1.1 INTRODUCTION

Many of the foundational issues of philosophical interest central to the contemporary discussions on cognitive science have been raised by Descartes in some form or other. Without a proper understanding of them it is not possible to appreciate, or to participate in, the contemporary discussions in cognitivist philosophy of mind. A careful examination of Descartes' theses on mind and cognition would reveal that the contemporary cognitivist theories are largely Cartesian in their outlook. The present chapter makes a study of the Cartesian theses from the point of view of cognitive science.

We have already seen that cognitive science makes the fundamental assumption that there is a natural, autonomous domain corresponding to cognition; namely, the existence of knowing subjects. Therefore, in the first section of this chapter, Descartes' cogito argument is construed as an attempt to establish the existence of knowing things. It will be followed by a discussion on Descartes' views on the nature of mind, and his arguments for the mind-body distinction. I shall argue that there is a line of reasoning implicit in Descartes' writing that mind-body dualism need not be taken to imply substantial distinction but only a conceptual one. This interpretation will be further substantiated by an examination of Descartes' argument for mind-body unity. Since substantial dualism and its difficulties are well known, substantial dualism as such does not find a place in the discussion.

The second section is a discussion of the Cartesian theory of cognition along lines consistent with a conceptual distinction between mind and body. Descartes does not use the term cognition. However, he uses the
term 'perception' in a wide sense to characterise all cognitive acts. Perception may mean either sensory perception or understanding. For Descartes, both sensory perception and understanding are functions of innate ideas. Hence his theory of perception and the doctrine of innate ideas form the theme of the section. Noam Chomsky who traces the origin of his own thesis on language and cognition to Cartesianism had a significant role to play in the development of modern cognitive science. In view of this fact, the chapter concludes with a brief section presenting a unified perspective on the Cartesian theory of mind, cognitive science, and what Chomsky called Cartesian linguistics.

1.2 THE MIND AND THE BODY

The present section deals with four issues: 1. Descartes' argument for the existence of mind; 2. his conception regarding the nature of the mind as opposed to that of the body; 3. his arguments for the distinction between the mind and the body; and 4. the union of the mind and the body so as to form a single cognising unit. A discussion of these fundamental problems, I think, can reveal how much philosophical discussions on cognitive science owe to Descartes; so much so that without a clear understanding of them, no meaningful philosophical discourse is possible on the foundations of cognitive science.

1.2.1 The existence of mind

Any legitimate science, we have noted, will have its own well defined subject matter. If cognitive science is such a discipline then there must be a set of entities that fall within its scope, and these are the set of knowing subjects. Since cognition is a function of the mind, the existence of knowing subjects means that there are minds. Descartes tries to find out whether there is at least one knowing subject and he recognizes himself to be one. He arrives at this truth through his methodic doubt. The methodic doubt suggested to Descartes the possibility that the whole of knowledge - both the opinions received from the senses and the general and necessary truths such as mathematical propositions - is mistaken. This observation is based on the fact that people do commit mistakes in mathematics, and are often deceived by the senses. Two important facts
known through the senses are that there is an external world and that we possess a body with sensory and motor organs. If the knowledge of these is totally mistaken, it is quite possible that there is no external world and that we have no senses and no bodies\(^1\). Descartes raises a fundamental question in this connection: from the possible non-existence of the external world and our own bodies, does it not follow that it is possible that we ourselves do not exist? His answer is as follows:

But we cannot for all suppose that we, who are having such thoughts, are nothing. For it is a contradiction to suppose that what thinks does not, at the very time when it is thinking, exist. Accordingly, this piece of knowledge - *I am thinking, therefore I exist* - is the first and the most certain of all to occur to any one who philosophizes in an orderly way.

To think that one does not exist, one must exist. Hence one's own non-existence is inconceivable.

*Cogito*, for Descartes, is an indubitable proposition. Doubting one's own existence reinforces the awareness that one is doubting. From this indubitable proposition, viz., 'I think' how does Descartes come to the conclusion 'I exist'? What is the nature of the relation between *Cogito* and Sam? Descartes argues that *Cogito ergo Sum* is not a syllogistic inference of the form: Whatever thinks exists; I think; Therefore, I exist. Once *Cogito* occurs to the mind, he argues, it recognizes the truth of Sum "by a simple intuition" Cartesian scholars are divided among themselves as to the nature of the transition from *Cogito* to Sum. Bernard Williams argues that the relation in question is one of presupposition i.e., the truth of *Cogito* presupposes the truth of Sum. Hence it is an inference, though not of syllogistic form. This interpretation permits the


Principles of Philosophy, CSM I, 194-95.

\(^3\)Second Replies, CSM II, 100.

For Williams, *Cogito ergo sum* is an inference of the special form: "if p presupposes q and p is true, q must also be true. For since 'p presupposes q' means 'q must be true for p to be either true or false', it follows a
replacement of *Cogito* with any arbitrary verb say 'walk' (Umbuiare). Consequently, it could be argued *Ambalo ergo sum*. This does not fit well with the Cartesian scheme for he wants to come to *Sum* from an indubitable proposition. *Cogito* is such a proposition where as *ambulo* is not, since its negation is conceivable. Unlike Williams, Hintikka argues that *cogito ergo sum* is not an inference but a performance. "The function of the word *cogito* in Descartes' dictum", he says, "is to refer to the thought-act through which the existential self-verifiability of 'I exist' manifests itself". The relation of *Cogito* to *Sum* is similar to the relation of a process to its product. The truth of *I exist* is revealed to one only when one actively thinks just as illumination is present only when the source of light exists. The truth of *I exist* cannot be revealed by any arbitrary human activity like breathing, but only by thinking. An attempt to think one's own non-existence amounts to persuading oneself to the belief that one does not exist. Through each act of thought, including the thought of one's own non-existence, the truth of *Sum* is verified. The self, in coining to know its own existence does not become the object of thought. Rather its existence is revealed in the act of thought.

Since the thought-act reveals the self, Descartes characterises it as the thinking thing or *res cogitans* which is variously called by him 'mind' or 'soul'. According to him, the *res cogitans* is that which "doubts, understands, affirms, denies, is willing, is unwilling, and also imagines and has sensory perception". This list of the activities the thinking thing can perform shows that Descartes understands the word 'thought' in a very broad sense covering all cognitive acts. The various types of cognitive acts are for him different forms or modes of thought. Any one of them can be substituted for *Cogito* in the above argument as each of them

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fortiori that *q* must be true for *p* to be true; in other words, if *p* is true *q* is also true." The truth of my thinking, presupposes the truth of my existence. Bernard Williams, "The Certainty of the Cogito" in *Descartes: A Collection of Critical Essays*, ed. Willis Doney (London: Macmillan, 1968), 96.


6*Meditations*, CSM II, 19.
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can reveal the truth of Sum. Since by 'thought' Descartes means any
cognitive act, the existence of the thinking thing is same as the existence
of the knowing thing. The existence of the knowing subject is the
foundation stone for cognitive science. Descartes here proves only his own
existence as a knowing subject, and it may be objected that we cannot have
a science of an individual. So we must prove that there are other
individuals as well. Here we are concerned with the problem of other
minds. If there exists at least one mind, it is logically and even
empirically possible that there are other minds as well. Such a
possibility is sufficient for conceiving a science of the mind.

1.2.2 Nature of mind

Descartes uses the word 'thought' to signify the thought acts and to
refer to the substance where these acts inhere. In the former sense the
term applies to "everything which we are aware of as happening within us,
in so far as we are aware of it." So the acts of thought are synonymous
with acts of consciousness. The various acts of thought fall under the
common concept of consciousness. When Descartes says that thought is a
substance, he means only the common concept of consciousness.

According to Descartes, thought is the essence of mind. The essence
of a thing is defined as that which is necessary for its existence.\(^7\)
Descartes claims that he has clear and distinct perception or awareness
that he is a thinking thing and nothing other than thought belongs to his
nature. Since only what he is aware of is sufficient to enable him to
subsist with it alone, thought is his essence.\(^11\) In short, thought is the
necessary and sufficient condition for the existence of res cogitans.

Malcolm argues that in identifying thought as his essence Descartes

\(^7\)Principles, CSM I, 195.
\(^8\)Cf. Third Replies, CSM II, 124.

Descartes provides only a negative definition of essence: "if something
can exist without some attribute, then it seems to me that that attribute
is not included in its essence". Fourth Replies, CSM II, 155.
\(^10\)Meditations, CSM II, 54.

employs the following principle:

\[ x \text{ is my essence if it is the case that (a) if I am aware of } x, \text{ then (necessarily) I am aware of myself and (b) if I am aware of myself then (necessarily) I am aware of } x. \]

Malcolm illustrates how thought alone satisfies the above principle. Any act of thought for Descartes is identical with an act of consciousness. Consequently, if I am aware of anything, then I am thinking. In Malcolm's view, though Descartes does not explicitly maintain that whenever I think, I am aware of myself, he would be drawn to accept it partly because "the best support for his principle 'I think ergo I exist' is at the same time a support for the principle 'I think ergo I am aware that I exist'". So thought satisfies the condition (a) of the above principle. As any instance of awareness is an instance of thought on Descartes' broad use of 'thinking', thought satisfies the condition (b) as well.

However, Malcolm points out that the above principle is defective. Condition (a) is satisfied irrespective of the value of \( x \). \( x \) could be given the value of any arbitrary human activity and that activity, say, breathing, would pass for my essence. Hence condition (a) does not serve to eliminate any candidate for my essence. The satisfaction of (a) by thinking does not help me to identify thinking as my essence. On the other hand, condition (b) can be used to eliminate candidates for my essence. From the fact that I am aware of myself, it does not necessarily follow I am aware of breathing but it does follow that I am aware of thought. Hence only thinking pass for my essence. But Malcolm is of the opinion that even (b) cannot be employed to prove that thought is my essence. Here the problem lies with the value of \( myself \). Anything can be substituted for \( myself \) and the resultant proposition would always be true. That is, if I am aware of breathing, then necessarily I am aware of thought. This odd consequence is attributed by Malcolm to Descartes' broad use of the word

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13 Ibid., 319.
14 Ibid.
'thought' whereby thought cannot occur without our being aware of It,\textsuperscript{15}

In my opinion, Malcolm's formulation of the principle does not seem to reflect Descartes' intuition. The word 'thought' may be either the act of thought or the object of thought. Descartes uses it in the former sense. For him, any act of awareness is an act of thought. Malcolm, on the other hand, understands it as an object of thought. Descartes would not disagree on condition (a). This doctrine implies that if I am aware of breathing, then necessarily I am aware of myself. However, it does not follow from this that breathing is my essence, for the content of thoughts (what thoughts refer to) does not form my essence. To be faithful to Descartes, the condition (b) must be restated as 'if I am aware of myself, then I am thinking'. The sentence would remain true even if the value of \textit{myself} is replaced by \textit{breathing}. Since the variable \( x \) in the principle take the value of individual thought-contents which are the object of my thought, Descartes does not employ the principle to identify his essence, for Descartes uses the word 'thought' in its generic sense.

Descartes' broad use of 'thought' has certain implications for our discussions on cognition. The acts of thought, as we have noted, are acts of cognition. Since acts of thought are identified with acts of consciousness, it follows that cognitive acts are conscious acts. So for Descartes, one of the most important aspects of cognitive states and processes is their phenomenality. Our perception, understanding, judgment etc. can be defined and explained only in relation to consciousness. This is a theme that will recur in the thesis.

The mind or the \textit{res cogitans}, according to Descartes, is unextended and hence it is not possible to distinguish any parts within it. Yet, the mind is endowed with various faculties, such as sensory perception, understanding, willing etc. These faculties with their specific acts are distinct from one another. Hence there is a possibility that these various acts belong to different substances. And mind could be a system of parts or association of subminds. Descartes denies such a possibility for it is one and the same mind which wills, understands and has sensory perceptions.

\textsuperscript{15} Cf "Descartes' Proof that His Essence is Thinking", 332-33.
The thinking substance can be conceived without any specific reference to the faculties. I can conceive of myself as a thinking substance even if I am not endowed with the faculties of willing or sensory perception, provided I am able to perform some intellectual act or other. None of the faculties on the other hand, can be conceived apart from thought for each act of any of these faculties is an act of thought. Hence the faculties belong to the thinking substance alone.

If the faculties were considered substantially, mind would be a system of subminds each of which would be contributing to the totality of its thoughts. As Wagner notes, for Descartes, faculties are modes and no mode depends upon another mode for its existence. Descartes would not grant intersubstantial dependencies between modes. So mind is not analysable into subminds as Aristotle holds. If the mind understands or wills only if one of the subminds does, such dependency violates the Cartesian principle of the independence of distinct substances. So the subminds if there are any, can only be treated as modes in the Cartesian sense. Though the various faculties are distinct from one another, their distinction is not real but only modal. In other words, the various acts of willing, understanding and sensory perceptions are modes of the indivisible thinking substance.

Descartes grants the possibility that what we have so far called mind in fact falls under the concept of body, and that thought acts really belong to the body. This possibility drives him to the examination of the nature of body in its metaphysical aspect i.e., body in the most general sense of the term. The most general concept of body attained through a clear and distinct perception of the intellect is that it is an extended substance, a continuum with three dimensions of length, breadth and height. The extended substance cannot be conceived except as being divisible, hence, argues Descartes, it is divisible and having parts. As in the case

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11 Meditation, CSM II. 59.
18 Ibid., 22.
19 Cf. Ibid., 59.
of the mental substance, the extended substance too is known through its acts or modes which, according to Descartes, are shape, size, position, being in motion, being at rest etc. As the corporeal substance is divisible, it could be supposed that each of these different acts inheres in different subjects and there are substances corresponding to each of these acts or accidents. Through motion and shape, for example, can be understood apart from each other, they cannot be understood apart from local extension, for all these acts "fall under the common concept of extension". Consequently, each part of the corporeal substance will have its own shape, size, motion etc.

1.2.3 Mind-body distinction

The mind and body are diametrically opposite in nature; mind is the thinking thing, unextended and indivisible, body is extended and divisible. A consideration of the nature of the body and that of the mind reveals that they cannot be identical as they fall under different common concepts. There is nothing common between them as they do not possess any common acts. Descartes provides three arguments for the distinction between the mind and the body. The first one, known as the argument from doubt appears in part IV of the Discourse. The second argument viz., the divisibility argument occurs at two places: in the Synopsis and in Meditation VI. However, the third known as the separability argument is the most powerful and well-articulated, and is presented in the sixth Meditation. Since this is the most significant of all the arguments, we shall be concerned only with it in this section. Our point in discussing this argument is to show that Descartes' argument for the mind-body distinction needs to be understood as an argument for the logical possibility of their separate existence and not for the fact that they exist independent of each other.

The separability argument runs as follows:

First, I know that everything which I clearly and distinctly understand is capable of being created so as to correspond exactly with my understanding of it. Hence the fact that I can clearly and distinctly understand one thing apart from another is enough to make me certain that two things are distinct, since they are

\[20\text{Third Replies, CSM II, 124.}\]
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The premises of the argument are carefully chosen from the conclusions Descartes arrived in the previous Meditations. The second Meditation reveals the idea of clear and distinct perception of mind existing as a thinking unextended thing. In the fifth Meditation, he comes to the clear and distinct conception of body as non-thinking, extended substance. The third and the fourth Meditations too have their own contributions. The third proves the existence of an omnipotent God who is not a deceiver and the fourth, the validation of clear and distinct perception by God, for he is the author of such perception. There is an element of truth or reality in my clear and distinct perception, for it is free from conceptual contradictions. Though there may not be anything corresponding to my clear and distinct perception, a state of affairs corresponding to the clear and distinct perception can be actualized by the omnipotence of God. Viewed in this way, clear and distinct perception is developed as a modal principle. The proof for the existence of God and his argument for the validation of clear and distinct perception helped Descartes achieve this goal.

In the light of this discussion, it becomes obvious that the clear and distinct perception of a thing indicates its possible existence. So it is clear that the first sentence of the passage quoted above states the modal principle: whatever is clearly and distinctly perceived is logically possible. The subsequent sentence is a statement of the principle of distinction derived from it, viz., the possible existence of one thing

21Meditations, CSM II, 54.
apart from the other shows that they are distinct. Descartes has already proved the existence of a thinking being and since he has a clear and distinct perception of mind as a thinking, non-extended thing, it is possible that mind exists as a thinking non-extended thing. Similarly he has a clear and distinct idea of body as extended, which does not attribute thought to it. So, it is possible that body can exist as such apart from the mind. Mind-body dualism is inferred from the possibility of their separate existence.

The underlying idea behind the argument is that distinction and identity are contradictory notions. If $x$ is identical with $y$, then it is necessary that $x$ is identical with $y$. On the other hand, if $x$ and $y$ have different sets of properties, it follows that they are not identical, meaning they are distinct. This can be understood, if one invokes the Leibnizian notion that necessity is truth across all possible worlds. If mind is identical with body, then it is necessary that they are identical. Hence it must be true in all possible worlds where mind or body exists. The existence of a single possible world where either mind or body exists and functions independent of the other is sufficient to establish that they are distinct. The following passage clearly points out that Descartes makes use of the modal intuitions to prove mind-body dualism:

> the fact that we often see two things joined together does not license the inference that they are one and the same; but the fact that we sometimes observe one of them apart from the other entirely justifies the inference that they are different... For it is a conceptual contradiction to suppose that two things which we clearly perceive as different should become one and the same (that is intrinsically one and the same, as opposed to by combination); this is no less a contradiction than to suppose that two things which are in no way distinct should be separated.\footnote{Sixth Replies, CSM II, 299. Emphasis added.}

The modal intuitions are required for the proof of mind-body distinction because as a matter of fact we find the power of thinking only with corporeality.

Philosophers are not unanimous as to whether Descartes makes use of any modal principles. While Kripke argues that the separability argument
Is a modal argument\textsuperscript{23} E.M. Curley reacts with the sarcastic comment: "Modal logic here appears to take over the role of theology in Descartes' philosophy"\textsuperscript{24}. According to him Descartes would not accept this offer. However, it seems to me that Descartes is in fact ready to dispense with theology. The only premises of the argument, according to him, are that "the mind can be understood as a subsisting thing despite the fact that nothing belonging to the body is attributed to it, and that, conversely, the body can be understood as a subsisting thing despite the fact that nothing belonging to the mind is attributed to it". \textsuperscript{25} Descartes invokes God's existence and His validation of clear and distinct perception only to justify his thesis that clear and distinct perception is the criterion of possibility. Such a justification was demanded by his own method. In his opinion, the existence or the non-existence of God does not affect the truth of the judgment that mind and body are distinct. If modern analytic philosophers can take inconceivability as the sole criterion for the identification of logical possibilities, there is no reason why Descartes could not take clear and distinct perception as the basis of logical possibility.

Descartes' use of the premise drawn from the Second Meditation viz. I have a clear and distinct conception of mind as a thinking thing which does not attribute any extension to it, has been objected to on the grounds that it makes the separability argument, an argument from ignorance. For example, Arnauld objected that my clear and distinct perception of mind apart from the body does not imply that they are not necessarily connected just as the clear and distinct conception of the triangle as having the property of right-angledness without another, namely that the square of the hypotenuse is equal to the sum of the square of the other two sides, does not mean that the properties in question are not necessarily connected. This objection does not seem to stand against the separability argument.


\textsuperscript{24}Descartes Against the Skeptics, (Oxford: Basil Blackwell, 1978), 201.

\textsuperscript{25}Fourth Replies, CSM II, 159.

\textsuperscript{26}Fourth Objections, CSM II, 141-42.
because Descartes does not take clear and distinct perception psychologically. On the other hand, clear and distinct perception of a thing must be complete which makes it logical rather than psychological. As Wagner point out, the completeness of the clear and distinct perception of the thing F requires us to include in its concept all the modes of the thing, $f_i$ .... $f_n$ and of no other properties besides those of (a) transcendental properties, (b) negative properties, (c) modes of $f_i$ .... $f_n$ (d) logical consequences of properties included in (a) - (c). Such an interpretation of clear and distinct perception would rule out counter examples of the sort Arnauld raised. Hence the premise in question does not make the separability argument one from ignorance.

However, the requirement that the clear and distinct perception must be complete, presents its own problems. It is doubtful whether it is humanly possible to have clear and distinct perception of anything at all. Moreover, as Wagner points out, the inclusion of the concepts of modes of $f_i$ .... $f_n$ in the clear and distinct perception of the thing F restricts the application of modal principles to proving mind-body distinction only. It is so because only two substances are available to us. If Descartes tries to save the idea of clear and distinct perception by dropping the concepts of the modes of $f_i$ .... $f_n$ from it, it turns out that something can lack the properties we do not find essential to it. If the clear and distinct perception is subjective and arbitrary, there is no reason why God should validate it.

The message of the separability argument, it seems to me, is that the concept of mind and the concept of body are distinct. Such conceptual or logical distinction does not rule out that there could be an extended mind. The expression 'extended mind' of course is a conceptual contradiction in Descartes' framework. Though he does not use this expression, he more or less means it when he says that the mind is united with the whole of the

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27 First Replies, CSM II, 85-86.
29 Ibid., 514.
30 Ibid.
human body. Descartes' point seems to be that even if we find mind united with the extended substance, such a union must be taken as a contingent one, for mind could exist apart from extension and extension, apart from mind. By the expression 'real distinction', between thought and extension, Descartes means the logical possibility of their separate existence. So the distinction between mind and body does not entitle Descartes to deny that they can exist together. In other words, a conceptual distinction between two things does not forbid their empirical or contingent identity, just as table and wood which are conceptually distinct could be empirically identical. The empirical or contingent identity of mind and body, according to Descartes, does not mean that they are really identical.

The real import of Descartes' arguments in a number of passages is not a substantial distinction of the type he often speaks but rather the logical possibility of the separate existence of mind and body. In actuality thinking nature is found to exist combined or united with extension. The mind does not and perhaps cannot exist independent of body in the actual world. This perhaps is the meaning of his observation that the kind of power required for their separate existence does not affect the truth of the judgment that they are distinct. What is perhaps required for their separate existence is the omnipotence of God. In other words, God could create a world in which mind and body would exist and function independent of each other. That is, in a world where the laws of nature are different, mind could function independent of the body. But given the laws of nature binding on the actual world, mind cannot exist and function independent of the body. In other words, their separate existence is only a logical possibility and not a nomological one. The difficulty of the interaction between mind and body seems to be the result of Descartes' confusion between logical and nomological possibilities.

1.2.4 Mind-body unity

Descartes' arguments for dualism, we have been arguing, need to be understood only as supporting the conceptual distinction between mind and body. By conceptual distinction we mean the logical possibility of their separate existence. Descartes, of course, speaks of mind as a substance existing and functioning independently of the body. Yet there are passages
where he clearly maintains that the mind depends upon the body for its existence and cognitive functioning. The substantial distinction would not grant him such a dependence. In what follows we shall examine Descartes’ account of the union of mind and body which further strengthens our claim that the talk of real distinction amounts only to the logical possibility of their separate existence.

The mind is distinct from the body because the metaphysical concepts of mind and body exclude each other. In spite of the distinction, Descartes maintains that there is a particular body united with a particular mind. While speaking of the union of mind and body he uses the term ‘body’ in a specific sense meaning the structure and organisation of certain limbs. This, of course, is a special case of the body in the metaphysical sense. But the body that is united to the mind is not an extended substance *per se* but an extended substance with a specific structure and organisation.

In Descartes’ opinion, the union of mind with body is known from the awareness of bodily sensations like pain, hunger, thirst etc. which are nothing but confused modes of thought. It is assumed that thinking by its very nature is clear and distinct. Consequently, the confused modes of thought if any cannot arise in the mind in virtue of its being a thinking thing, but emerge because of its joining with something other than itself viz., the body. Thus for Descartes man is a composite entity consisting of mind and body. The composite entity exists as if it is one subject, hence they could be characterised as "one and the same". This unity is not the unity of nature but of composition. In the case of the former kind of unity, things united cannot be conceived independent of each other whereas in the case of unity of composition, they can be conceived apart from each other. Thus the basis for the distinction between mind and body is that each as a metaphysical concept is complete in itself and the two can be conceived independent of each other. Yet they can be considered as one and

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32 Comments on a Certain Broad Sheet. CSM I, 299.

the same; mind exists in a particular body with a certain specific structure and organisation, like a mode or a quality that inheres in a substance. In other words, though mind considered in itself is a complete thing (and hence a substance in Cartesian terms) it could be viewed as a quality inhering in the body when conceived in relation to the body.\(^{34}\)

The particular body joined to the mind, argues Descartes, is an automaton working in accordance with certain mechanical principles. This idea of body as a machine has rendered a reading of Cartesian dualism in line with Plato for whom body is the vehicle of the soul. Arnauld points out that within the Cartesian framework "man is merely a rational soul and body is merely a vehicle for the Soul - a view which gives rise to the definition of man as a 'Soul which makes use of body'\(^{35}\). The modern version of this objection is advanced by Gilbert Ryle who interprets dualism as the "dogma of the Ghost in the Machine.\(^{36}\) But Descartes would not approve of this understanding of dualism. For him, mind and body are joined together as if they were "intermingled" with each other. It is this intermingling which helps a person know the conditions of the body like pain, hunger etc., through confused modes of thought. As mind is very much affected by the conditions and activities of the body, the relation between mind and body is not similar to that between a sailor and a ship. Had it been so, pain, hunger, etc. would not have been known through confused modes of thought but through pure intellectual perception, just like a sailor who perceives the damage to the ship by sight\(^{37}\). Thus for Descartes, mind and body are mixed up or intermingled. This union according to him, is a "substantial union" which "does not prevent our having a clear and distinct concept of mind on its own, as a complete thing"\(^{38}\). This means that mind-body dualism does not imply that mind exists and functions independently of the body, but that the concept of mind is complete in

\(^{34}\)See Sixth Replies, CSM II, 297-98; Comments, CSM I. 299.

\(^{35}\)Fourth Objections, CSM II, 143.


\(^{37}\)Meditations, CSM II, 56.

\(^{38}\)Fourth Replies, CSM II, 160.
itself and that such a concept can be formed without any relation to the concept of body as a substance. In other words, the concept of body does not entail the concept of mind and *vice versa*.

The conceptual distinction between mind and body does not prevent Descartes from holding on to the view that the human mind depends upon the particular body united to it to perform many of its functions. As he notes:

> For even the mind depends so much on the temperament and disposition of the bodily organs that if it is possible to find some means of making men in general wiser, and more skillful than they have been up till now, I believe we must look for it in Medicine.\(^39\) That is to say, mind depends upon the bodily conditions and dispositions of the organs for its functioning. If the body is affected, the normal functioning of the mind too is affected. In his reply to Gassandi, he concedes that the mind does not work properly when it is in the body of an infant and that its actions are often slowed down by wine. However, he notes that as a thinking thing *per se* or in other words when the functions of the mind as such are considered, it is complete in itself and is not made more or less perfect by bodily conditions.\(^40\) That is, the concept of mind is neither enriched nor impoverished by our knowledge of the particular conditions of the body. Though mind and body are complete in themselves, they are incomplete concepts considered in relation to man.\(^41\) It is clear that for Descartes, man is neither body devoid of thought nor a disembodied mind but the union of both mind and body. A human limb, say a hand, considered in itself is complete. However, it is structurally and functionally dependent upon the concept of the human body. In a similar way, mind is functionally dependent upon the mind-body unit called man.

Descartes in a sense wants to suggest that though mind can be conceived as res *cogitans*, it depends upon the body united to it to carry out the operations of thought. In this context, it would be interesting to raise an important question. Can a disembodied mind if at all there is

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\(^{39}\) *Discourse on the Method*, CSM I, 143.

\(^{40}\) *Fifth Replies*, CSM II, 245.

\(^{41}\) *Fourth Replies*, CSM II. 157.
one, conduct the activities of thought? The line of thinking we have pursued so far suggests that Descartes' answer would be negative. In fact, Descartes clearly maintains that mind can think only with the help of body. In his reply to Arnauld, Descartes observes:

I do not doubt that the mind begins to think as soon as it is implanted in the body of an infant, that it is immediately aware of its thoughts, even though it does not remember, this afterwards because the impressions of these thoughts do not remain in the memory.  

For Descartes, the nature of mind is thought and it does not cease to think even for a moment. If the mind begins to think only when it is implanted in the body of an infant, it is doubtful whether mind has a disembodied existence. It is interesting to note that Descartes nowhere speaks of the pre-existence of mind. If it is true, then it is doubtful whether mind can exist and function in a disembodied state when it departs from the body. This means that a mind can exist and function only in a body. Descartes' talk of mind's being implanted in the body can be understood to mean that at a particular stage of the development of the human embryo, the mind emerges in the body.

There are, of course, a number of cognitive functions like memory, imagination, sensory perception etc. which the mind is unable to perform in isolation from the body. These cognitive acts are special modes of thinking or consciousness which depend upon the mind's union with the body. Take, for example, memory. It is natural to suppose as Gassandi did, that if it is the nature of mind that it always thinks, then it must have had thoughts while in the womb or during deep sleep. But no one remembers such thoughts.  

Descartes does not doubt the occurrence of thought at the embryonic stage of the human being's life and during deep sleep. He explains the failure of the humans to recollect such thoughts by appealing to physiological factors.

So long as the mind is joined to the body, then in order for it to remember the thoughts which it had in the past, it is necessary

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43 *Fifth Objections*, CSM II, 184.
for some traces of them to be imprinted on the brain; it is by turning to them, or applying itself to them, that the mind remembers. So is it really surprising if the brain of an infant or a man in deep sleep, is unsuited to receive these traces?\textsuperscript{44}

If memory traces in the brain are a necessary requirement for remembrance, remembrance cannot occur in a disembodied state. The same is true also of sensory perception and imagination. These functions are performed only because of certain physiological processes in the brain. Two cognitive functions which the mind performs without the aid of brain processes are pure understanding and volition.\textsuperscript{45} Cognition of mathematical propositions and understanding of mathematical or geometrical objects is an instance of pure intellection according to Descartes. But it is doubtful whether the contemplation of abstract ideas and mathematical propositions can be considered a case of cognition. Cognition or understanding takes place only when abstract universal ideas are applied on particulars. If at all there is a disembodied mind, it would not be able to attain any knowledge, for it would not be able to avail itself of any particulars to which universal forms of thinking can be applied. The most important function of will in Descartes' system is to affirm or deny the propositions presented by the intellect. In the absence of propositions about the world of particulars the faculty of will would be without employment. All these observations suggest that given Descartes' framework, no cognitive process can take place in a disembodied state.

In the light of our observation that Descartes cannot in principle grant a disembodied existence of individual minds, Descartes' thesis that the mind is united with the whole body assumes significance. Mind exercises its function mainly in a particular gland located in the middle of the brain. And from there "it radiates through the rest of the body" by means of the nervous system and other mechanical constituents of the body.\textsuperscript{46} The union of unextended, indivisible and incorporeal thought with extended divisible corporeal substance remains a stumbling block in understanding

\textsuperscript{44}Fifth Replies, CSM II, 247. See also Treatise on Man, CSM I. 105ff.
\textsuperscript{45}Meditations, CSM II, 51.
\textsuperscript{46}The Passions of the Soul, CSM I, 340-41.
Descartes. The problem was raised by Cassandi as follows. Suppose that the mind is united with the body at a point. This point is either a physical point or a mathematical point. If the mind is united with body at a physical point, it follows that the mind too is extended as a physical point is not without extension. On the other hand, if the point in question is a mathematical point, we cannot speak of a union of mind with body since the mathematical point is purely imaginary. Descartes does not give a satisfactory answer to Cassandi. However, he makes an attempt to resolve the problem in the Sixth Set of Replies where he compares mind to the power of 'gravity' or heaviness. Though heaviness is scattered throughout the body, it can exert its force at one part of it. Similarly mind can exert its power in a particular part of the brain and yet can be diffused all through the body. So for Descartes the mind is "co-extensive with the body — the whole mind in the whole body and the whole mind in any one of its parts". Heaviness of a body, it may be noted, does not exist independently of the body. Hence this analogy does not permit Descartes to say that mind exists and functions independently of the body.

Descartes conceives both mind and body as independent of each other. However, he argues that the mind is united to the whole body. The question is how the mind and the body which have nothing in common can be united. The root cause of the problem, in my opinion, lies in the equivocation of the word 'body'. Descartes uses it in two different senses. In the metaphysical sense, body is a corporeal substance, extended and divisible. Body per se is distinct from the mind by definition. Here body is taken in the most general sense of the term. Descartes uses the term also in a much more restricted sense, meaning particular body of a certain sort. Such particular bodies are identified and classified based upon their structure and organisation. The human body, for example, is one such type of body.

\[47\] Fifth Objections, CSM II, 235-36.

\[48\] Sixth Replies, CSM II, 298. As the measure of gravity or heaviness is not proportionate to the volume of the body in which it inheres, it, argues Descartes, could be concentrated to a mathematical point. He warns that there is no complete parallelism between heaviness and mind as the concepts like divisibility, and measurability are applicable to gravity but not to the mind.
When Descartes observes that the mind is united to the whole body, he uses the term 'body' to refer to the human body with its own characteristic function and organisation. Descartes clearly lays it down as follows:

And the soul is of such a nature that it has no relation to extension, or to the dimensions or to other properties of the matter of which the body is composed; It is related solely to the whole assemblage of the body's organs.\(^{49}\)

There is not much difficulty in understanding how the mind is united to the whole of the body if mind — to use an expression from the contemporary discussion on the mind-body relation — is realised by the assemblage (i.e., structure and organisation) of the body's organs. The immediate consequence of this view is that the dismantling of the organisation of the body's organs would lead to the disappearance of the mental properties from the material substance. In Descartes' words, the mind "becomes completely separate from the body when we break up the assemblage of the body's organs."\(^{50}\) The human body has the required structure and organisation for the functioning of the mind. Descartes is ready to concede to the Aristotelian Scholastics that mind may be considered as the form of man provided it is taken as the principle of thought.\(^{51}\) In other words, the mind realised by the functional organisation of the brain is not a passive state of brain but an active principle. But unfortunately, Descartes shrunk from developing the relation between the functional organisation of the brain and the mental states and processes. That is, he did not explore how mental processes result from the organisation of matter.

In the light of Descartes' account of the nature of mind and its relation to the body discussed so far, it seems that the mind-body relation may perhaps be better articulated by using the analogy of the computer. In the case of the computer a distinction is made between the program of the computer and its mechanical structure viz., the hardware. The computer like the human body is an automaton, with its own mechanical structure and

\(^{49}\)The Passions, CSM I, 339. Emphasis added.  
\(^{50}\)The Passions, 340.  
\(^{51}\)Fifth Replies, CSM II, 246.
organization. The term *program* refers to the sequence of instructions that controls the computational activity of the central processing unit of the computer. Though very inferior to the human mind in its capacities, and functions, the program almost seems to satisfy many of Descartes' defining characteristics of the human mind. It is the principle responsible for the thought (of course in a very limited and perhaps metaphorical sense) of the computer. The program cannot be conceived as a corporeal substance. It has no physical dimensions and hence is indivisible. The program developed for specific purposes may, however, have modules similar to different modes or faculties of the Cartesian mind. Each of the modules can be understood apart from the other modules but none of them can be understood apart from the program as a whole. In other words, a module always belongs to a particular program. Hence a program can be said to be *functionally* indivisible since each subunit of the program, with a specific purpose can be understood only in relation to the general purpose for which it is developed.\[^{52}\] The program depends upon a particular machine for its functioning. Yet it can be conceived independently of the machine on which it runs. That is to say, it has an independent existence of its own. Thus a program is a substance to use Descartes' vocabulary as it can exist on its own.\[^{53}\] The other observations made with reference to Descartes' concept of mind, are true of the program as well. Since the same program runs in different machines, it can be conceived independently of the particular machine on which it runs and hence it has an aspect of universality. The program does not function independently of the machine, but it starts functioning as soon as it loaded into the computer. The program is fed into the active memory of the computer; yet it is united to the whole of the computer. In addition to the central processing unit of the computer, it is related to the input as

\[^{52}\] Any functional unit *per se* including the human body according to Descartes is functionally indivisible: "For the body is a unity which is in a sense indivisible because of the arrangement of its organs, these being so related to one another that the removal of any one of them renders the whole body defective." The Passions, CSM I, 339.

\[^{53}\] For Descartes anything that exists or can exist on its own is a substance. In his replies to Mersenne Descartes identified substance on the basis of the possibility of its independent existence. In *Principles*, on the other hand, he seems to define substance as that which actually exists on its own. See *Fifth Replies*. CSM II, 159 and *Principles*. CSM I, 210.
well as to the output mechanisms. Moreover, the destruction of the structure and organisation of the machine implies that the program too ceases to function.

Despite the parallel between the program and the human mind, Descartes would not consider the mind to be similar to the program as the latter does not exhibit two important characteristics of the human mind, viz., consciousness and creativity. Our aim in the presentation of the parallel between the program and the mind is to emphasise the view that Descartes' considerations entail only a conceptual distinction between mind and body. The stuff of dualism for Descartes, as Bracken notes, is not the dualism of substances as we generally understand it, but the mere existence of an abstract level of explanation.\(^{54}\)

### 1.3 THEORY OF COGNITION

In the previous section, we have been trying to establish that Descartes' distinction between mind and body needs to be understood only as a conceptual distinction. This interpretation is very advantageous from the point of view of understanding the cognitive processes of the mind. It is possible to explain cognition without wrestling with the notorious problem of interaction: how two substances viz., *res cogitans* and *res extensa* which are diametrically opposite in nature causally interact with each other. As mind is united with or is realised by the structure and organisation of the bodily organs, mind seems to be "intermingled" with the body. Consequently, each of the cognitive states and processes have corresponding bodily states and processes; though Descartes occasionally maintains that there is a particular type of cognition viz., the pure understanding, which has no bodily correlate. If the mind cannot exist and function in a disembodied state as we noted in the previous section, it is doubtful if there could be any intellectual process without the corresponding brain process. Thus in each of the cognitive processes both the mind and the body are involved. In every act of sensory perception, for example, in addition to the senses, the intellect is also involved. So Descartes would not grant any pure sensation as the empiricists would postulate.

Descartes uses the term ‘perception’ in a wide sense covering cognitive acts like sensory perception and understanding. Knowledge arises not through sensation per se but through the scrutiny of the mind. As far as cognition is concerned, the activities of the body and the mind are involved. In what follows we shall discuss Descartes' theory of cognition in two stages. First we shall discuss his theory of perception. Here our emphasis will be on understanding the physiological processes involved in perception. A proper understanding of perception is not possible without a study of Descartes' doctrine of innate ideas. This will be dealt with in the second stage.

1.3.1 Theory of Perception

The most important of our cognitive processes is, no doubt, sense perception. As already noted, it involves both the senses and the intellect. Sensory perception can be seen as the continuation of physiological processes in the body, and in this sense there is no radical difference between the physical and the mental processes. Hence the entire cognitive process can be seen as a kind of mechanical process. Sense perception, according to Descartes, takes place in three grades or levels: the physiological processes, the sensations and the judgments consequent upon the sensations. At the first grade of perception, common to both brutes and humans, the sensory organs are stimulated by external objects and the impressions formed thereof reach the brain through the nerves. The impressions reaching the brain, consisting of certain movements, form the first grade of sensory response. This immediately leads to the second grade of sensory response produced in the mind as a result of its being united with the body. The second grade consists of the perceptions of pain, pleasure, colour, smell etc. or, in short, what Locke later called "secondary qualities". The third grade consists of the judgments about the objects in the external world. These judgments are occasioned by the movements of the bodily organs.\(^{55}\)

It is important to know how the first grade leads to the second viz., the perception of secondary qualities, since the second grade of sensory response, is for Descartes, a mental response. Since the mind is present

\(^{55}\)Cf. Sixth Replies, CSM II, 294-95.
in the brain and is united with it, the first grade of sensory response consisting of certain movements in the nerves directly "acts upon" the mind. These movements according to Descartes are ordained by nature so that mind may have these sensations whenever they occur. The various states of mind which are the immediate results of these movements are the sensory perceptions. Though there appears, in Descartes' account, to be a temporal gap between the first and second grades of sensory response, the first and second stages are in fact only conceptually distinct grades of the same processes. In other words, the mechanical movements of the nerve fibers in the brain forming the first grade of the sensory response simultaneously realise the second grade because of "the intermingling of mind and body". It accords with the standpoint we have adopted in the discussion of the mind-body problem: that the distinction between the two is conceptual, and not substantial. The secondary qualities the movements produce are obscure and confused, (There is no "intelligible resemblance" between the secondary qualities supposed to be in the objects and our sensations of these qualities.) These qualities which exist only in the mind of the perceiver refer to some entities or the other in his body or in the world. But the real nature of the things represented by these sensations cannot be known by an examination of them. Consequently, there is nothing resembling our ideas of colour, light, smell etc. in the objects we perceive. The secondary qualities, according to Descartes, refer to certain dispositions in the objects which depend upon the size, shape and motion of the parts of the object.

There are other qualities in objects like position, distance, size, shape, motion etc. Here again, for convenience's sake we shall use the Lockean expression "primary qualities" to characterise them. According to Descartes, the perception of primary qualities takes place differently from the way the knowledge of secondary qualities arises. The perception of the primary qualities is not strictly speaking caused by the movements in the brain. They are known, according to Descartes, in accordance with a sort of "rational calculation". As a result of being affected by the sensation

56Principles, CSM I, 280.
57Cf. Ibid., 216-17.
58Ibid., 285.
of colour one judges that the object located outside is coloured. The size, shape, distance etc. of the object is calculated "on the basis of the extension of the colour and its boundaries together with its position In relation to the parts of the brain,. . .". Similarly the changes occurring in the position of the limbs where nerves culminate are correlated with the slight changes in the position of the tiny part of the brain where nerves originate. It is on the basis of the various positions of the tiny part of the brain, that we come to know the position of an object relative to the body. The same explanation holds for the perception of the local motion of an object. The objects at various distances are perceived by adjusting the shape of the eyes. The changes in the shape of the eyes too are correlated with certain movements in the particular part of the brain which are "ordained by nature", so as to make the mind perceive distance. These various processes however, Descartes argues, take place without our awareness of them.

The perceptions of the primary qualities unlike these of secondary qualities are clear: "Our knowledge of what it is for the body to have a shape" for example, "is much clearer than our knowledge of what it is for it to be coloured". We do not know what there is in the objects corresponding to the secondary qualities. The primary qualities on the other hand, are found "to be actually or at least possibly present in objects in a way exactly corresponding to our sensory perception or understanding". In other words, primary qualities are presented to the mind "as things or modes of things existing (or at least capable of existing) outside thought, . . .".

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59 Sixth Replies, CSM II, 295. It is clear that for Descartes, the perception of colour is a basic requirement for the visual perception of primary qualities, for according to him, anything coloured is extended. Rules for the Direction of the Mind, CSM I, 40-41. But Descartes does not explain how we come to know the extension of colour and its boundaries. This is problematic because the notions of extension and boundary are necessary for us to have those of shape and size. We cannot discriminate part of the bodies we are looking at except in so far as they differ in colour. Optics, CSM I, 168.

60 Principles, CSM I, 218.

61 Ibid.

62 Ibid., 219.
The above account of the perception of primary and secondary qualities makes obvious the mechanistic character of the process of perception. There is an implicit suggestion that mind is a certain kind of machine, perhaps a calculating machine. The mechanistic model of perception Descartes had in mind becomes further explicit when he argues that for perceiving objects, the mind does not have to contemplate images transmitted by them to the brain. This is not acceptable for two reasons: First of all, it cannot be explained how images can be formed by the objects. Secondly, it is not possible to specify how the senses receive the images and transmit them to the brain. On the other hand, to have sensory perceptions, there must be certain movements in the brain which are said to stimulate the mind. These movements are the representations of the objects. These representations in the form of movements in the nerves cannot be identified with the perception of objects. Nor can these movements resemble the objects that cause them. The object and its representation resemble each other only in a pictorial representation. If the representations were pictorial, their perception by the mind would functioning like an eye within the brain. This model of perception would lead to infinite regress, since the images within the internal eye would require a further eye and so on \textit{ad infinitum}. Descartes rules out such a model of perception when he says:

\begin{quote}
... we must not think that it is by means of this resemblance that the picture causes our sensory perception of these objects - as if there were yet other eyes within our brain with which we could perceive it.\textsuperscript{63}
\end{quote}

The external object is represented in the brain in the form of certain movements of the nerves. These movements lead to the perception of the object because of mind's presence in the brain; or, in other words, mind is realised in the structure of the brain. In his account of the mechanical model of perception, Descartes emphasises the representational aspect and the computational character of perception. So he can be considered the forerunner of the computation-representation theory of mind.

The nature of the relation between the movements of the nerves and the corresponding perception is problematic. Descartes finds it difficult to

\textsuperscript{63}Optics, CSM I, 167.
characterize this relation as he almost interchangeably uses three different expressions to convey the idea: First, movements are *ordained* by nature such that whenever they occur, the corresponding perception takes place. Second, the perceptions are *occasioned* by the movements of the bodily organs. Third, they *cause* or produce the corresponding perception. A closer examination shows that there is a common idea running through all three of them, viz., that there is no temporal gap between the physiological processes and the corresponding perceptions. The movements of the nerves are ordained by nature such that at the very same moment of their occurrence, the corresponding perceptions are realised. Similarly, the movements of the nerves occasion the perceptions, only as long as the movements are present. That is, the occasion for the occurrence of an event cannot be temporally prior to it. However, the third view, viz., that movements in the brain cause or produce perception seems to conflict with the other two. The apparent conflict vanishes if it is understood in terms of the notion of causality Descartes devised in the first set of replies to prove the existence of God. Two senses of the notion of the efficient cause can be distinguished. In the first case, causes are prior to the effects in time, hence they are distinct entities existing in different discrete moments. In the second sense, on the other hand, something can be cause of itself where "the concept of a cause is, strictly speaking, applicable only for as long as the cause is producing its effect, and so it is not prior to it"\(^6^4\). In this case, we may note, there is no actual distinction between cause and effect but only a conceptual or a logical distinction. An understanding of the causation of perception in this latter sense of efficient causality fits well with Descartes' overall framework. This view categorically denies that anything material from the external world is carried over to the brain or to the mind. Moreover, this view of causation and the mind-body relation relieves us, as we noted above, of the burden of explaining the interaction between substances which are opposite in nature. Certain brain states or processes "act upon" the mind to produce a particular mental state, say pain, but the mental state in question is realised by the states and process in question. As this view makes room for the conceptual distinction between cause and effect,

\(^{64}\textit{First Replies}.\ CSM II, 78.
body and mind, brain states and mental states and so on, it would not allow reduction of the mental to the physical, as concepts would not yield to pressure of reduction.

1.3.2 Theory of Innateness

In the above discussion on Descartes’ account of perception, we noted that the ideas of external objects formed through the act of perception are not strictly speaking caused by external objects in the sense that something material passes over to the mind in pictorial form. In other words, the external objects do not imprint any images upon the mind. On the other hand, on the occasion of sensory stimulation the mind forms certain ideas. This perceptual model has driven Descartes to attribute a very rich innate content to the mind. In sharp contrast to the empiricist *tabula rasa* conception of mind, Descartes argues that some of the most basic ideas and general principles are implanted in the mind. They are a necessary requirement for the occurrence of cognitive acts like perception, understanding etc. Since no knowledge of the material world is possible without them, they are for Descartes, as Bracken puts it, the ontological foundation for the knowledge of the external world.65

Depending upon the manner in which ideas arise in the mind, they are classified into innate, adventitious and made up. In Meditations Descartes observes: "My understanding of what a thing is, what truth is, what thought is, seems to derive simply from my own nature. But my hearing a noise, as I do now, or seeing the Sun, or feeling the fire, comes from things which are located outside me, or so I have hitherto judged. Lastly, sirens, hippogriffs and the like are my own invention."66 The list of innate ideas viz., substance, truth and thought, given in the passage, is neither exhaustive nor very specific. A more specific and comprehensive list is enumerated elsewhere. They are ideas of independent thinking substance or God, created thinking substance, corporeal substance, duration, order, number, size (i.e., extension in length, breadth and depth), shape, position and motion.67 The list of innate ideas, it can be seen, fall into

65Bracken. Mind And Language. 3.
67Principles, CSM I, 208-211.
two classes: those having references and those not having them. We shall name the former referential innate ideas and the latter, non-referential innate ideas. The ideas of God, soul and corporeal substance belong to the former category. The ideas of size, shape, position, motion etc. can also be included in it, for these ideas refer to the various modes of the corporeal substance. The non-referential innate ideas are those of duration, order and number. They are just ways in which the external objects are conceived. For example, there is no existing thing corresponding to duration. Nor does duration belong to the material objects in the way shape belongs to them. It is just a mode under which a thing is conceived in so far as it continues to exist. Similarly, there is no order or number independent of things ordered or numbered.\textsuperscript{68} The same is true of other universals as well. They too are only psychologically real.

Besides the kinds of ideas cited above, some general principles or "common notions" are also native to the mind: \textit{Nothing comes from nothing; It is impossible for the same thing to be and not to be at the same time; What is done cannot be undone; He who thinks cannot but exist while he thinks;}\textsuperscript{69} \textit{If you add equals to equals, the result will be equal;}\textsuperscript{70} \textit{Things which are equal to a third thing are equal to each other.}\textsuperscript{71} The common notions too do not refer to any objects in the external world. Some of them have their employment in the construction of geometrical proofs. These principles or maxims are eternally true and any mistake with regard to them occurs due to mind's failure to attend to them all the time. In addition to these general maxims or principles, there are certain specific rules innate in the mind for the modification or manipulation of ideas, such as shape, size, motion etc., and the rules in accordance with which these three things (shapes, sizes and motions) can be modified by each other are, according to Descartes, "the Principles of Geometry and Mechanics"\textsuperscript{72}. Since the ideas of shape, size and motion, the foundational notions of geometry and mechanics, and the rules for their manipulation are

\textsuperscript{68}Cf.\textit{Principles}, CSM I, 211.  
\textsuperscript{69}Ibid., 209.  
\textsuperscript{70}Ibid., 197.  
\textsuperscript{71}Comments. CSM I, 304.  
\textsuperscript{72}\textit{Principles}. CSM I, 288.
innate, it could be said that all of our actual and possible knowledge of the material world is innate. By the successive application of this finite number of rules, these ideas can be modified by each other indefinitely. The result of each such modification either corresponds to or at least can correspond to the world of things. Thus once the basic notions and principles are known, the knowledge of the external world can in principle be deductively arrived at. Thus Descartes provides a deductive model of cognition as well. Just as the ideas of shape, size, and motion pertain to the material objects, the rules too in some sense relate to the external objects; for the modifications of these shapes, sizes and motions obey the rules or principles of geometry and mechanics.

There are two defining characteristics of innate ideas viz., their universality and their clarity and distinctness. The universality of innate ideas may be understood in two ways. First, they are available for use to all human beings provided there occurs the appropriate sensory experience to activate them. As Descartes writes to Mersenne "since all men have the same natural light, it seems that they all must have the same notions".73 Secondly, they are universal as against particular in the sense they can have infinitely many instantiations. For example, the concept of a triangle is a universal as it can be applied to all existing particular triangles. Hence innate ideas may be considered as "all those which represent true, immutable, and eternal essences"74. Innate ideas and common notions are clear and distinct. We have a very clear understanding of what shape, size, motion etc. mean and much of our knowledge of the external world is derived from them. The ideas conveyed to us by the senses are confused and obscure. Therefore, they "cannot serve to give us knowledge of anything outside ourselves, . . ."75


74Letter to Mersenne, 1641 in AT, 303. Quoted in Anthony Kenny "Descartes on Ideas", in Doney, ed., Descartes: A Collection of Critical Essays, 231. This passage is quite strange since Descartes does not accept the existence of universals. It contradicts his view that the universals are just modes of thinking. See Principles, CSM I, 212.

75Principles, CSM I, 288.
Innate ideas are not produced in us by the senses. If the ideas conveyed to us by the senses like heat, sound, colour, etc. do not refer to anything outside ourselves, they too must be innate. In the following passage Descartes seems to argue for the same. The ideas of pain, colours, sounds and the like must be all the more innate if, on the occasion of certain corporeal motions, our mind is to be capable of representing them to itself, for there is no similarity of these ideas and the corporeal motions. The passage seems to blur the distinction between innate and adventitious ideas. Kenny however, argues that the distinction can be maintained as follows:

Innate ideas are capacities whereas adventitious ideas refer to the exercise of the very same capacities accompanied with an extramental judgment: that is, it is judged that the occurrent idea is caused by the extramental object.

On Kenny's account no strict distinction can be maintained between innate and adventitious ideas. From one point of view all ideas are innate and from another all are adventitious. It does not seem that Descartes would agree with this view of the distinction between the innate and the adventitious. Irrespective of whether we think of a triangle followed by a judgment or not, the idea of a triangle is innate, since according to him all those ideas which involve no affirmation or negation are innate. This suggests that the distinction between the two can be retained in a different way altogether. Innate ideas are universal ideas whereas adventitious ideas are particular. We may note that the adventitious ideas listed in the above quoted passage from the Meditations viz., my hearing a noise, seeing the sun, and feeling the fire are all particular ideas. On the basis of the distinction between universal and particular, it is possible to understand what Descartes means when he says that the ideas of pain, colour, sound etc. are innate. As universal ideas or general concepts they are innate. On the other hand, particular instances of them

76Comments. CSM I, 304.
78Cf. AT III, 418. Quoted in Kenny, "Descartes on Ideas", 233.
79It must be noted that the perception of the particular is not possible without the universals.
are adventitious. As Kenny himself observes: "When Descartes says that the idea of truth is innate, he does not mean that one is born thinking of truth; and on the other hand, in saying that the idea of heat comes from the fire, he does not mean that the concept of heat is acquired by sensation".\(^8^0\) The difficulty, it seems, is the product of Descartes' persistent confusion between ideas of sensation and sensations proper.

Innate universal ideas are a necessary requirement for the cognition of the particular. A figure drawn on a piece of paper cannot be cognised as a triangle unless we are equipped with the universal concept of a triangle. Similarly to have the particular idea of the sun resulting from its perception, a number of innate universal concepts like those of shape, colour, motion, light, heat etc. are required. The innate ideas work as the basic components of one's knowledge of the external world. There could be an infinite number of ideas of particular things due to the permutations and combinations of the finite set of basic components. The permutations and combinations take place in the intellect on the occasion of the sensory stimulation. For Descartes perception and understanding are not two totally distinct acts as each act of perception involves understanding. In understanding, what is presented to the mind is analysed into its basic components. The sensations for example are presented with certain codes carrying information about the external world which are decoded with the help of innate ideas. In other words, the meaning of sensory data is the function of innate ideas and principles. Descartes says:

> It is surely obvious to everyone that strictly speaking, sight in itself, presents nothing but pictures, and hearing nothing but utterances and sounds. So everything over and above utterances and pictures which we think of as being signified by them is represented to us by means of ideas which come to us from no other source than our own faculty of thinking. Consequently, these ideas along with that faculty, are innate in us, …\(^8^1\)

So in cognition both the particular sensations evoked by the external objects and the universal ideas existing in the mind are involved. Since particular sensations are understood in terms of universal ideas innate to the mind, Descartes, like Plato, compares acts of cognition to acts of

\(^{80}\)"Descartes on Ideas," 231. Emphasis added.

\(^{81}\)Comments. CSM I, 305.
remembering. "And the truth of these matters is so open and so much in harmony with my nature, that on first discovering them [clear and distinct ideas], it seems that I am not so much learning something new as remembering what I know before, . . ." In short, since the knowledge of the external world is derived from innate basic components, we could in a sense say that all our knowledge is innate.

By the innateness of an idea, Descartes does not mean that one is conscious of it from birth. Nor does it mean that an innate idea can be brought to the consciousness at will. In his opinion, by the innateness of an idea "we simply mean that we have within ourselves the faculty of summoning up the idea". The innate ideas exist in us as certain capacities or powers. They are brought to consciousness under appropriate circumstances. Inward ideas do not refer to the acts of the mind but rather the acts of the mind require innate ideas and reveal their existence. Descartes makes it clear as follows:

But it must be noted that, although we are always actually aware of the acts or operations of our minds, we are not always aware of the mind's faculties or powers, except potentially. By this I mean that when we concentrate on employing one of our faculties, then immediately if the faculty in question resides in our mind, we become actually aware of it, and hence we may deny that it is in the mind if we are not capable of becoming aware of it.

That is, we become aware of innate ideas not through introspection but by the exercise of these ideas. They exist not actually but potentially in the faculty of thought. Here, Descartes seems to identify innate ideas with the faculty of thinking itself. This view is in fact endorsed in the following passage.

I have never written or taken the view that the mind requires innate ideas which are something distinct from its own faculty of thinking. I did, however, observe that there are certain thoughts within me which neither come to me from external objects nor were determined by my will, but which came solely from the power of thinking within me: So I applied the term 'innate' to the ideas or notions which are the forms of the thoughts in order to distinguish from others which I called 'adventitious' or 'made

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82 Meditation. CSM II, 44. Emphasis added.
83 Third Replies, CSM II, 132,
84 Fourth Replies. CSM II, 172.
up'. This is the same sense as that in which we say that generosity is 'innate' in certain families or that certain diseases such as gout or stones are innate in a certain others: it is not so much that the babies of such families suffer from these diseases in their mother's womb but simply that they are born with a certain 'faculty' or tendency to contract them.\(^{85}\)

This passage, according to Sullivan, can be construed as a retreat from the doctrine of innate ideas to "a reliance on the powers of reasoning itself to generate these ideas", that is to "a more generalised rationalist position". This, he argues, is "a major concession to the Aristotelians and a retreat from Platonism".\(^{86}\) However a change of position does not seem to be attributable to Descartes solely on the basis of this passage. Descartes' position is that it is due to the reality of innate ideas and principle that cognition is possible. This does not mean that innate ideas have an existence distinct from the faculty of thinking. There is no separate realm of innate ideas, a receptacle or container that houses them. On the other hand, it is these innate ideas and principles that constitute the faculty of thinking. As Descartes himself clarifies, he uses the expression 'innate ideas' to characterise those notions that form the basic structure or form of thought.

It is true that Descartes sometimes conceives of the thinking faculty as a sort of 'disposition' or 'tendency'. Since the thinking faculty is endowed with certain conceptual structures and forms, it has the capacity to bring to consciousness the clear and distinct universal ideas. So Descartes argues that they "always exist within us potentially, for to exist in some faculty is not to exist actually, but merely potentially, since the term 'faculty' denotes nothing but a potentiality".\(^{87}\) By the term innate ideas Descartes means not only the conceptual structures and thought forms of our thinking faculty, but also to the universal ideas resulting from the exercise of the thinking faculty.

By innateness Descartes means a potentiality, disposition or a tendency. These clarificatory expressions themselves have been used in two

\(^{85}\) Comments, CSM I, 303-304.


\(^{87}\) Comments, CSM I, 305.
different ways in the history of philosophy. Unless these two senses are identified and distinguished. Descartes' use of innateness could be easily misunderstood. Potentiality or disposition can be used in the sense of mere receptivity. For example, a piece of wood has the potentiality to have hacked out of itself statues of various personalities, depending upon the intentions of the sculptor. On this account there is an unlimited number of statues potentially present in a piece of wood. The empiricist philosophers, when they speak of the potentiality or disposition of the mind, understand it in the sense of mere receptivity. The dispositions of the mind are similar to the dispositions of a piece of wax to receive any impression no matter what in fashion, depending solely upon the nature of the seals that fall upon it. In other words, the content of the mind is determined solely by the objects in the environment no matter what their nature is.

There is an equally compelling theory of potentiality or disposition which construes it as a real power. For example, the potentiality of a mango seed to grow into a mango tree — the tree exists in the seed potentially. Environmental factors like the nature of the soil, water, the availability of sunlight and open space etc. do have some influence on the growth and development of the tree. But the effects of these factors are very limited in the sense that they do not seem to have much role in determining the nature of the tree. When the rationalist philosophers speak of the potentiality or disposition of the mind, they understand it as an active power. In spite of the influences of the sensory stimuli, the forms that mind could take is in a sense predetermined. In contrast to the tabula rasa conception of the mind, Leibniz argues that mind is like a veined marble with the figure of a statue implicit in it. The sense experience serves to reveal the innate structure of the mind just as chiseling reveals the figure within the marble. When Descartes says certain universal ideas and principles exist in the mind potentially, he means to say that they can be brought to consciousness because of the influence of sensory experience which triggers the conceptual structure already existing in the mind.

Descartes invokes the doctrine of innateness to explain the acquisition of knowledge and the universal availability of certain basic concepts. Their universality is not accounted for by arguing that they are abstracted from the sensory experience, for there are no sensory data that
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are universally available. Innate Ideas, we have seen, are universal, The sensation present only particulars which are confused. Hence the clear and distinct universal concepts, which are to be applied to the particular in order that there be cognition of the external world, must be innate to the mind. Though these universal ideas exist as potentialities, and hence are unconscious, they are defined in relation to consciousness. Though they do not actually exist in the consciousness they can come to consciousness. And in each cognitive act — which is for Descartes invariably a conscious act, the innate ideas are somehow present.

1.4 DESCARTES, COGNITIVE SCIENCE, AND CHOMSKYAN LINGUISTICS: A UNIFIED PERSPECTIVE

Descartes' philosophy of mind is not directly responsible for the development of the contemporary cognitive science. The latter, in fact, emerged from the sharp reaction to behaviourism. However, the view of mind that emerged out of this reaction has a very strong affinity and similarity with the Cartesian theory of mind and in this sense, Cartesianism is no doubt a distant philosophical pedigree of contemporary cognitive science. Three philosophically interesting foundational notions of cognitive science in its narrow sense are functionalism, formalism and internalism.88 I shall briefly state how each of these three doctrines that constitute the theoretical foundation of contemporary cognitive science resemble Cartesianism in its own ways.

Setting apart the pre-theoretic intuitions that make cognitive science possible, in the introduction we identified two each of substantive and methodological issues as forming the philosophical foundations of cognitive science. The substantive issues are the mind-body distinction and formalism, the doctrine that the mind is a computational representational device. Among the methodological assumptions are functionalism and internalism (methodological individualism).

In the above discussion of Descartes' philosophy of mind we have dealt with each of these issues. Descartes makes a very strong case for an understanding of mental states and processes independent of the body where

these functions are exercised. Similarly cognitivists, as a result of their commitment to the mind-body distinction, argue that the mental states and processes can be understood at a very abstract level independent of the kind of substances that realise them. Descartes also grants the existence of internal representations which can be modified in accordance with certain rules. These representations as well as their modifications are realised by the assemblage of the body's organs which is responsible for the acquisition of knowledge and for the production of behaviour. For the cognitive scientists, cognition is a formal process in the sense that executing structures and processes are causally efficacious only on account of their structural organisation as well as the form of internal representations.

According to functionalism conceived as a methodological strategy, cognition consists of a number of cognitive functions like vision, memory, understanding, language use etc., organised into a system and executed cooperatively by certain structures and processes. This is a version of Descartes’ theory that the mind has a number of faculties like imagination, memory, understanding, willing and sensory perception. By internalism the cognitivists mean that cognition is an internal process totally determined by a set of internal conditions. Cognition, they argue, is governed by or totally determined by a set of internally represented instructions or by program. Hence environment has very little influence on the cognitive processes. Descartes would readily agree with this view for he too believes that cognitive states and processes are, to a large extent, a function of the internal structures and conditions of the cogniser.

The above foundational assumptions of cognitive science taken together imply a computational representational theory of mind blending elements of mentalism and nativism. I do not intend to elaborate upon this theory of mind here as it will be dealt with in detail in the third chapter. My point here is that the modern cognitive enterprise can indeed be considered in line with Descartes’ attempt — he of course, was not successful — at naturalising mind within a mechanistic framework.

The growth and development of cognitive science has two very powerful influences. The first is the invention of computers and our attempt to understand human cognitive capacities and functions on their model. The second is the revolution brought about by Noam Chomsky in our study of the linguistic faculty. Here we are not concerned with the influence of the
computer revolution on cognitive science but with the impact of the Chomskyan revolution in understanding language use. This assumes importance in the context of our present discussion because of two significant claims made by Chomsky: first, that linguistics is a subfield of cognitive psychology; second, that the linguistics he develops is Cartesian in the true sense of the term. Chomsky shares with Descartes his commitment to innatism and the view that language is the medium of expressing one's thought.

According to Descartes, the bodily functions of both humans and beasts can be explained in purely physical and mechanical terms. The sole difference between humans and beasts is that the humans possess a thinking faculty whose existence is evidenced by creativity exhibited in human action and linguistic behaviour. Man can perform actions appropriate to the new situations and can construct grammatically correct, context sensitive sentences expressing new thoughts. Reason or the thinking faculty, for Descartes, is a universal instrument capable of responding in many different ways to different situations.\(^\text{89}\) Though Descartes succeeded in mechanically explaining many of the cognitive functions of the mind, he did not provide a mechanical explanation for human creativity. Chomsky's concerns in linguistics can be construed as an attempt to give an explanation of human creativity within a mechanistic model using Cartesian resources.

The Cartesian view on the creative use of language by humans, according to Chomsky, suggests that human languages are unlike animal communicative systems. Whereas the animal communicative systems have only a finite number of fixed responses under the control of certain stimuli, human languages are free from stimulus control. The utterance of new sentences is not predictable on the basis of the external stimuli. Hence, human languages do not serve merely a communicative function. They are, on the other hand, instruments for the free expression of new thoughts.\(^\text{90}\) As a linguist, Chomsky aims at the study of the mechanism responsible for the production of new grammatically correct sentences.

\(^{89}\)See *Discourse, CSM I*, 139-141.

In his endeavour to develop a linguistics that can explain the creative use of human language, Chomsky has been greatly influenced by the Cartesian School of Port Royal Grammarians. According to Humboldt, who belongs to this school, there is a finitely specifiable fixed mechanism which enables the speaker to produce infinitely many speech events. This generative principle, according to Humboldt, can be considered the "form of language". It consists of a finite set of transformation rules called the grammar of the language. The unlimited possibilities of thought and language are constrained by the rules of sentence formation. The existence of the generative principle or the organic form of the language, according to Humboldt and other Port Royal Grammarians, implies that there is a deep structure consisting of an arrangement of simple sentences which could be brought to consciousness with care and attention. The same generative principle is involved in speech perception as well. For the perception of speech, argues Humboldt, mind produces a representation of the presented expression, making use of the same generative principle. This means that both speech production and speech perception are creative acts of the mind requiring an internal representation of the semantic content. The underlying system of generative principles is virtually identified in both hearer and the speaker, which makes inter-personal communication possible. The fundamental identity of the generative system in various individuals is explained by appealing to the uniformity of human nature.

In Chomsky's opinion, Humboldt and others did not care to explicate the nature of the generative principle. They, no doubt, specified the universal aspects of the grammatical form that determined the class of all possible languages. However, there was no attempt to develop particular generative grammars that conform to the universal schema. The generative principle, argues Chomsky, must be understood as the concept of generative grammar. The speaker of the language knows the generative grammar of his language in the sense that he possesses a capacity or potentiality to use language grammatically. So the knowledge of grammar does not mean the actual employment of the grammatical rules. Like the Port Royal Grammarians Chomsky is committed to the view that there exists a deep structure responsible for the actual production of sentences. But unlike

them, he argues that the deep structure does not consist of sentences but of the abstract structure underlying various sentences of a language: The deep structure may be highly abstract; it may have no close point by point correlation to the phonetic realization”.92 The transformational rules are applied to these abstract underlying forms.93 The possession of deep structure enables the speaker to use language in concrete situations. On the basis of his concept of deep structure Chomsky makes a fundamental distinction between competence and performance. By 'competence' Chomsky means the speaker-learner's knowledge of his language and by 'performance', the actual use of language in concrete situations.94

In consonance with Descartes' theory of mind, Chomsky makes three interrelated claims about the deep structure and principles responsible for one's capacity to use language; they are for him, (a) innate, (b) universal, and (c) necessary. The innateness thesis is invoked to explain how the speaker-learner acquires the underlying deep structure responsible for the production and perception of the linguistic expressions. "By attributing such principles to the mind, as an innate property, it becomes possible to account for the quite obvious fact that the speaker of a language knows a great deal that he has not learned".95 That the knowledge of the grammar is an innate property of the human mind, according to Chomsky, does not mean that the speaker-learner is actually conscious of the grammatical rules. Unlike Descartes who tried to defend the existence of innate ideas in terms of our capacity to become conscious of them on their employment, Chomsky establishes the possession of the innate knowledge of the grammar just in terms of speaker-learner's capacity to use it. "Any interesting generative grammar" he argues, "will be dealing, for the most part, with mental processes that are far beyond the level of actual or even potential consciousness". 96 So the speaker-learner is not

93Cartesian Linguistics, 56. See also note no.106 in Ibid., 107.
95Cartesian Linguistics, 60.
conscious and perhaps could never become conscious of the innate grammatical structure.

For Chomsky the innateness thesis is an explanatory hypothesis. That is, the speaker-learner's ability in the use and acquisition of language is explained by attributing to him the knowledge of the rules of grammar. "... we postulate that a speaker of a language has an unconscious knowledge of the rules of grammar if this postulate is empirically justified by the role it plays in explaining the facts of use and understanding and acquisition of language."\(^\text{97}\) It is because of the innate linguistic categories and forms that a child is able to internalise the highly complex grammatical rules of his language within a very short span of time. This, however, does not rule out the role of external factors in the acquisition of particular grammars. In line with Descartes, Chomsky too argues that the external factors are required to set the innate mechanism to work. However, the form of the language acquired, is not determined by the external factors, but by the internal structure and organisation, for what is acquired on the basis of scattered and inadequate data has uniformities not determined by them. On the basis of relatively few and highly degenerate data, the child is able to come out with well-formed sentences as outputs. The gap between the input and output is explained by attributing a rich species-specific innate mechanism.

The language faculty for Chomsky is not just an input output system like the communicative systems of birds and animals. It has an initial state and in the course of development acquires a steady state, passing through various intermediary states. The performance of the linguistic faculty is fully determined by the initial state. Hence, state changes are mostly directed internally. However, the extraneous factors have their own impact upon the linguistic faculty. The state changes can occur as a result of the exposure to one or another language. Hence state changes reflect linguistic experience. So the "language faculty is modified in response to linguistic experience, changing states until it pretty much stabilises, perhaps as early as six to eight years old, which would mean that later (non-lexical) changes that have been found, up to about puberty,

are inner-directed”. So we may say that Chomsky advocates methodological individualism or internalism for the study of human linguistic faculty.

The universality of linguistic categories and forms innate to the mind explains the existence of linguistic universals, i.e., features common to all languages. The grammatical structures and principles common to all languages, according to Chomsky, can be considered as the universal grammar. He says:

The central doctrine of Cartesian linguistics is that the general features of grammatical structure are common to all languages and reflect certain fundamental properties of the mind. It is this assumption which led the philosophical grammarians to concentrate on *Grammaire Generale* rather than *Grammaire Particuliere*. There are then, certain language universals that set limits to the variety of human language. The study of universal conditions that prescribe the form of any human language is "grammaire generale".

Since the universal grammar is a fundamental property of the human mind, and since language learning as well as language use or production are basically mental acts, there cannot be any language which does not reflect the universal grammatical categories. The existence of the linguistic universals, according to Chomsky, must be traced to certain categories and forms of the mind.

This leads to the third of Chomsky's claims, namely, that the universal grammatical structures and categories are necessary. The necessity of the universal grammar can be understood in two different ways. First of all, the innate knowledge of universal grammatical principles is a pre-requisite or a necessary condition for language learning. The universal grammar is not learned. Rather, this is what makes learning of a language possible. "Such universal conditions are not learned; rather, they provide the organising principles that make language learning possible, that must exist if data is to lead to knowledge". Secondly, the universal grammatical categories are necessary in the sense that no particular language can exist or operate without them. It must be noted

99 *Cartesian Linguistics*, 59.
100 Ibid., 59-60.
that by the necessity of the universal grammatical principles. Chomsky does not mean that they are logical truths.

In the above, we have tried to rethink the significance of Descartes' theory of mind in the context of Chomsky's theory of language, for the latter's work is a kind of scientific exposition of Descartes' thesis. But Chomsky's claim that his theory of language is within the Cartesian framework has been challenged by many philosophers. According to David Cooper, for example, the three central notions viz., innateness, universality and necessity common to Chomsky and seventeenth century rationalists are employed by Chomsky in a way radically different from the rationalists' use. In his opinion, Chomsky interprets innateness as a sort of disposition but there are passages in Descartes and other rationalists which support the view that men literally and actually know truths and ideas prior to experience.\footnote{David E. Cooper, "Innateness - Old and New," \textit{Philosophical Review} 81 (1972): 469.} Necessity and universality are the marks of innateness both for older rationalists and for Chomsky. By the universality of innate knowledge, the older rationalists understand the knowledge of universal i.e., non-particular truths, concepts and principles whereas for Chomsky it is the knowledge which is universally and generally possessed.\footnote{Cf."Innateness - Old and New," 472.} Similarly, by necessity the old rationalists mean that which is not contingent. Chomsky, on the other hand, employs it in the sense of that which is \textit{required} or as a certain pre-supposition.\footnote{Cf, Ibid.. 474-75.}

If Cooper's observations are correct, Chomsky made a radical break from Descartes, and the similarities between them if any are merely superficial. However, our discussion of Descartes in the present chapter suggests that Chomsky's use of innateness, universality and necessity is in continuity with Descartes'. He only refines and reformulates the basic Cartesian tenets. With regard to innateness, it seems the problem lies with Cooper's understanding of the term. Cooper has in mind the contemporary empiricist/behaviourist conception of disposition and potentiality according to which there is no reality for the dispositions and capacities. The early rationalists, on the other hand, employ...
disposition in the sense of real power. Certain universal truths and ideas exist in the mind potentially but they can be brought to consciousness under the impact of appropriate experience. So the universal truths and ideas are psychologically real, though they may not be psychologically actual. Chomsky's views square with those of the early rationalists, since he too subscribes to a realist construal of the dispositions. Since the real power or potentiality is not defined by Chomsky with reference to consciousness, he in a sense breaks away from the Port Royal Grammarians. For him, the potentiality or disposition is defined with reference to the correct employment of the rules of grammar. The speaker of the language actually knows the rules of grammar when he employs them. The definition of innate knowledge with reference to consciousness gives the older rationalists the liberty to take the universal ideas and truths as something actual as well as potential. Since Chomsky defines innate knowledge of grammar in relation to the correct employment of the rules of grammar, the speakers of the language can be said actually to know the grammatical rules if and only if they correctly employ them. Chomsky inherits the older rationalists' realist construal of innateness. The real difference between the old and new rationalism is that the former defines the innate knowledge or potentiality with reference to consciousness while the latter does not. In this sense, Chomsky makes a break from the older rationalists including the Port Royal Grammarians. But the point of difference is not the dispositional construal of innateness as Cooper maintains.

Similarly it can be seen that Chomsky's use of the concepts 'universal' and 'necessity' are also rooted in Descartes. The non-particular truths do not picture any particular states of affairs. Similarly the universal concepts have several instantiations. It is true that the universal concepts and truths are available to all humans and hence they could be considered knowledge universally and generally possessed. But not all the universal truths and concepts have their application in each act of cognition. Chomsky's basic linguistic forms and categories are universal, for they exist in all human beings as a part of their common genetic endowment. These linguistic categories have several instances. So they can be considered universal even though they do not occur in all possible languages, for it could be said that the particular language is one of the several modes of cognition. With regard to the
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notion of necessity, it is true that older rationalists think of certain basic truths and propositions as necessary in the sense that they turn out to be true under all possible situations. However, Cooper fails to note that the older rationalists used the notion in the sense of 'empirically necessary' as well, for without these innate concepts no cognition is possible. So Cooper's observation that Cartesian and Chomskyan rationalisms are radically different doctrines fails to take note of all relevant aspects of the Cartesian school of thought.

Chomsky's enterprise is undoubtedly a continuation of Descartes' attempt to develop a scientific understanding of human cognitive processes. The Cartesian idea that mind is a unified system of a number of cognitive faculties is found in Chomsky. The mind", he argues "then, is not a system of general intelligence,. . . Rather, the mind has distinct subsystems, such as the language faculty, a cognitive system, a system of knowledge, not an input or output system".104 As a linguist he identifies only the language faculty for his scrutiny and analysis. To understand the linguistic competence of the language user, the formal program viz., the grammar used for computing the grammatically correct sentences also must be specified. Like any other cognitive process, language production and perception can be understood in terms of formal structures and rules where neither the meaning of the sentences nor their physical form is taken into account. This results in the conception that the mind is a computational representational system. "For unknown reasons", argues Chomsky "the human mind/brain developed the faculty of language, a computational representational system based on digital computation with recursive enumeration and many other properties"105. It is the internal representation of the generative procedure that provides a scientific explanation for human creativity in cognition. Linguistic creativity in particular is the result of the internal representation of the particular grammar that specifies the structure of the language. This enterprise is truly Cartesian, since we find in Descartes the seeds of the formal view of mind


105 Ibid., 50.
as a computational representational system. Chomsky's contribution in understanding Descartes' philosophy of mind is that he read the Cartesian problematic as truly scientific.

1.5 CONCLUSION

So far we have been trying to understand Descartes' intuitions on the working of the mind as a step towards a scientific study. Such a study for him is not reductionistic as is apparent in our discussion on the dualism of mind and body. Most of the cognitive functions and processes are explained with reference to brain states and processes. Nevertheless man is a combination of body and mind. Since the working of the body can be mechanically explained, it means that man is a rational machine. As a latter day Cartesian, La Mettrie, observes: "Since all the functions of the soul depend to such a degree on the proper organisation of the brain and the whole body, that they are apparently the organisation itself, the soul is clearly an enlightened machine". Descartes did not clearly lay this down, the idea does emanate from his own doctrines. It must be remembered here that while pointing towards the possibility of explaining cognition as a sort of mechanical calculation, he also equally emphasised the phenomenal aspects of cognition. All cognitive states and processes are for him conscious mental states and acts or they could at least be brought to consciousness. This is a point to which we will come back again and again in the succeeding chapters as contemporary cognitive science pays scant


107 Chomsky attributes the view that the mind is realised in the mechanical structure and organisation of the brain to La Mettrie. However, he fails to note that this view is implicit in Descartes, and many of his passages can be interpreted in this way as we have attempted above. Cottingham seems to realise this when he observes: "Descartes' position is thus quite clear. His reflection on our uniquely human ability to respond to "all contingencies of life", led him to believe that the 'universal instrument' of reason could not feasibly be realised in a purely physical set of structures; but the possibility of such a physical realisation is one that, good scientist that he is, he is not prepared absolutely to rule out*. John Cottingham, "Cartesian dualism: theology, metaphysics and science," 249.
attention to the phenomenality of the mental states. His insistence on the phenomenal aspects of cognition concealed Descartes' scientific temperament in the study of mind. This led to a reading of mind where mind is understood as a homunculus — a little man controlling the body while residing within the brain. Most contemporary reactions to Descartes are from this angle. Since these reactions played a significant role in the emergence of cognitive science, we shall deal with them in the next chapter.