animals. The acts of reason (or, what is the same, the acts of conceptual thought), Descartes declares, can "not be in any way derived from the power of matter." Since, in his view, brute animals are nothing but living mechanisms composed entirely of material parts or organs, they are without mind or reason. Stressing this as the radical difference in kind between men and brutes, Descartes writes:

It is a very remarkable fact that there are none so depraved or stupid, without even excepting idiots, that they cannot arrange different words together, forming of them a state-

ment by which they can make known their thought; while, on the other hand, there is no other animal, however perfect and fortunately circumstanced it may be, which can do the same. . . .

This does not merely show that the brutes have less reason than men, but that they have none at all, since it is clear that very little is required in order to be able to talk. . . . [5]

The nub of the indirect argument can, therefore, be expressed in the following challenge: "Show me an animal or a machine that can engage in conversation, either with another machine or with another animal or with a human being, and I will either have to concede that matter organized in a certain way can think conceptually, or I will have to posit the operation of an immaterial power in the machine or in the sub-human animal."

Translated into terms that fit the present state of science and technology, the Cartesian challenge can be somewhat expanded so that it has three distinct prongs. The first prong is a challenge to the neurologist to give an adequate explanation of conceptual thought in terms of brain action. The second prong is a challenge to the zoologist to discover a non-human species of animal the members of which engage in conversation with one another, or that can be taught to engage in conversation with members of the human species after we have found some means of translation between the propositional language of that species and our own. (This prong of the challenge, it must be noted, is not met by training circus or laboratory animals to respond to human words; or to imitate the sounds or even the verbal sequences of human speech, for parrots and myna birds can do that. [6]) The third prong is a challenge to the technologist to produce a machine, specifically not a computer but an artifact that, without being programmed to do so, can engage in conversation with human beings, using as a means not "computer talk," but an ordinary natural language such as English.

I have two reasons for setting forth the Cartesian challenge as a three-pronged affair. One is that all three points seem to me to be involved in the challenge that emerges from Descartes' statement of the indirect argument. The other reason is that each of the three prongs has a distinct and different interest in view of claims now being made by neurologists, zoologists, and tech-

nologists. However, as we shall see, it is only the third prong—the challenge to the technologist—that may result in a decisive resolution of the issue, one way or the other. Even if the neurologist were to do the very best he can to meet the challenge addressed to him, it would still be possible to maintain that conceptual thought involves an immaterial power. And if the zoologist should ever be able to show that the bottle-nosed dolphin, for example, has a propositional language that should enable us, by translation, to engage in conversation with him, it would still be possible to conclude that the bottle-nosed dolphin, like man, has the power of conceptual thought because his constitution, like man's, involves an immaterial power. But the third prong, in my judgment, provides no escape hatch of that sort. If a robot can be built that meets the Cartesian challenge by successfully passing what I am going to call "the conversational test," then, unless one were inclined to posit pixies, it would be impossible still to assert the immateriality of conceptual thought.

In the two following sections of this chapter, I will briefly consider the first and second prongs of the Cartesian challenge. They do not deserve as much attention as the third prong, which in my judgment is not only the most serious, but the only one that can promise results that may be decisive one way or the other. I will, therefore, devote the whole of Chapter 14 to it.

(3)

No neurologist claims, in the present state of his science, that he can give a satisfactory neurological explanation of conceptual thought that has the support of decisive experimental or clinical data. Leading neurologists are quite frank and explicit on the confession of their ignorance of the brain's action in the performance of simple acts of memory. [7] When it comes to conceptual thought, which is much more complex than memory, they acknowledge even more plainly their inability at present to give a neurological explanation of it.

K. S. Lashley, late Professor of Neuropsychology at Harvard University, was especially attentive to the problems raised for the neurologists by the serial order, the mental set, and the conceptual intentions or meanings involved in human speech, but

he did not advance even a tentative hypothesis about the underlying brain action. In addition, he made a point of insisting that the mechanics of machine language or "computer talk" gives us no hint about the neurological mechanisms involved in propositional speech and conceptual thought. [8] And J. M. Nielsen, Clinical Professor of Neurology and Psychiatry at the University of Southern California, who has devoted himself to the clinical study of aphasia and agnosia, declares that there is no clinical or experimental evidence of a brain center for conceptual thought. [9]

Among the neurologists, the most speculative is Lord Russell Brain, who has proposed some conjectures about how our cerebral cortex may operate when we understand the meaning of words and when we think conceptually, using words to do so. But even he asks: "Is it likely that physiology will ever throw any real light upon the relationship between the brain and the mind?" His answer is as follows:

I believe that, working in conjunction with psychology, it will. I can only guess where present advances seem to be leading us. . . . My guess is that in the nervous system we are looking at the threads while with the mind we perceive the patterns, and that one day we may discover how the patterns are made out of the threads. [10]

Let us adopt Lord Brain's hope, one that is naturally shared by Lashley, Arbib, McCulloch, and others concerned with the neurology of propositional language and conceptual thought. [11] Let us suppose that future advances in neurology, both on the side of theory and on the side of experimental or clinical evidence, provide us with much more knowledge than we now possess of how our brain works when we engage in conceptual thought and exercise our power of propositional speech. The question remains: Will it ever be possible to show by experimental or clinical neurology that the working of the brain—granted that we understand how it works as well as that can be understood—is more than a necessary condition of conceptual thought?

The answer must be negative. An affirmative answer would beg the question that is at issue, for it would assume the correctness

of the identity hypothesis that, beyond being a necessary condition, the action of the brain is the sufficient condition of conceptual thought. But this is precisely what must be shown. As Sellars points out, the most we can hope for from future neurological research and theory is a showing that neurophysiological processes are "sufficiently analogous to conceptual thinking to be a serious candidate for being what conceptual thinking 'really' is." [12] If this were to be shown, that would remove the chief obstacle to identifying conceptual thinking with the action of the brain. But removing this obstacle does not by itself solve the problem, especially if any reasons can be given on the other side, as they can be, for maintaining that brain action may be a necessary, but cannot be the sufficient, condition of conceptual thought.

Were there no reasons whatsoever for supposing that the universal intentions in conceptual thought cannot be materially embodied in brain processes, then the better the neurologist's account of how the human brain works when men engage in conceptual thought, the more it would confirm the identity hypothesis. But in view of the philosophical dispute over the identity hypothesis, in which arguments are advanced against it that it does not satisfactorily answer, additional neurological evidence and improved neurological theory cannot decisively show that brain action is the sufficient cause of conceptual thought. No matter how far the neurologist can go in demonstrating, experimentally or clinically, the dependence of conceptual thought upon brain processes, that dependence may mean no more than that the brain is a necessary condition of conceptual thought. Furthermore, no matter how far he can go in showing the structural parallelism between brain processes and thought processes, the analogy between them is no more than an analogy; it is not an identity, even though it may have the effect of removing an obstacle to identifying thought processes with brain processes.

(4)

The neurologists leave us with one question for which we must turn to the zoologists for an answer. Whatever knowledge we may have of how the brain works when we engage in conceptual

thought and propositional speech, we still have to ask what difference between the human brain and the brains of other animals explain *their lack* of propositional speech and conceptual thought. The answer now universally given to this question is that the brains of the highest mammals are of such magnitudes in size and complexity that, with one possible exception, they all fall below a critical threshold in the quantitative continuum, above which propositional speech occurs, as in the case of man, and below which it does not, as in the case of other mammals. [13]

The one exception mentioned above is the bottle-nosed dolphin. A number of zoologists, pre-eminently Dr. John Lilly, think that the relative brain weight of the dolphin is so close to the ratio between the brain and body weight of man that it should be possible to communicate with the dolphins by establishing some two-way translation between human and dolphin language. If this can be done, it would show, according to Dr. Lilly, that dolphins had the power of conceptual thought. The assumption here to be tested is either that the dolphins already have a language of their own which men can learn and use to converse with them, or that the dolphins have large enough brains to be taught a human language. On either assumption, the test calls for a two-way conversation between men and dolphins, a conversation that exhibits conceptual thought as much as a conversation between men, or at least between an adult and a small child. [14]

Dr. Lilly recognizes all the difficulties to be overcome in making a test of this sort, but he is hopeful that it can be done and will turn out to be successful. Let us ask, therefore, what we would learn from the results of the test that he envisages, first if it fails, and second if it succeeds.

If the test fails, the negative result can be interpreted as merely a failure to overcome the difficulties already seen to be inherent in the effort of men to engage in conversation with a non-human species. Failure would *not decisively show* that the dolphins lacked enough brain power to engage in propositional speech. [15]

If the test succeeds, the positive result would be open to two interpretations. Though the positive result might help us to ascertain more precisely the critical threshold in the continuum of brain magnitudes, above which propositional speech can occur, it would not by itself be decisive as to whether a certain magnitude of brain is *the sufficient* or only *a necessary* condition of propo-

sitional speech and conceptual thought. The point being made here is exactly the same point that was made earlier with regard to the correlation between stages in human brain growth and the first appearance and subsequent development of propositional speech in the human child. [16]

Hence, if dolphins ever converse with us in a manner that exhibits their power of conceptual thought, we would be left with these two possible interpretations of the fact: either (1) a certain magnitude of brain is the sufficient condition of conceptual thought, in which case there is no need for an immaterial power in order to explain it; or (2) a certain brain magnitude is a necessary, but not the sufficient, condition of conceptual thought; and so, in the dolphins as well as in man, an immaterial power must be operative.

If, for the reason just given, experiments with the bottle-nosed dolphin cannot decisively resolve the issue, then *a fortiori* no other zoological evidence can decide the question: first, because, among the higher mammals, only the dolphin has a relative brain weight that approximates the relative brain weight of man; second, because similar efforts with other animals, even if successful, would be open to the same interpretations that apply to a successful outcome of efforts with the dolphin.

That being so, only one source of decision is left to us—that which may be provided by the technologists in their effort to produce machines that simulate human intelligence, including man's power of conceptual thought as that is manifested in propositional speech. This brings us to the third and last prong of the Cartesian challenge.